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NOTES ON LATIN INSCRIPTIONS FOUND IN BRITAIN.

PART III.

BY THE REV. JOHN McCAUL, LL.D.,
PRESIDENT OF UNIVERSITY COLLEGE, TORONTO.

Read before the Canadian Institute, 26th March, 1859.

8. The following inscription is on a sarcophagus, or stone coffin, which was found at York several years ago and is now preserved in the Museum of the Yorkshire Philosophical Society :

MEI...AL· THEODORI
ANI..OMEN· VIXIT· ANN
XXX·V· M·VI· EMI· THEO·
DO·A· MATER· E· C·

In removing it when found, it was unfortunately broken, and the inscription is consequently imperfect. The fracture extends between I and A in the first line, I and O in the second, X and V in the third, and O and A in the fourth.

Mr. Wellbeloved (*Eburacum*, p. 110,) remarks :

“The difficulty is confined to two words. The first word no doubt, when perfect, was MEMORIAL for MEMORIALE, but the author has not met with that

word in any other inscription. If L, which is undoubtedly the present reading, be an error for E, the difficulty is removed. EMI in the third line presents the next difficulty; it might, though unusual, be a contraction for EMERITI; but that would be very strangely introduced, after the mention of the age, and without any notice of the legion to which Theodorianus had belonged. OMEN was most probably NOMEN, and that the abridged form of NOMENTANI.

Dr. Thurnham (*Crania Britannica, Decade 1.*) observes :

"The principal difficulty is confined to two words; the first of the inscription, and the EMI in the third line. It seems most probable that both these are *prænomina*, the first that of Theodorianus, the other of Theodora; though what these names have been it is perhaps not possible to say." * * * The inscription is probably to be thus read: Diis Manibus [conjectured to have been on the *operculum* or lid, which has not been preserved] Mei...al. Theodoriani Nomentani vivit annis xxxiv, mensibus vi. Emi. Theodora mater efficiendum curavit." * * * "Altogether the external evidence is in favour of the remains found in this coffin being those of a Roman citizen and soldier, a native of Italy, and of the ancient Latin territory in the immediate neighbourhood of Rome itself."

There is no doubt that the only difficulties in the inscription are from M to L in the first line, and EMI in the third. Mr. Wellbeloved's conjecture of NOMENT is confirmed, as far as the last letter is concerned, by "an accurate rubbing," procured by Dr. Thurnham, "which shows distinctly the ligulate letter T in the word OMENT." It also seems to me evident that Mr. Wellbeloved's readings, MEMORIAL and EMERITI, must be at once rejected, and for the reasons which he himself states. Nor can I concur with Dr. Thurnham in the view which he has taken of the external evidence being in favour of the remains being those of a Roman citizen and soldier. The absence of the usual notice of the legion or cohort seems to suggest the presumption, that Theodorianus had not been a soldier.

I am inclined to read from M to L thus: MEM· C· VAL; *i. e.* Memoria Caii Valerii. MEM may stand for either MEMORIA or MEMORIÆ; if for the former, I regard it as meaning "The monument;" if for the latter, "To the memory." I prefer the first interpretation, which is confirmed by the words MEMORIAM· POSSVIT (*sic*) on another stone coffin also found at York. The abbreviation MEM· may be justified by the inscription given by Gruter, 894, 2, and the construction in the nominative by that given by Marcelli, cc.

As to EMI, I regard it as the perfect tense of the verb *emo*, *i. e.* as meaning, "I Theodora his mother bought." It is scarcely necessary to

point out to any one familiar with Latin sepulchral epigraphy the frequency of such a notice of the mode in which the sepulchre was obtained. Fabretti, p. 153, gives many examples of such purchases. Nor is the use of the first person rare. *Vide* Fabretti, pp. 236 and 252. The only doubt which remains is as to the meaning of E· C. Various interpretations may be proposed, such as *ei carissimo, ejus carissima, ejus causa, ex communi*, scil. sumptu, or according to the received interpretation of these *notæ* on other stones, *erigendam* (i. e. *memoriam*) *curavi*, for such sarcophagi stood above ground.

According to my views, the whole inscription may be read thus:—*Memoria Caii Valerii Theodoriani Nomento. Vixit annos (or annis) xxxiv, menses (or mensibus) vi. Emi Theodora mater [et] erigendam curavi.*

I have no grounds for the selection of *Caii* as the prænomen; it is wholly conjectural. If there had been room for the *Nomen gentilicium* and the *Nomen patris*, I should have supplied G or P before AL, thus taking it for either GAL· or PAL·, the abbreviations of the Galerian or Palatine tribes. After *emi* I understand *locum* as is usual, (or *memoriam*,) and supply *et*, the omission of which is not rare.

9. In the year 1726 an altar was found at Corbridge, in Northumberland, which bore the following inscription, as given in the Appendix to Gordon's *Iter Septentrionale*, and in Horsley's *Britannia Romana*, Northumberland, n. cviii. :

LEG· A.....
 Q· CALPVRNIVS
 CONCESSINI
 VS· PRAEF· EQ
 CAESA· CORI
 ONOTOTAR
 VM· MANV PR
 AESENTISSIMI
 NVMINIS DEL VS.

The altar and inscription are imperfect, as a portion of the stone has been broken off at the top. Horsley supplies the deficiency in the first line with VG· PR· PR·, and reads the whole thus:—“*Legato Augustali proprætoræ, Quintus Calpurnius Concessinius Præfectus*

equitum Cæsariensium Corionototarum manu præsentissimi numinis dei votum solvit."

The chief difficulty in the inscription is in the words CAESA-CORIONOTOTARVM. The author of the letter in Gordon's Appendix thinks that we have here a new body of horse, called *equites Cæsarienses* (or *Cæsariani*) *Corionototæ*. The latter designation he supposes to be "a corruption of the Roman name of a people in these parts, perhaps *Curia* or *Coria Otadenorum*, and that *Corbridge* was the place." Horsley rejects this explanation, and proposes three other names, of which the word in the text may have been a corruption: *Coritani*, a people of one of the *Provinciae Cæsarienses*; *Coriotiotar* in the anonymous *Ravennas*: and *Crotoniatæ*, which last he seems to have preferred. As to the explanation of the rest of the inscription, he adopts the view, that *præsentissimum numen Dei* signifies the Emperor, and that *manu* intimates that *Q. Calpurnius* was advanced to his post by the immediate hand of the Emperor, supposed to be *Commodus* or *Caracalla*.

The first doubt which presents itself as to the correctness of this interpretation, arises from the terms *equites Cæsarienses*. So far as I am aware, (and I have made a diligent search on the subject,) there is no example of any *equites* having been denominated *Cæsarienses*. As to the reference, which is made in Gordon's Appendix to Gruter, p. 445, it proves nothing to the point, for in that inscription there is no mention of *equites*. Nor is the well known form *equites singulares Cæsaris* applicable here.

Another doubt is suggested by the meaning given to *manu præsentissimi numinis dei*, as here too I have been unable to find any authority for the interpretation, "the immediate hand of the Emperor."

Under such circumstances I am inclined to regard *Cæsa* as the participle of *cædo*, and agreeing with *manu*, which I interpret as *band* or *body*. Of the suggestions relative to *Corionototarum*, I prefer that which considers it as a corruption of *Coriotiotar*. As to *præsentissimi numinis dei*, I understand the phrase as referring to the god to whom the altar was dedicated, and whose name, along with that of the legate, doubtless appeared on that part of the stone which has been broken off. In construction, *numinis* is governed by *cultor* understood: an ellipsis, which is confirmed by an inscription found in Portugal, and given by Gruter and Orelli:

DEO ENDOVELICO
 PRAESTANTISS
 IMI ET PRAESEN
 TISSIMI NVMINIS
 SEXTVS COCCEIVS
 CRATERVS HONOR
 INVS EQVES ROMA
 NVS EX VOTO.

De Wal also gives this inscription in his *Mythologiæ Septentrionalis Monumenta* (p. 73), and in his interpretation correctly supplies *cultor* after *numinis*.

I read the inscription thus: Legato Augusti Proprætore, Q. Calpurnius Concessinius, Præfectus Equitum, cæsa Corionototarum manu, præsentissimi numinis dei [cultor] votum solvit.

According to this view, the circumstances under which the altar was erected were these:—Calpurnius Concessinius before going into action with a band of Coriototares vowed to some god, that, if successful, he would erect an altar to him. Having cut them to pieces he performed his vow in grateful acknowledgment of the aid of that deity, who had manifested on this occasion his characteristic of giving most timely and effectual assistance. The only objection which I see to the interpretation which I propose arises from the use of *præfectus equitum*, without giving the designation of those *equites*. To this it may, I think, be replied, that the *equites* engaged in this action were so well known at the time, that it was unnecessary to specify them; or that on the part of the altar which was broken off there may have been some notice that sufficiently indicated them; or that the force may have been composed of different parties, all of whom could not be stated, and hence it was considered better to omit all than to name some; or, finally, that we have other examples of this omission.

If my interpretation be correct this stone possesses unique interest, as the inscription is, so far as I am aware, the only one extant which records an engagement between the Romans and the Britons.

10. In Horsley's *Britannia Romana*, Northumberland, ix. a, we find the following copy of an inscription on a stone found at Benwell, the ancient Condercum:—

VICTORIAE
 .. GG AIFE
 NSSENECIO
 N COS FELIX
 ALAIASTO

...M PRA.

Horsley reads it thus : *Victoriæ Augustorum nostrorum fecit nepos Sosii Senecionis consulis Felix alæ primæ Astorum præfectus.*

There can, I think, be no doubt that this reading should be at once rejected. It is plain that the names in the second and third lines after AVGG are ALFENVVS SENECIO ; and the only real difficulty in the inscription is the initial letter or letters of the fourth line before COS. To me it seems most probable that we should read instead of N either VC or V alone. In a mural tablet found at Risingham, as given by Bruce, (*Roman Wall*, p. 287,) and Surridge, (*Notices, &c.*, Pl. III.,) we find the words ALFENI SENECI[O]NIS VOCOS, which, with *Henzen, n. 6701, I would read, as here, VC COS i. e. *vir clarissimus consularis.*

Alfenus Senecio was *legatus Augusti* in Britain under Severus and Caracalla, the two *Augusti* noticed in the Benwell inscription. He is mentioned also on two other stones found at Greta Bridge and Brough.

As the Risingham tablet gives the 3rd Consulship of Severus and the 2nd of Caracalla as the date of its erection, it may be inferred that Senecio was in the island at some time between 205 and 207 A. D.

From an inscription found at Naples, and given by Gruter, p. 208, Orelli, n. 4405, and Mommsen, n. 2646, it also appears that he was Sub-Prefect of the fleet at Misenum.

Horsley offers a suggestion as to tracing ASTORVM to *Asta* in Liguria, not to the Astures, a people of Spain. There can be no reasonable doubt, however, that the latter are intended. In Bruce's *Roman Wall*, p. 110, we have an inscription on a stone found at the same place, Benwell, which is decisive on the point :

* There are other difficulties in this inscription, on which, however, I do not feel competent to offer an opinion, as the only copies, which I have seen of it, are the above mentioned; and of these Bruce's is on too small a scale for distinctness, whilst Surridge's accuracy seems very doubtful. Indeed, if his copies of inscriptions be no more reliable than his interpretations, they are worse than useless. Henzen (as above cited) gives a restoration of the whole inscription with but partial success.

MATRIBVS CAMPEST
ET GENIO ALAE PR HISPANO
RVM ASTVI. M. &

As to the grammatical construction of the inscription, which forms the subject of this article, I supply *jussit* after COS, and *curavit* after PRAEF. i. e. Senecio jussit, Felix curavit.

11. In the year 1812, a *tabula honestæ missionis* was dug up at Malpas, in Cheshire. It is given by Lysons (*Reliq. Brit. Rom.*, i., p. iv.); and also by Wright (*The Celt, the Roman, and the Saxon*, p. 362), who supplies an English translation. The inscription ends with the words:—

* * * * * DVMTAXAT · SINGVLĪ · SIN
GVLAS · A D XIII K · FEBR
M · LABERIO MAXIMO II
Q GLITIO ATILIO AGRICOLA II CO
ALAE · I · PANNONIORVM · TAMPIANAE · CVI · PRAEEST
C · VALERIVS CELSVS · DECVRIONI
REVRRO SEVERI · F · HISPAN
DESCRIPTVM · ET · RECOGNITVM · &c. &c.

Of these, Mr. Wright gives the following translation: "That is to say, each with each. On the 13th kalends of February. To M. Laberius Maximus twice and Q. Glitius Atilius Agricola twice consuls, to the first ala of the Pannonians, termed the Tampian, which is commanded by C. Valerius Celsus, to the decurion Reburus, son of Severus, the Spaniard. Copied and revised," &c.

In this translation there are some serious errors, which it seems important to point out as the work, in which they are found, is justly regarded as a very useful and able compendium of British Archæology. The meaning of the words *dumtaxat singuli singulas*, is not expressed by "each with each." The sense is, "provided they have but one each." Martini (*Diss. super Claud.*) explains this as prohibiting their having more than one wife at the same time; but Spangenberg (*Tab. Neg.*, p. 520) regards it as a limitation of the privilege to one marriage; and, in confirmation of this view, refers to two *tabulae*, in which *primæ* is expressed. Again, the words *M. Laberio Maximo II. Q. Glitio Agricola II. Co.* should not have

been translated as if they were in the dative case. The expression is the ordinary form in the ablative. Nor are *alæ primæ Tampianæ* in the dative. They are in the genitive after *decurioni*.

Reburrus, the son of Severus, a Spaniard, a decurio of the first ala of Pannonians termed the Tampian, is specially named, as one of those to whom the privileges of *civitas* and *connubium* were given, because this revised copy belonged to him, and was made for his use. The original at Rome gave the names of all those to whom the privileges had been ceded; in each copy made for an individual, only his name was given, with occasionally the addition of the names of his wife and children. The seven names (omitted in my extract), with which the inscription ends, are those of the witnesses who attested the truth of the copy. On this subject, *vide* Marini (*Att. de Frat. Arv.*, ii. p. 433); Platzmann (*Juris Romani Testimoniis*) Morcelli (*de Stil.*, ii. p. 309); Borghesi (*Actt. Acad. pont. Archæol.* x. p. 131); Cardinali (*Diplomi Imperiali*); and Henzen (*Rhein Jahrb.*, xiii. p. 98.)

FORMATION OF ICEBERGS AND TRANSPORTATION OF BOULDERS BY ICE.

BY JOHN RAE, M.D.

Read before the Canadian Institute, 29th January, 1859.

Having spent seven summers and two winters on the Arctic coast of America, although I did not particularly devote my attention to the phenomena connected with ice, I could not fail to notice some of the more remarkable aspects peculiar to such latitudes, especially as regards its formation into icebergs, and its power as an agent in carrying boulders and large masses of rock from one locality to another. Some notes of the results of such observations, slight as they are, may possibly be of interest to the members of the Canadian Institute, as embracing conclusions arrived at on the spot. In thus treating of these subjects, I may be repeating observations already set forth by others. If so, I must plead as an excuse, my ignorance of the fact, and my readiness to give way to any prior claims, if such be brought forward by their originators.

In the formation of icebergs such as I have to describe, a rocky or precipitous coast, with deep water close to the shore are requisite, and the precipices should run in a direction at right angles, or nearly so, to the prevailing winds, the face of the rocks being turned away from the direction of the wind.

During winter, in the Arctic regions, nearly all the gales of wind are from N. and N.W. These gales are very frequent, and either accompany or immediately follow every fall of snow, so that where there are precipices having a southern or eastern aspect, large drifts of snow are formed under their lee. If the water is deep, as it generally is, at the foot of these cliffs, the weight of snow forces the ice on which it rests down into the water, submerging with it the superincumbent snow, and all this submerged snow becomes frozen into a solid mass of ice. Every gale adds a fresh stratum of snow, so that in spring there may be a snow-drift more than one hundred feet in depth;* which, under such circumstances as I have described above, is from the same process of submergence and solidification. The process of submergence, however, has its limits, and above this the snow-drift goes on accumulating, in like manner with every succeeding gale. When the summer comes, the surface of these drift-banks is thawed, and the water filters through the snow underneath, which, being of a much lower temperature than 32° , causes the whole to freeze, in like manner, into a solid mass of ice.

A large portion of this ice, which once was snow, if the summer has not been a peculiarly mild one, remains until the following winter, when a fresh deposit takes place, and thus from year to year one accumulation succeeds another until the whole height from the base to the top of the cliff is filled up. This extends in a sloping direction (getting gradually thinner,) out to the sea, reaching to a greater or less distance according to the height of the cliff and other favouring circumstances. From time to time pieces break off from this accumulated mass of solid ice, and when the water is deep enough they are floated away in the form of icebergs. Frequently the ice separates from the cliff itself, and occasionally tears away large pieces of the rock along with it. Of this fact I saw some striking examples, whilst sailing in a ship through Hudson's Straits, on my way to England, in the autumn of 1854. We were close to the north coast of the Strait, which is very precipitous, and I could distinctly see large icebergs aground near

* I have seen a snow-drift of more than twenty feet deep formed in one night.

the shore, having on one side indentations and projections corresponding to the irregularities in the face of the precipice from which they had become detached.

The whole of the north shore of Hudson's Strait, which lies between lat. 61° and 64° north, and lon. 65° to 75° west, being lofty and precipitous, is well adapted for the formation of bergs; they are consequently very numerous, in some cases of very large extent, and more than one hundred feet high. In addition to these huge bergs, strong gales of wind and currents, acting separately or in concert, frequently force floes of ice one over the other, to the height of fifty or sixty feet. The whole freezes together and forms a kind of spurious iceberg, which is easily distinguished from the true one by its jagged and irregular form.

In Hudson's Bay there are few or no icebergs deserving the name, because there are no high rocks possessing the peculiarities requisite for their formation. For the same reason there are none to be seen along the northern shore of America, from Point Barrow in lon. 156° eastward, to Backs River, in lon. 96° . Neither are there any icebergs in Regents Inlet or Victoria Strait.

According to Dr. Kane's account, as given at page 149, vol. ii. of the narrative of his last voyage, the icebergs in Smith's Sound are formed in a very different manner from that which I have described, nor is there any reason why both descriptions, although differing, should not be essentially correct. Dr. Kane, when speaking of Humboldt's Glacier, says: "The enormous masses of the great Glacier are propelled, step by step and year by year, until reaching water capable of supporting them they are floated off to be lost in the temperature of other regions."

The great changes and difference in the forms and color of icebergs arise from the turning over of these floating islands. The ice wastes faster under water than it does with air, and the iceberg becoming top heavy changes its position until its equilibrium is restored.

When at Repulse Bay in the spring of 1847, I was somewhat surprised to observe that as the sea ice wasted away by the combined effects of thaw and evaporation, boulders of from three to four feet in diameter appeared on the surface of the ice, at such a distance from the land as entirely to preclude the idea that they had rolled thither from the low flat shore in the neighbourhood. These boulders were

certainly not on the ice in the autumn, and as the sea in the bay had frozen over perfectly smoothly, there was only one way in which I could rationally account for these large stones getting so placed. By observation in the same locality in 1853—4, I fully satisfied myself as to the correctness of the theory which I now mention.

The shores at Repulse Bay are in many places flat and shelving, and are thickly strewn with boulders of various sizes. The rise and fall of the tide is from six to eight feet, so that there is a considerable extent of beach exposed at low water. In the latter part of September when the sea begins to freeze, the ice settles down with the ebb and in many cases rests upon the boulders, by which either holes are broken through the ice corresponding to the boulders on which it rests, or it is raised up in the form of a cone over where the stone lies. As the ice acquires thickness a cavity is formed of the shape of the upper part of the boulder, to which after a time the boulder adheres with sufficient tenacity to raise it from its bed. After this the whole process is simple. As the tide ebbs and flows, the boulder rises and falls with the ice, and as the latter thickens it becomes completely embedded in it. The ice in the locality where my observations were made, in the month of April had attained a thickness of more than eight feet. For a month or so after this, the thickness remains the same, as the evaporation from the surface is about equal to the additional freezing underneath. The thaw in May and June goes on so rapidly that by the first week in July, the boulders, which in the previous autumn had been below the ice, are now above it, supported on ice four feet or more thick, and solid enough to be drifted by winds and currents hundreds of miles before becoming too much wasted to carry its load.

Pieces of rock much larger in size than those I have described may be carried very great distances when they are attached to icebergs, either by falling from or being torn out of the precipices where the icebergs are formed; and such transported blocks are doubtless strewed all along the bed of the Atlantic, in the course over which the icebergs float into more southern latitudes, until, melting in the gulf stream, they drop the huge masses of rock, torn from the cliffs of Greenland and the Arctic coasts, thousands of miles apart from the parent cliff from which they have thus been severed.

ON THE FORMATION OF MAGNESIAN LIMESTONES.

BY T. STERRY HUNT,
OF THE GEOLOGICAL SURVEY OF CANADA.

At a meeting of the Canadian Institute, held on April 10th, 1858, Professor Chapman produced, and deposited with the Institute, a sealed packet containing a notice of certain investigations and demonstrative experiments then in progress, by Mr. T. Sterry Hunt, of the Canadian Geological Survey. Mr. Hunt's investigations having now been sufficiently advanced to admit of the publication of his views, the sealed packet has been opened, by his directions, and is herewith appended to the communication, which sets forth the special views he claims to have adopted at the annexed date.—ED. *Can. Jour.*

NOTE ON THE ORIGIN OF DOLOMITES.—BY T. STERRY HUNT.

The results of a long series of investigations and experiments relative to the formation of dolomites or magnesian limestones, have led me to reject the idea of their metamorphic origin from the alteration of limestones in the manner generally understood. I conceive that dolomites have been formed in sea basins, from which the soluble salts of lime have been completely separated, as sulphate or as carbonate by the agency of alkaline carbonates, which afterwards give rise to carbonate of magnesia. This carbonate appears capable, under certain conditions, of slowly combining with carbonate of lime, and forming with it a double carbonate, which is dolomite.

The experiments required for the complete demonstration of this theory are as yet unfinished, but I wish by this note to take priority in the solution of a difficult and hitherto unresolved problem in Chemical Geology.

Montreal, March 30, 1858.

The mode in which magnesian limestones occur, often interstratified with beds of pure carbonate of lime, has induced some recent observers to reject the notion which supposes dolomite to have been formed by the alteration of beds of limestone, whether by magnesian vapours, as supposed by Von Buch, or by the intervention of magnesian solution, as conjectured by Haidinger and Von Morlot.

The observations of Coquand and Delaouë have led them to conclude that dolomites have, in many cases at least, been formed by the precipitation of carbonate of magnesia mingled with carbonate of lime. It was, however, still necessary to the solution of the problem of the origin of dolomites to show, first, the conditions under which carbonate of magnesia could be found and deposited; and, secondly, how it could be made to unite chemically with carbonate of lime to form the double salt dolomite.

In the Report of the *Geological Survey of Canada*, for 1857 (see also *Am. Jour. of Science* (2), vol. xxxvi. 110), I have shown two processes by which sediments of magnesian carbonate may be formed. First, by the action of solutions of bicarbonate of soda on basins of sea-water, which precipitate all the lime as carbonate, and then give rise to a soluble bicarbonate of magnesia; and, secondly, the action of bicarbonate of lime on solutions containing sulphate of magnesia. I have found that the presence of this salt greatly increases the solubility of bicarbonate of lime in water—bicarbonate of magnesia and sulphate of lime being formed by double decomposition. By adding alcohol to such a solution, or by evaporating it at a gentle heat, gypsum is deposited, leaving the more soluble bicarbonate of magnesia in solution.

In the same way, alcohol separates gypsum from a mixed solution of bicarbonate of lime and sulphate of soda—an alkaline bicarbonate remaining dissolved.

The subsequent evaporation in shallow lakes, or basins, of solutions of bicarbonate of magnesia, formed by either of the above mentioned processes, must give rise to deposits of hydrated carbonate of magnesia more frequently mingled with carbonate of lime, supplied by springs containing either bicarbonate of lime or chloride of calcium. The hydrated carbonate of magnesia, at 160° C. (and perhaps at a lower temperature), under pressure to prevent the loss of carbonic acid, is converted into magnesite or anhydrous carbonate of magnesia; but if carbonate of lime be present, the two combine to form a double carbonate, which is dolomite, and may be separated from intermixed carbonate of lime by the action of dilute acetic acid, at 32° F., which readily dissolves the latter, but attacks the dolomite more slowly.

I have found this union of the two carbonates to take place alike in the presence of earthy and alkaline chlorides, sulphates, and car-

bonates, at temperatures between 130° and 200° centigrade. A portion of the magnesia is always, under these conditions, converted into magnesite, and may be partially separated from the dolomite, by taking advantage of the fact that it is less soluble in acetic acid at the temperature of 60° F. than the double carbonate. In nature, the combination must take place at the lowest possible temperature, and one which is probably insufficient to produce the insoluble magnesite. This, when once found, I have shown to have no tendency to unite with carbonate of lime.

The application of these observations to the various conditions in which dolomites and magnesites are met with in nature, and especially to their association with gypsum and anhydrite, is evident. The details of my experiments will appear in the Report of the Geological Survey for 1858,

Montreal, 25th April 1859.

REVIEWS.

Wanderings of an Artist among the Indians of North America, from Canada to Vancouver's Island and Oregon, through the Hudson's Bay Company's Territory and back again. By Paul Kane. London: Longmans, 1859.

It has been long familiar to Canadians that we had among ourselves one who, in search of the materials for his art as a painter, had explored the great North-West, and brought back with him many graphic records and curious reminiscences of Indian life. The pages of our own Journal have been repeatedly enriched from his notes of travel, and we hail with cordial welcome the issue of the full narrative of his wanderings in so tasteful and creditable a form. With somewhat of the stoical taciturnity of his Indian friends, our author has been in no hurry to invite the public to share in his strange and stirring adventures. He began his wanderings some fourteen years ago, in the summer of 1845, and returned to Toronto in 1848; so that he has brooded over these notes of his far wanderings for more than the Horatian term, while working out his pencillings into more complete and enduring forms. We are glad, however, to have good

proof in the completed volume, that no part of this interval has been spent in book-making; but, on the contrary, that we have here the notes of the observant traveller in all their freshness and original piquancy. And it would be difficult to conceive of one better fitted to travel for us in a strange wild land, among the savage children of its forests and prairies, than an artist, with sketch-book and note-book in one. An observant eye he must have, a keen appreciation of every striking minutiae of detail, and a discriminating perception of all that is most characteristic in the strange locality and its stranger occupants; but along with this it is rare to find the painter gifted with any power of the pen. He will open out to you all the felicitous pencillings of his sketch-book, and all the rich coloring of his portfolio, but his art goes no farther; and with the dumb eloquence of his canvas must the student be satisfied. Here, however, without any ambitious attempt at literary workmanship, we have a spirit-stirring journal of adventures and strange perils encountered among the Indians of the North-West, for the purpose of preserving, by means of the pencil, some permanent record of races already changing, and destined ere long to pass away.

The term of fourteen years is no very long period, yet it is a strange proof of the contrast which that wild North-West presents to our eastern clearings, that such an interval could be allowed to pass between our author's observations and their publication, without any change in the tenses of his verbs being needful. His own experiences in his native Canadian Village, as referred to in his preface, sufficiently illustrate this. Among its primitive log-houses and temporary frame-buildings on the banks of Ontario, he had passed his boyhood, familiar with the Indians, who still found their game among the water-fowl of the Bay, or in the thickets of the surrounding forest, and were then rather attracted than scared, by the diminutive clearings of the earlier colonists. But the same energy which at a later period sustained our Canadian artist in his perilous adventures among the tribes of the far West, led him in earlier years to visit Europe for the facilities it afforded in the study of his profession as a painter. With funds, exceedingly moderate in amount, but all amassed by his own sturdy toil, he passed months of profitable study amid the teachings of Rome's immortal treasury of art; and, if we mistake not, has, pencil in hand, had a peep at some nooks in each of the four quarters of the globe. But his Canadian village did not

stand still, meanwhile, as the scenes of his western wanderings have seemed to do. "On my return to Canada," says he, "from the continent of Europe, where I had passed nearly four years in studying my profession as a painter, I determined to devote whatever talents and proficiency I possessed to the painting of a series of pictures illustrative of the North American Indians and scenery. The subject was one in which I felt a deep interest in my boyhood. I had been accustomed to see hundreds of Indians about my native village, then Little York, muddy and dirty, just struggling into existence, now the City of Toronto, bursting forth in all its energy and commercial strength. But the face of the red man is now no longer seen. All traces of his footsteps are fast being obliterated from his once favourite haunts, and those who would see the Aborigines of this country in their original state, or seek to study their native manners and customs, must travel far through the pathless forest to find them." Travel far, accordingly, he did, and the long interval since his return has been spent in completing a series of paintings in oil, including portraits of chiefs, warriors, and celebrated medicine men, as well as of Indian beauties; pictures of dances, hunts, and other characteristic scenes illustrative of Indian life, along with landscapes depicting the strange scenery of the unexplored West. Some of the illustrations given in the present volume, such as the Chimney Rock, present its striking geological features, others cannot fail to interest the ethnologist, and this the accompanying narrative tends to increase.

The portrait of Mancemuckt, for example, the Chief of the Skene tribe on the Columbia River, is full of ethnic character, and no less so is that of Ogemawwah-Chack, "The Spirit Chief," an Esquimaux from the Hudson's Bay, who, according to received opinion, was 110 years old at the time his portrait was taken: and Mr. Kane adds, "The events which he related as having witnessed seemed to warrant the belief. He had an only son, whom I often met, quite elderly in appearance. The mother of this boy had died very shortly after his birth, and there being no woman giving suck near at the time, the father, to soothe the cries of the starving infant, placed the child's mouth to his own breast, and finding that the child derived some benefit from it, he continued the practice for some days, and, strange to say, milk flowed from his nipples, and he brought up the child without the assistance of any woman."

Dr. Livingstone, it will be remembered, declares such nursing of orphan infants by a male white wet-nurse to be a well recognized practise in some of the African localities he explored; and the confirmation of so singular a physiological novelty among the Arctic Esquimaux would be of no slight value. As, however, old Ogemawah Chack's nursling had long since achieved his weaning before Paul Kane received his assurance of the fact, the most we can assume is, that the Esquimaux have faith in such means of encountering one of the most puzzling trials of a solitary widower.

Among the landscape illustrations of the volume is the wood cut of "Chimney Rock," as strange an illustration of the freaks of Nature in some of her wilder geological escapades as is often to be met with. and accompanying it is the following legend, which will furnish a fair example of the pleasant manner in which the author's pen and pencil sketches are combined :

"As we approached the place where the Walla Walla debouches into the Columbia River, we came in sight of two extraordinary rocks projecting from a high steep cone or mound about 700 feet above the level of the river. These are called by the Voyageurs the Chimney Rocks, and, from their being visible from a great distance, they are very serviceable as land marks.

"The Walla Walla Indians call these the "Rocks of the Ki-use Girls," of which they relate the following legend, which was told me by an Indian whilst I was sketching this extraordinary scene. It must be borne in mind that all Indian tribes select some animal to which they attribute supernatural, or, in the language of the country, *medicine* powers: the whale, for instance, on the north-west coast; the Kee-yea, or war-eagle, on the east side of the Rocky Mountains, supposed to be the maker of thunder; and the wolf on the Columbia River. Now the great Medicine Wolf of the Columbia River, according to the Walla-Walla tradition, the most cunning and artful of all manitous, having heard that a great medicine grasshopper was desolating the whole country which of right belonged to himself, and was especially under his protection, immediately resolved to trace him out and have a personal encounter with him. With this view, he proceeded down the banks of the river, and soon fell in with the object of his search. Each of these formidable manitous thought it best to resort to stratagem to overcome his opponent. Being afraid of each other's "medicine" powers, they accordingly commenced by exchanging civilities, and then, with a view of terrifying each other, began boasting of their wonderful exploits, and the number they had killed and eaten. The grasshopper said to the wolf that the best way to ascertain who had devoured the largest numbers would be to vomit up the contents of their respective stomachs. The grasshopper, in the violence of his exertions, naturally closed his eyes, and the wolf, perceiving this, adroitly drew a great part of his opponent's share over to his own side without being detected. The grasshopper, when he perceived how much larger the pile before the wolf was than his own, gave up

the contest, and proposed to the wolf an exchange of shirts in token of amity and forgiveness. To this also the wolf consented, but requested the grasshopper to take off his shirt first as he was the first proposer; but the grasshopper refused, and wished the wolf to commence the ceremony.

"The wolf finally agreed to this, and striking himself suddenly on the breast, his shirt immediately flew off. The grasshopper was greatly astonished, and not being possessed of any charm by which he could strip himself so expeditiously, was obliged to take off his shirt in the common way of drawing it over his head; the wolf now watched his opportunity, and while the grasshopper had his head and arms entangled in the shirt, he killed him.

"The wolf having thus got rid of his troublesome and dangerous rival, commenced his return home. On arriving within a few miles of the Walla-Walla he saw three beautiful Ki-use girls, with whom he fell desperately in love. They were engaged in carrying stones into the river, in order to make an artificial cascade or rapid, to catch the salmon in leaping over it. The wolf secretly watched their operations through the day, and repaired at night to the dam and entirely destroyed their work. This he repeated for three successive evenings. On the fourth morning he saw the girls sitting weeping on the bank, and accosted them, inquiring what was the matter; they told him they were starving, as they could get no fish for want of a dam. He then proposed to erect a dam for them, if they would consent to become his wives, to which they consented sooner than perish from the want of food. A long point of stones running nearly across the river is to this day attributed to the magic of the wolf-lover.

"For a long time he lived happily with the three sisters,—a custom very frequent among Indians, who marry as many sisters in a family as they can, and assign as a reason that sisters will naturally agree together better than strangers,—but at length the wolf became jealous of his wives, and by his supernatural power changed two of them into the two basalt pillars, on the south side of the river, and then changed himself into a large rock, somewhat similar to them, on the north side, so that he might watch them for ever afterwards. I asked the narrator what had become of the third sister. Says he, 'Did you not observe a cavern as you came up?' I said I had. 'That,' he replied, 'is all that remains of her!'

Accompanying the portrait of Kee-akee-ka-saa-ka-wow, is a highly interesting account of the artist's interview with this distinguished warrior, the head Chief of the Crees: who robed himself in his most magnificent costume, and uncovered one of his Medicine pipe-stems, in order to have his portrait taken with full effect. Mr. Kane's ordinary mode of treating his Indian sitters, however, left them little opportunity of getting themselves up for the occasion. "Usually," says he, "when I wished to take the likeness of an Indian I walked into the lodge, sat down, and commenced without speaking, as an Indian under these circumstances will generally pretend not to notice. If they did not like what I was doing they would get up and walk

away; but if I asked them to sit they most frequently refused, supposing that it would have some injurious effect upon themselves."

The incidents connected with some of Mr. Kane's attempts to secure a "sitting," furnish curious and amusing illustrations of Indian manners, and along with other portions of his lively and spirited narrative, open up exceedingly picturesque glimpses of Indian life. But before noticing one or two of them, let us follow him on the way to one of his pictorial experiences. Proceeding to Vancouver's Island on one occasion, he thus describes the navigation of an arm of the Pacific under native pilotage:—

"At 8 o'clock, A. M., we embarked and proceeded to make a traverse of thirty-two miles in an open sea. When we had been out for about a couple of hours the wind increased to a perfect gale, and blowing against an ebb tide caused a heavy swell. We were obliged to keep one man constantly bailing to prevent our being swamped. The Indians on board now commenced one of their wild chants, which increased to a perfect yell whenever a wave larger than the rest approached; this was accompanied with blowing and spitting against the wind as if they were in angry contention with the evil spirit of the storm. It was altogether a scene of the most wild and intense excitement; the mountainous waves roaming round our little canoe as if to engulf us every moment, the wind howling over our heads, and the yelling Indians, made it actually terrific. I was surprised at the dexterity with which they managed the canoe, all putting out their paddles on the windward side whenever a wave broke, thus breaking its force and guiding the spray over our heads to the other side of the boat.

"It was with the greatest anxiety that I watched each coming wave as it came thundering down, and I must confess that I felt considerable fear as to the event. However, we arrived safely at Fort Victoria, at 2 P. M., without further damage than what we suffered from intense fatigue, as might be expected from eleven hours' hard work, thoroughly soaked, and without food. One of the Indians told me he had no fear during the storm, except on my account, as his brethren could easily reach the shore by swimming, even should the distance have been ten miles."

Once safely ashore, our artist-traveller employs himself busily on Indian portraiture. While taking the likeness of one Indian he unceremoniously ejects all others, and among the rest one is summarily turned out of doors who struck him only as being of a very plain and unprepossessing appearance. Half an hour after he learns that he has abruptly ordered out of doors Yellow-cum, the head chief of the Macaws, a warrior feared and detested by his enemies the Clallum Indians, and whose fame had led Mr. Kane to project a journey of sixty miles to see him. Yellow-cum proved placable, on receiving the explanations and flatteries of the courtly painter and

Medicine-man, addressed to his high mightiness ; but, at the same time, he stated that his pride had been wounded, and he had felt extremely mortified at being treated so before so many Indians. Yellow-cum accompanied the artist to his temporary study, and while he was making a sketch, gave him a recital of much of his private history, some of the notes of which are of special interest. Much of Mr. Kane's success depended on the universal reputation he acquired as a Great Medicine-man from the practice of his art, and the mysterious ideas associated with his life-like portraits, which were regarded as sources of influence for good or evil over the originals, if not indeed a part of themselves. This superstitious estimate of his art manifested itself in various ways. On one occasion he tells us :

“ I visited the lodges of the Eus-a-nich Indians. The chief was very rich, and had eight wives with him. I made him understand, by showing him some sketches, that I wished to take his likeness. This was, however, opposed so violently by his ladies, that I was glad to escape out of reach of their tongues, as they were all chattering together, while he sat like a grand Turk, evidently flattered by the interest they showed for his welfare. A few days after I met the chief some distance from his camp and alone, when he willingly consented to let me take his likeness upon my giving him a piece of tobacco.”

Again he tells us of his success in securing the portrait of Shawstun, the head chief of the Sinahomas, who attracted his attention first by his pre-eminent ugliness. “ He inquired very earnestly,” he adds, “ if my sketching him would not involve the risk of his dying ; and after I had finished the sketch, and given him a piece of tobacco, he held it up for some moments and said it was a small recompense for risking his life. He followed me afterwards for two or three days, begging of me to destroy the picture ; and at last, to get rid of him, I made a rough copy of it, which I tore up in his presence, pretending it was the original.” Repeatedly Mr. Kane was indebted for his safety to the superstitious fears which his paintings excited ; and in one case, when an Indian had pursued him for some days and occasioned him great annoyance, he effectually subdued him by the mere threat of taking his likeness. During his stay among the Cowlitz Indians, a tribe of Flat-heads, Mr. Kane painted Caw-wacham, a woman of the tribe, with her child under the process of having its head flattened, and the picture forms one of the most curious illustrations of the present volume. But he adds, “ It was with some

difficulty that I persuaded her to sit, as she seemed apprehensive that it would be injurious to her. At a later date he tells us :

“I again crossed Prairie de Bute, and arrived at my old friend Kiscox, the Chief of the Clalum's, Lodge; but, to my astonishment, I found him and his family unusually distant in their manners, and the children even running away from me and hiding. At last he asked if I had not taken the likeness of a woman when last among them. I said that I had, and mentioned her name, Caw-wacham, A dead silence ensued, nor could I get the slightest answer to my inquiries. Upon leaving the lodge I met a half-breed, who told me that Caw-wacham was dead, and that I was supposed to be the cause of her death. The silence was occasioned by my having mentioned a dead person's name, which is considered disrespectful to the deceased, and unlucky. I immediately procured a canoe, and started for Fort Vancouver, down the river, paddling all night, well knowing the danger that would result from my meeting with any of her relations.”

The descriptions and drawings of Indian customs, games, and dances, and of remarkable local scenery, are no less interesting ; but for these we must refer the reader to the book itself. There is only one of the illustrations—that of the Cree Half-breed, which forms the frontispiece,—which we cannot commend. The original painting, with which we are familiar, presents an exceedingly interesting illustration of the blending of the white and Indian features in the female Half-breed. But the London chromo-lithographer has sacrificed every trace of Indian features in his desire to produce his own ideal of a pretty face, such as might equally well have been copied from an ordinary wax doll.

Mingling among the Indians as a great Medicine-man, respected or dreaded for his supernatural powers, Mr. Kane witnessed many singular rites and customs not often seen, and never before narrated by a traveller. Without being either a critical linguist, or an ethnologist, he has accumulated many facts highly valuable to both ; and now, when this volume appears so opportunely, just as public interest is concentrated both here and at home on the Red River, the Columbia, Frazer's River, and Vancouver's Island, there must be a numerous class of readers to whom its pages will prove full of attractive materials. In a very few years—judging from the rapid progress of settlement which the gold diggings of Frazer River, and the commercial facilities of Victoria, have originated,—these wanderings of an artist among the Indians of North America will possess another interest, as the record of a condition of things as rapidly disappearing as the traces of aboriginal arts from our own Canadian clearings.

One more brief extract we must find room for. The volume is inscribed, in a graceful dedication, to George William Allan, Esq., of Moss Park, Toronto, "as a token of gratitude for the kind and generous interest he has always taken in the author's labours," and after referring to a Commission with which he has been honored by the Canadian Legislature, for the execution of a selection of paintings from his Indian studies, he alludes to the extensive series of oil paintings executed by him for his liberal friend and patron, Mr. Allan. These amount in all to upwards of a hundred, including many highly characteristic life-size portraits, pictures of *Indian games, dances, hunts, and combats, and of their lodges, cemeterics, canoes, &c.*, as well as of studies of the remarkable scenery on the great rivers of the North-West. In addition to these, Mr. Allan also possesses a valuable collection of Indian dresses, weapons, implements, carvings, medicine rattles, pipes, &c., obtained by the author during his travels. At one time Mr. Kane indulged the hope that these, with his sketches and notes, would have been made the basis of a national work, to be undertaken by the authority of the Provincial Legislature; and few works could be more welcome to the students of ethnological science. Meanwhile it is gratifying to know that the materials have been preserved by the liberality of a native Canadian; and we cordially sympathise in the remarks with which the author concludes his preface: "I would gladly indulge the hope that the present work will not prove the sole published fruits of my travels among the Indian tribes of North America, but that it will rather be a mere illustration of the novelty and interest which attach to those rarely explored regions, and enable me to publish a much more extensive series of illustrations of the characteristics, habits, and scenery, of the country and its occupants."

D. W.

The Bookseller, a Hand-book of British and Foreign Literature.
Nos. XIII. XIV. London: 1859.

This British periodical—a curious and acceptable product of the division of labor, begot by an age without its equal for rivalry and competition,—reaches us with the imprint of James Campbell, an enterprising wholesale Bookseller and Publisher, recently established on Canadian soil. It devotes itself specially to "THE TRADE," or gentle craft of Booksellers, with a fair recognition also of all that is

noticeable in reference to the secondary and altogether subordinate guild of book-makers: the authors,—manufacturers of what, after all, we presume the Trade look upon as mere raw material, till the MS. has passed through their refining manipulation of reader's copy, proofs, and sheets; and folders' and binders' hot-pressing, stitching, boarding, and binding; with all the advertising mysteries of preparatory announcement, and final notices of the press. Here, for example, is a word in defence of the bookseller,—not in his lofty capacity as enthroned in The Row, and giving final judgment of life or no-life, to the still unprinted MS. of the trembling author, guilty of a first work,—but as the mere retailer, the trader in books. See what high functions pertain to this, the mere diaconate of such literary priesthood:

“The bookselling business is rather like a profession than a trade; but, unfortunately, book-buyers, as a whole, are too prone to overlook this in all its bearings, for when they are desirous of consulting the intelligent bookseller professionally, they too frequently haggle with him in a manner they would feel ashamed to do with their butcher or tailor. A clergyman, we will suppose, wants materials for particular sermons; a barrister, particulars respecting some case in hand; a member of Parliament, some details for his speech: off each one goes to the bookseller, occupies a great deal of his time, and, after half an hour's talk, feels himself at liberty to cheapen a five-shilling book. All our trade-readers can supply scores of instances where this has been the case, and where the time spent over the customer has in value greatly exceeded the profit on the purchase, even when the full price has been paid—how much more, then, when the discount has been applied for?”

If such are the acolytes, what must the sovereign pontiffs of the Row be: the Longmans and Murrays, Simpkins, Whittakers, and Rivingtons? To such the author must approach, with his unborn work, disposing his manuscript at their feet with all the trembling awe with which the ancient suppliant laid his sacrifice on the altar, and propitiated the priest ere he dared to consult the sacred oracle! From such tribunal Milton—one of the immortals,—accepted his award of five pounds for a *Paradise Lost*. And James and Horace Smith—representatives of the commoner order of literary mortals,—have told the tale of their modern experience with the oracle. Their famous “*Rejected Addresses*,” now in a twenty-fourth or twenty-fifth London edition, and with incalculable American re-prints, became at first *rejected* addresses, in a sense they had not dreamt of when choosing the title. Their story is worth laying to heart. “Alas,” says one of them, in the preface to the eighteenth edition, when con-

gratulating themselves, as authors, on the completion of their task, "Alas, our difficulties, so far from being surmounted, seemed only to be beginning. Strangers to the arcana of the bookseller's trade, and unacquainted with their almost invincible objection to single volumes of low price, especially when tendered by writers who have acquired no previous name, we little anticipated that they would refuse to publish our *Rejected Addresses*, even although we asked nothing for the copyright. Such, however, proved to be the case. Our manuscript was perused and returned to us by several of the most eminent publishers. Well do we remember betaking ourselves to one of the craft in Bond Street, whom we found in a back parlor, with his gouty leg propped upon a cushion, in spite of which warning he diluted his luncheon with frequent glasses of Madeira. 'What have you already written?' was his first question, an interrogatory to which we had been subjected in almost every instance. 'Nothing by which we can be known.' 'Then I am afraid to undertake the publication.' We presumed timidly to suggest that every writer must have a beginning, and that to refuse to publish for him until he had acquired a name, was to imitate the sapient mother who cautioned her son against going into the water until he could swim. 'An old joke—a regular Joe!' exclaimed our companion, tossing off another bumper. 'Still older than Joe Miller,' was our reply; 'for, if we mistake not, it is the very first anecdote in the *facetiae* of Hierocles.' 'Ha, sirs!' resumed the biblioplist, 'You are learned, are you? so, soh! Well, leave your manuscript with me; I will look it over to-night and give you an answer to-morrow.' Punctual as the clock we presented ourselves at his door on the following morning, when our papers were returned to us with the observation,—'These trifles are really not deficient in smartness; they are well, vastly well for beginners; but they will never do—never. They would not pay for advertising, and without it I should not sell fifty copies.'" A publisher, however, was found at length, to whom, when success had established the merits of their clever satire, they effected a sale of their collected Imitations of Horace, and their half-share in the joint copyright for one thousand pounds!

The rogueries of book-puffing, preparatory announcements, "*Just published*" notices of books still unborn; "*Nearly ready*" of books not yet in the compositors' hands, &c. New editions, second, third, and fourth, all effected by mere reprints of title-page; advertised

favourable notices, ingeniously culled from damnatory reviews; and a thousand other tricks of *The Trade*: have all been told long ago. But we see that the *Westminster Reviewer*, for April, in his "*Morals of Trade*," leaves out "*THE TRADE*" par excellence, to turn against the authors and their immoralities.

A deplorable picture he does draw of mercantile and trading morals, filling the ample canvass so thoroughly that we would gladly believe there is no room left for the author to be dragged into such company. "The remark of Dr. Darwin, that the law of the animal creation is, 'Eat and be eaten,' may be paralleled with respect to our trading community, of which the law appears to be, 'Cheat and be cheated!'" Unhappily the accusation does not appear for the first time in this *Westminster* article. The reviewer might have taken his motto from Tennyson's "*Maud*," with a singular appropriateness to the present condition of Europe:—

Is it peace or war? Better war! loud war by land and by sea,
 War with a thousand battles, and shaking a hundred thrones.
 For I trust if an enemy's fleet came yonder round by the hill,
 And the rushing battle-bolt sang from the three-decker out of the foam,
 That the smooth-faced snub-nosed rogue would leap from his counter and till,
 And strike, if he could, were it but with his cheating yard-wand, home.

The author of "*The Morals of Trade*," has nothing to say against the booksellers, or if he has he keeps it to himself. But after noticing imagined comments on the misdoings of the mercantile world, from the Solicitor, the Barrister, and other representatives of professional respectability, not, in his estimation so entirely without sin as to justify them in casting the first stone, the Reviewer proceeds: "Does the condemnation come through the press? The condemned may remind those who write, of the fact, that it is not quite honest to utter a positive verdict on a book merely glanced through, or to pen glowing eulogies on the mediocre work of a friend, while slighting the good one of an enemy; and may further ask, whether those who, at the dictation of an employer, write what they do not think, are not guilty of the serious offence of adulterating public opinion."

It would seem indeed to be the fashion, among critical penmen of the present day, to make a special set at the author's weak points. Here, for example, is Dr. Charles Mackay's last effusion of the kind, in his satirical poem styled "*SAFE PREDICTIONS!*" After making his safe predictions of the patriot, the disconsolate widow, the

wealthy sunshine-friend, and the politician bent on "serving his country," he thus handles the author; though, as will be seen—with an author's experience,—he has a niche reserved for the critic too:—

Whene'er an author shows you meekly
 His last new book,
 And says all critics, daily, weekly,
 Its faults o'erlook,
 And praise it far beyond its merits—
 On this decide,
 He ranks himself with choicest spirits,
 And bursts with pride.

Whene'er a critic o'er his duties
 Still snarls and snaps;
 Affirms all faults, and speaks of beauties
 With cold "perhaps,"
 Hunts for small flaws with keenest pleasure
 From day to day;
 The man's a donkey; know his measure;
 And let him bray.

In reference to all such matters the "Bookseller" is the organ of the trade. Its monthly obituaries record the demise of bibliopolic notabilities; and its historical narratives tell of the grand achievements of publishing and bookselling enterprise. Moreover, as such, it professes to have glimpses behind the curtain; to know who the great unknowns are; and from time to time to let its readers into the secret. Since the death of T. K. Hervey a certain change has been noticable in the tone of the *Athenæum*, ascribable to the consequent changes in editorial generalship. A paragraph in the "Bookseller," for February, admits us into the *Athenæum*'s editorial sanctum, in its zeal on behalf of the occupant:

"The *Saturday Review*," says our Trade organ, "is supposed to be edited by a gentleman who has long been connected with the press—Mr. Cooke, formerly of the *Morning Chronicle*,—and he might be supposed to understand what is due from one literary gentleman towards another; yet, in the *Review* for February 12th, we find the editor of the *Athenæum*, Mr. Hepworth Dixon, designated as 'dull, pompous, factious, ill-informed, and inaccurate;' also as a 'garbler of historical evidence.' Has not the editor any control over the 'gentlemen' who condescend to write in the *Saturday Review*?"

So then, Mr. Hepworth Dixon is the new editor of the *Athenæum*. This at least accounts for the style in which Macaulay has been handled of late in the columns of that literary periodical. Again

we learn that its rival, and senior, the *Literary Gazette*, is—or is supposed to be—under the editorial conduct of Mr. Shirley Brooks. The latter learned editor,—if we mistake not,—personally or by deputy, first recorded recently the re-interment of John Hunter's remains, in Westminster Abbey, *between the graves of Ben Jonson and Wilkie!* This was too good a catch for his critical brother; and here accordingly is a specimen of the literary amenities between those knights of the critical quill whom the Trade periodical would drag from behind their prescriptive curtain of anonymity:

“The world of fine sentiment has been shocked by reports in the newspapers that the gentlemen who have found the bones of John Hunter in one grave and deposited them in another, ‘between the bodies of Wilkie and Jonson,’ have been tossing the skull that shaped ‘Volpone’ and ‘The Alchemist’ from hand to hand. The words on Shakspeare's tomb have naturally risen to every reverential and poetic lip. But we dare say the skull of Jonson is as mythical as the body of Wilkie—and, perhaps, the bones of Hunter. The body of Wilkie, as Capt. Joy can testify, lies in the bed of the Mediterranean. Gentlemen who know that Wilkie lies in a particular spot of Westminster must be good authority (very good) for any particular skull being that of Ben Jonson.”

The world at large, and none more so than the American literary world, has a keen hankering after such personations of the anonymous editorial or critical *w.e.* A learned American editor recently achieved more notoriety than he aimed at, by an indignant assault on the Rev. Sydney Smith, (!) for an article in the *Edinburgh Review*, less complimentary to the Great Republic than the patriotic editor was prepared to accept, even from the pen of Peter Plymley. Messrs. Leonard, Scott & Co., of New York, the American re-printers of the *British Reviews*, in their “Circular to Editors with whom we exchange,” issued during the present season, still name Professor Fraser, of Edinburgh University, as the editor of the *North British*, in ignorance seemingly of the feud of orthodoxy and independence, in the midst of which he threw up his editorial pen. Private rumor hints to us of its being now wielded—after being in commission for some time,—by the Rev. Mr. Dun of Torphichen, an amiable country clergyman of a scientific and literary turn; but who has yet his spurs to win in the literary arena. Sir Cornwall Lewis appears to be the latest known editor of the *Edinburgh Review*, in New York circles—in the west, as we have seen, the responsibility still devolves on Sydney Smith. Lockhart would seem to be the last editor of the *London Quarterly* heard of by its New York re-printers. The

Bookseller tells us that Mr. Whitwell Elwyn,—formerly on the staff of the *Literary Gazette*,—now fills his chair. So also, all who are curious may cull from the *Bookseller's* gossip hints as to the editorial forces of *Bentley's New Quarterly*, the *Irish Literary Gazette*, the *Eclectic*, and a host of other periodicals, old and new.

Whatever editor or author specially desires to keep secret it forthwith becomes the duty of the *Bookseller* to hunt out and make public; for are not author and bookseller as naturally antagonistic as spider and fly, painter and picture-dealer, or architect and building committee? The monument of Dr. Johnson, in St. Paul's, is said, from its pose and barly proportions, to represent the author who felled the bookseller! Its vicinity to "The Row" has not, we fear, had all the moral weight on the fraternity haunting Ave Maria Lane, Amen Corner, and the neighbouring purlieus, that authors would desire. More recently an author, entertained at a booksellers' dinner, insisted on drinking Napoleon's memory, as one worthy to be had in reverence, at least by authors,—for did he not shoot a bookseller! No author's secret shall therefore be safe henceforth, if the *Bookseller* can ferret it out; and abundant thanks will reward the bibliopolic gossip for his zeal.

The world at large greatly covets a knowledge of all such literary secrets as are implied in anonymous publications; and, indeed, piqued by the lack of a full compliance with the cravings of its unreasonable curiosity, an "Eikon Basilike," a "Junius' Letters," or a "Vestiges of Creation," assume an importance far beyond their real worth. But for the best interests of literature: the independence of criticism, the perfect freedom of opinion, and the right of private judgment in scientific and literary as well as in theological expressions of heretical or unpopular opinions, we are inclined to believe that it is for the ultimate behoof of all, that so long as a writer chooses to publish anonymously—unless when dealing in personalities and slanders,—his right of withholding his name should be respected. The *Athenæum* may bandy words with the *Literary Gazette*, and receive its *quid pro quo*, and nobody the worse for it; but no man of good sense would willingly encourage the idea that instead of such literary abstractions, the beligerents are in reality Mr. Hepworth Dixon and Mr. Shirley Brooks. This, however, our Canadian press has yet to a great extent to learn; and nothing tends more to

lessen its influence and to curb its power, than the conscious personality which so frequently gives the tone alike to attack and reply.

More than one curious discussion has of late occupied the press at home, relative to withheld names of anonymous or pseudonymous publications. "Adam Bede," the recently published novel, is issued by Blackwood, with a name on the title which, to the ordinary reader, seems genuine enough, but those who are in the secret of the authorship of this book, which all the Reviewers have agreed to praise, must have been amused by a correspondence which has recently appeared in the *Times* regarding it. A Mr. Anders, rector of Kirkby, says the author is a Mr. Joseph Liggins, of Nuneaton, Warwickshire; and the author, under his *nomme de plume* of George Elliott, denies this point blank, adding: "Allow me to ask whether the act of publishing a book deprives a man of all claim to the courtesies usual among gentlemen? If not, the attempt to pry into what is obviously meant to be withheld—my name,—and to publish the rumours which such prying may give rise to, seems to me quite indefensible, still more so to state these rumours as ascertained truths." This is putting the question on its true grounds; and—whatever may be said in regard to editorships, or anonymous reviewing,—nothing can be more unjust, discourteous, or mean, than the attempts frequently resorted to to force the supposed author into an admission, or a refused denial of his literary offspring. In reference to the "George Elliott" impersonation, we rather hope to see the officious rector of Kirkby subjected to the penalties of a false seer, in so far as ridicule may supply a fair return for blundering impertinence. George Elliott, we strongly suspect, belongs to the same sex as George Sand, Currer Bell, and other *masculine* writers of our day.

The authorship of the "Vestiges of Creation" has of late assumed the form of a controversy scarcely less piquant than the older Junius one, or the more popular question with the last generation relative to "The Great Unknown," which tempted even "the first Gentleman of Europe" to forget his manners, in the excess of his curiosity. "We are authorized," says the *Bookseller* of December last, "to state that Mr. Robert Chambers is not the author of the 'Vestiges of Creation.'" But Mr. Robert Chambers made the same declaration some seven or eight years ago; and still the charge turns up with every new mention of that popular compendium of

Theologico-Scientific heresy. All courtesy and gentlemanly feeling is set aside ; and not only anonymous writers, but one at least who gives his name, persist in the accusation,—in his case grounded on knowledge acquired when in the confidential service of the reputed author! Certainly the “Morals of Trade” can reveal nothing worse than this. Suddenly, however, the venue is changed. George Combe, who, in a quiet, steady, unostentatious way had stuck through life to his phrenological hobby, dies at Edinburgh in a good old age ; and the Cataloguers of the Museum Library—finding anonymous authors a blot on Panizzi’s well-matured scheme,—father the “Vestiges” on the deceased phrenologist. Once more Mr. Robert Chambers has to decline the questionable literary honors anew thrust upon him. Then the London *Critic* comes to the defence of the British Museum Cataloguers, and re-affirms the Combe authorship, in a way that promises a *finale* to the controversy ; if dogged affirmation, backed by mysterious hints of esoteric sources of information, could do it. But the controversy about the authorship of the “Vestiges” still goes on. Professor Nichol, who had been named long ago as one having some share in the responsibilities of the “Vestiges,” and who revived the idea that he had a hand in the preparation of the book, by the emphatic way in which he denied Mr. George Combe’s connection with it, has since met that supposition with a negative. The *Critic* reiterates its belief in Combe’s authorship. It says, “We have already stated that when we attributed the authorship of the ‘Vestiges’ to Mr. George Combe, we did so upon the authority of one whose name is second to that of none in the world of science—perhaps we should have indicated the source of our information more clearly had we said, whose name has no equal. We are now in a position to state the grounds upon which this conclusion was arrived at by the person indicated. When the ‘Vestiges’ first appeared he felt satisfied, as well from the style as from internal evidence, that Combe was the author of it. To test this, he made certain corrections of a few misstatements of recondite facts, and caused those corrections to be shown to George Combe, and to him only ; but when the second edition appeared, those mistakes, and those only, were found to have been corrected. This was pretty strong inferential evidence ; but it so happened that afterwards a long private correspondence took place between this personage and Mr. Combe, arising out of some points mooted in the ‘Vestiges,’ especially phrenological ones—the former combatting

Mr. Combe's views, which were entirely in unison with those of the author of the 'Vestiges.' But what is more conclusive than all this, is the fact that during the whole of that correspondence the person to whom we have referred invariably assumed Mr. Combe to be, and addressed him as the author of the 'Vestiges,' and this was never denied, or in any way contradicted by Mr. Combe. From these facts, and from that time forth, it became a settled conviction in his mind that Mr. George Combe was the author of the 'Vestiges'—and we are not surprised at it. It is upon this authority that the Catalogue of the British Museum has been altered, and the book will now be found under the head of George Combe." The person thus mysteriously intimated as one "whose name is second to none in the world of science," is understood to be Professor Owen. But the question he thus deals with is no scientific one, and we, for one, differ from him entirely as to any internal evidence of such authorship, in the style. If Combe be the author, death, we presume, must be held to put an end to that claim of courtesy which requires us to respect such author's secret. But the denial has been made in the most explicit terms, by Mr. Robert Cox, and others best qualified to do so. George Combe is certainly not the author of the "Vestiges." Its style is not his. Neither is it that of Robert Chambers. But under the old Edinburgh theory of its authorship, it is by no means improbable that George Combe is a *vestige* of the joint *creator* of the book; as Robert Chambers has long been suspected, and Professor Nichol long believed to be.

Returning to the *Bookseller*: its Trade Gossip; Monthly Obituary; Literary and Historical Sketches; and Notices of Books: are all interesting, well got up, and show things from a new point of view. It is well that the Trade should have its literary mouth-piece, if it be for nothing else than to show the author what it thinks of him. The tailor fully believes he makes the man, though popular proverb has long required nine tailors to complete such creation. We learn now that it is the bookseller who makes the author,—for which he ought only to be too thankful, without complaining of transatlantic booksellers' reprintings, and the like processes by which the hungry author is sometimes forced into the condition to inquire, in the words of old Eliphaz the Temanite:—Should a wise man utter vain knowledge, and fill his belly with the east wind?

Three Visits to Madagascar during the years 1853, 1854, 1856, including a Journey to the Capital; with Notices of the Natural History of the Country, and of the present Civilization of the People.—By the Rev. William Ellis, F. H. S., author of “Polynesian Researches.” Illustrated by wood-cuts, from photographs, &c.—London: John Murray, Albemarle Street. 1858.

Among the books which have lately issued from the press, few can claim a higher degree of interest than Mr. Ellis' narrative of his visits to Madagascar; a country so long known, yet remaining so strange to the more cultivated nations of Europe and America. Populous, and possessing a certain type of civilization, with a climate favorable to the wonders and glories of vegetation; offering inviting prospects of commercial advantage not yet brought within the reach of those who desired to try the reality; and with a religious history highly obscure, yet fitted to excite an intense interest: could hardly have been visited at all, certainly could not have been visited by an intelligent and enquiring, as well as enterprising traveller, without his communications respecting it being welcomed by numbers, and his subject ensuring his success as an author. With these accidental advantages, Mr. Ellis unites the zeal, judgment, and experience which fitted him for the more weighty part of his duties, and the genuine love of nature, and careful preparation for profiting by what he observed, which must make his work attractive to the naturalist and the anxious inquirer respecting little known regions, as well as peculiarly interesting to all who desire the progress in the world of our holy faith, or can estimate and honour the firmness and devotedness of the martyr.

We cordially recommend Mr. Ellis's book to all thoughtful readers, and whilst leaving its most important parts to be studied in its own pages, we shall present a few extracts relating to scenery, manners and natural objects, which are suitable to our pages, and may afford entertainment to the reader, though removed from their context.

A MADAGASCAR DWELLING.

“The house of the harbour-master was a well constructed native dwelling, about forty feet long and between twenty and thirty feet high, with a door in the centre and a window on each side; the whole front shaded by a broad verandah, and the house thatched with

the leaves of the traveller's tree. The floor of the verandah, as well as the house, was formed of thick planks or boards neatly joined, and raised a foot and a half above the ground. The walls inside were covered with *ropa* cloth, and a fine large mat was spread on the floor. A neatly-made four-post bedstead, covered with fine sleeping mats, stood in one corner; choice cooking utensils in another; bags of rice and stores, with materials for making mats, and native and European weapons, occupied other parts of the dwelling. In the centre was a table of native workmanship, covered with a white cloth, on which refreshments were placed, and there were a number of chairs and native seats made of matting, like high square ottomans, in different parts of the room."

Here surely are some elements and signs of civilization. But we proceed to a passage which shows—shall we say?—an advance on some of our own countrymen, or at least equality with some of the refined ladies of a neighboring nation:

MADAGASCAR SNUFF-TAKING.

"I was much amused on this occasion, and often afterwards, with the manner in which the chiefs and people generally indulge their taste for an article resembling snuff, a native manufacture comprising other ingredients besides the pulverised leaf of tobacco, such as salt, and the ashes of a native herb, which mixture is regularly sold in the markets. The retinue of every chief or officer of any rank, includes a bearer of what we should call his snuff-box. Those officers who attend on a superior, or are unattended by their own slaves, carry this article of luxury in some part of their dress, frequently suspended from the girdle, and concealed under the folds of their *lamba*; and we sometimes met a traveller with his snuff-box suspended from his neck, who seemed almost destitute of everything else except the most scanty clothing. On the occasion of our first meeting with the chief with whom we were now conversing, whenever he required the agreeable stimulus, which was tolerably frequent, the attendant slave who was usually squatted behind him, presented to him a short piece of bamboo cane, about nine inches or a foot long, and less than an inch in diameter, beautifully polished, and ornamented with rings. Into the end of this cylindrical case, a circular piece of cane or wood attached to a long tassel of silk threads was neatly fitted. When the slave had removed this ingeniously-contrived stopper or lid, the

chief took the cylinder, and shaking a small quantity, about half a tea-spoonful, into the palm of his hand, he then by a quick jerk of the hand, tossed the powder, with great dexterity, on to his tongue, without touching his lips with his hand or its contents. I do not remember ever seeing any of the natives smoking tobacco, but this use of it is universal; and though some deposit it in a different manner in the mouth, it was usually, as in this instance, jerked upon the tongue."

MADAGASCAR DRESS.

"While we were thus occupied, an officer with several attendants entered the house. He was a tall, stout man, between fifty and sixty years of age, with features resembling those of a South Sea Islander. On the upper part of his person he wore a fine figured shirt, with upright Vandyck collar, and wristbands of the same pattern, and, loosely thrown over this, a large and handsome silk scarf or lamba. The centre of the lamba consisted of broad stripes of purple, scarlet, pink, and yellow, edged with a border tastefully wrought in a kind of open work, exhibiting a curious pattern in yellow and scarlet silk. He had neither shoes nor stockings, but wore a blue cloth cap, the shade edged with silver, and the crown surrounded by a broad band of gold lace. Two of his attendants carried swords, one like a heavy cavalry weapon, the other with a straight and smaller blade."

We now turn to our author's description of one of the most curious of vegetable productions, the water yam, or lace leaf, called by botanists, from its native name,

OUVIRANDRA.

"The natives describe this plant as growing in running streams. The root or rhizome is about the size of a man's thumb in thickness, and six or nine inches long, often branching in different directions, like the roots of the ginger or turmeric, but in one continuous growth, not a succession of distinct formations attached at the termination of one and the commencement of another. The root is composed of a white fleshy substance, apparently without large or tough fibres, and is covered with a somewhat thick light-brown skin. I was informed that it also grew in places which were dry at certain seasons of the year; that the leaves then died down, but the root,

buried in the mud, retained its vitality, and when the water returned fresh leaves burst forth. The natives spoke of it as tenacious of life, and said that whenever the earth around even the smallest portion of it remained moist, that portion would put forth leaves again when covered with water. This plant is not only extremely curious, but also very valuable to the natives, who at certain seasons of the year, gather it as an article of food—the fleshy root, when cooked, yielding a farinaceous substance resembling the yam. Hence its native name *ouvirandrano*, literally, yam of the water,—*ouvi*, in the Malagasy and Polynesian languages, signifying yam, and *rano* in the former signifying water. The *ouvirandra* is not only a rare and curious, but a singularly beautiful plant, both in structure and colour. From the several crowns of the branching root growing often a foot or more deep in the water, a number of graceful leaves, nine or ten inches long, and two or three inches wide, spread out horizontally just beneath the surface of the water. The flower-stalks rise from the centre of the leaves, and the branching or forked flower is curious; but the structure of the leaf is peculiarly so, and seems like a living fibrous skeleton rather than an entire leaf. The longitudinal fibres extend in curved lines along its entire length, and are united by thread-like fibres or veins, crossing them at right angles, from side to side, at a short distance from each other. The whole leaf looks as if composed of fine tendrils, wrought after a most regular pattern, so as to resemble a piece of bright green lace, or open needlework. Each leaf rises from the crown on the root like a short delicate-looking pale green or yellow fibre, gradually unfolding its feathery-looking sides, and increasing its size as it spreads beneath the water. The leaves in their several stages of growth pass through almost every gradation of colour, from a pale yellow to a dark olive green, becoming brown or even black before they finally decay; air bubbles of considerable size frequently appearing under the full-formed and healthy leaves. It is scarcely possible to imagine any object of the kind more attractive and beautiful than a full-grown specimen of this plant, with its dark green leaves forming the limit of a circle two or three feet in diameter, and in the transparent water within that circle presenting leaves in every stage of development, both as to color and size. Nor is it the least curious to notice that these slender and fragile structures, apparently not more substantial than the gossamer and flexible as a feather, still possess a tenacity and wiriness which

allow the delicate leaf to be raised by the hand to the surface of the water without injury.”

It is interesting to learn that this wonder of the vegetable creation has been safely conveyed to Europe by Mr. Ellis, and living plants placed by him at Kew, Chiswick, Regent's Park, and the Crystal Palace, so that it will become a familiar object to our countrymen. A leaf that constitutes only a frame-work to regular open spaces, being formed like a window with small panes, does at first astonish us by its novelty, but when we are informed that it grows entirely under water, reflection shows it to be still within the usual order of nature, and what might have been anticipated from consideration of the circumstances. The leaf is constructed somewhat like the lily of the valley, with straight veins meeting by a gentle curvature in the apex, and these regularly crossed by smaller veins at nearly equal distances. Did it grow in the air the inter-spaces would be filled with cellular tissue, and covered with epidermis. Water tends to prevent this growth, and thus leaves the veins like a skeleton leaf. Whoever has examined the common water crowfoot has seen the same phenomena, only there some leaves are on or above the surface of the water, which are like those of other plants, while those underneath, though filamentous, have not the same regular disposition on the meeting together of the fibres which belong to the peculiar venation of the plant. *Ouvirandra* is constantly referred to as an example of what is called a *fenestrate*, window-frame leaf, but the description of it in its native site is peculiarly interesting.

Amidst many botanical notices of an attractive character, and showing Mr. Ellis's love of nature and habit of correct observation, we will select one other—his description of

THE TRAVELLER'S TREE.

“This tree, *Urania speciosa*, is altogether one of the most remarkable that has been discovered in Madagascar. And the extent to which it prevails may be inferred from its native name, *ravinala*, by which it was designated by Sonnerat, its discoverer. *Ravinala* is literally, leaf of the forest, as if it was the leaf by which the forest was characterized, which is the fact where it abounds, though in many parts it is not met with at all. The tree rises from the ground with a thick succulent stem like that of the plantain, or the larger species of *Strelitzia*, to both of which it bears a strong resemblance. It sends

out from the centre of the stem, long broad leaves like those of the plantain, only less fragile, and rising, not round the stalk, but in two lines on opposite sides, so that as the leaves increase, and the lower ones droop at the end, or extend horizontally, the tree presents the appearance of a large open fan. When the stem rises ten or twelve feet high, the lower part of the outer covering becomes hard and dry, like the bark [a cocoa-nut tree has no *bark*: the author means the outer layer] of the cocoa-nut tree. Many of the trees in this region were at least thirty feet from the ground to the lowest leaves. I frequently counted from twenty to twenty-four leaves on a single tree, the stalk of each leaf being six or eight feet long, and the broad leaf itself four or six feet more.

“The whole of these twenty-four bright green gigantic leaves, spread out like a fan at the top of a trunk thirty feet high, presented a spectacle as impressive as it was to me rare and beautiful; and in this part of the country they were the most conspicuous objects for miles together, and were it not that these vast bright green shining leaves are slit on each side by the winds, and so flutter in smaller portions with the passing breeze, the prevalence of this tree would impart a degree of almost inconceivable magnificence to the vegetation of the country. In the fan-like head of the traveller’s tree there were generally three or four branches of seed-pods. The parts of fructification seemed to be enclosed in a tough firm spathe, like those of the cocoa-nut, but the subsequent development was more like that of the fruit of the plantain. When the pods, or seed vessels, of which there were forty or fifty on each branch, were ripe, they burst open, and each pod was seen to enclose thirty or more seeds, in shape like a small bean, but enveloped in a fine silky fibre of the most brilliant blue or purple color.

“But this tree has been most celebrated for containing, even during the most arid season, a large quantity of pure fresh water, supplying to the traveller the place of wells in the desert. Whenever I enquired of the natives they always affirmed that such was the fact, and that so abundant and pure was the water, that when the men were at work near the trees, they did not take the trouble to go to the stream for water, but drew off and drank the water from the tree. Having formerly been somewhat sceptical on this point, I determined to examine some of the trees; and during my journey this morning, we stopped near a clump of the trees. One of my bearers

struck a spear four or five inches deep into the thick firm end of the stalk of the leaf, about six inches above its junction with the trunk, and on drawing it back a stream of pure clear water gushed out, about a quart of which we caught in a pitcher, and all drank of it on the spot. It was clear, cool, and perfectly sweet. On further examination I found that there was no filtration of the water through any part of the plant, as I had been led to suppose when I had seen water drawn by Sir William Hooker from one of the specimens in the palm house at Kew. There was a kind of natural cavity, or cistern, at the base of the stalk of each of the leaves, above its union with the stem, and the water which had been collected on the broad and ribbed surface of the leaf had flowed down a groove or spout on the upper side of the stalk into this natural reservoir, whence it supplied nutriment to the tree, and refreshment to the traveller and the laborer.

“But in Madagascar this tree might, with propriety, be called the *builder's tree* rather than the traveller's tree. Its leaves form the thatch of all the houses on the eastern side of the island. The stems of its leaves form the partitions, and often sides of the houses: and the hard outside bark [this tree again has no bark, but the outer layer of all endogenous trees is harder than the interior, and is sometimes confounded with the bark of exogenous trees like those of our forests,] is stripped from the inner and soft part, and having been beaten out flat, is laid for flooring; and I have seen the entire floor of a long well-built house covered entirely with its bark, each piece being at least eighteen inches wide, and twenty or thirty feet long. The leaf, when green, is used as a wrapper for packages, and keeps out the rain. Large quantities are also sold every morning in the markets, as it serves the purpose of table cloth, dishes, and plates at meals; and folded into certain forms is used instead of spoons and drinking vessels.”

The magnificent and useful tree here described is well represented in the work by a wood-cut from a photograph. It belongs to the same natural family as the *Strelitzia*, of which several species, one of which is as large as this *Urania*, may be seen in English hot-houses, and the plantains and bananas which are such familiar objects in tropical countries. No plants, excepting the palms, can compare with these in the splendour of their foliage.

It seems from Mr. Ellis's observations that at least the ruling tribe

in Madagascar is of Malay origin. The prevailing cast of features may be judged of from the numerous photographs of individuals of various ranks and of both sexes. It would be easy to extract largely from this interesting volume in relation to scenery, manners, arts, the court and royal family, and more especially the interesting prince who is heir to the throne, as well as the particulars given respecting the state of the Christian converts, and the dreadful persecution they have endured. Our author's visit to South Africa in the interval of two of his Madagascar trips would also furnish matter deserving of notice, but we refer our readers to the volume itself, which will well reward perusal, and will be found as pleasing as it is instructive, so that few who open it will leave it without a complete perusal.

W. H.

Holbein's Dance of Death, exhibited in elegant Engravings on Wood, with a dissertation on the several representations of that subject.
By Francis Douce, Esq., F.A.S.

Holbein's Bible Cuts, consisting of ninety illustrations on Wood, with introduction. By Thomas Frognall Dibdin. London: Henry G. Bohn, 1858.

The lists of donations to the Library of the Canadian Institute have repeatedly recorded the liberal gifts of Mr. Henry G. Bohn, of London; and from the last of these contributions we select the above volume as a curious and interesting revival of ancient art, which forms one of the series of his Illustrated Library.

Holbein's Bible cuts restore to our eyes the Bible lessons of an elder and greatly simpler age of larger and less critical faith. To such these illustrations of the sacred Scriptures were full of earnest truthfulness, while to us they frequently verge on caricature. The anachronisms in architecture, costume, furniture, &c., are often amusing enough; while the fearlessness with which the old artists grapple with the most unmanageable and recondite themes, furnishes singular illustration of the mental culture and the moral faith of the age, in which, and for which, such works of art were produced. We find such subjects as the following, handled with boldness, and wrought out in every minute detail:

"God appeareth to Moses in a burning bush."

“*The fearful presence of God upon the Mount,*” a scene illustrated in various scenes of Moses’ ascent of Mount Sinai: Moses figuring in all of them, as in Michael Angelo’s famous statue, with horns.

“*An Angel driveth the Assyrian host;*” a wood-cut of singularly spirited execution.

“*The Lord said unto my Lord, sit thou at my right hand, until I make thine enemies thy footstool.*”

The visions of Isaiah, Ezekiel, and Daniel, the “Wheels within wheels,” the “Four beasts,” with other subjects equally profound and difficult for the pencil.

Each of the illustrations is accompanied with the fitting passage from sacred writ, in English, Latin, French, Italian, and Spanish, without any note or comment on the discrepancies sometimes noticeable in the translation. The incidents in the life of the Patriarch Job, for example, furnish the subjects of several illustrations, of which the following are the accompaniments of one:—

ENGLISH,—*Then said his wife unto him: Dost thou still retain thine integrity? Curse God and die.*

LATIN,—*Dixit autem illi uxor sua: Adhuc tu permanes in simplicitate tua? benedic Deo et morere.*

FRENCH,—*Et sa femme lui dit: Tu conserveras encore ton intégrité! Bénis Dieu, et meurs.*

ITALIAN,—*E la sua moglie gli disse, Ancora perseveri tu nella tua integrità? benedici Iddio, e muori.*

SPANISH,—*Y su muger le dixo: ¿Aun te estás tú en tu simplicidad? benedice á Dios, y muérete.*

The mere English reader will perceive the diversity between the “curse God” of the English version and the various forms of “benedicite” in the others.

Such, however, are graphic samples of the modes of simple illustration which appealed to the eye, and to the faith, of ages more primitive and frequently far more earnest in their faith than our own.

But a more curious interest attaches to the larger portion of the same volume, devoted to the art and literature of the famous “Dance Macabre,” or Dance of Death.

Among the favourite devices of mediæval art, by means of which the painter and the sculptor were employed to lend their aid in enforcing the lessons of morality and religion on an illiterate age, none are more worthy of notice and study than the “Dances of Death,” a singular

class of ideographic moralities, executed chiefly in the 15th and 16th centuries.

This solemn and yet satirical pageant was often painted on the church-yard walls, and even in the Church itself, as at Hexham, in Northumberland, where the choir screen of the Abbey Church is adorned with a painting of the "Dance of Death," executed in the reign of Richard the Third, or early in that of his immediate successor. In other examples it is preserved in a more enduring form by means of the sculptor's art, as in the celebrated and beautiful Roslyn Chapel, near Edinburgh. Among the eccentric and bewildering variety of ornaments pertaining to that gorgeous specimen of the arts of the fifteenth century, (A. D., 1446,) the *plurima mortis imago* predominates, in some cases, with ludicrously incongruous adjuncts, but in others, with gentle and more suggestive symbols, as when flowers are seen sprouting from the empty sockets of a skull. Within the mouldings of two of the arches, or rather stone beams of the north aisle, the sculptor's allegories expand into more elaborate and coherent detail. There are two series of clustered figures in relief, the one representing the ancient allegory of "the Seven Deadly Sins," and the other "the Dance of Death."

The majority of these singular representations of death's universal sway; these

"Lessons for every heart, a Bible for all eyes,"

are replete with satirical assaults against the clergy and the priest-craft of the times; constituting in this respect an echo of the contemporary satires of the poets, just as Michael Angelo's altar-piece in the Sistine Chapel reproduces the satirical picturings of Dante's "Inferno."

Doubtless the poets in like manner reproduced the pictorial scenic moralities which appealed to their eyes, and suggested with fresh evidences the quaint incongruities of life and death which form so inexhaustible a theme for the satiric muse.

The Scottish poet Dunbar, who must have looked upon the rich devices of Roslyn Chapel when fresh from the sculptor's chisel, reproduces one of its "sermons in stone" in his "Dance of the Seven Deidly Synnis;" and it may not be thought improbable that the more popular "Dance of Death," either as represented in the Roslyn aisle, or in the same style of art, with an angel playing on the bagpipes bringing up the rear, as figured over the entrance to the cemetery of the ancient Collegiate Church of St. Giles at Edinburgh, may have

suggested much of the same poet's imagery in his "Lament for the Makars," where he pourtrays Omnipotent Death as taking

"..... All estates,
Princes, prelates, and potentates,
Baith rich and poor of all degree;"

and then describes his conquests over the knight in the field, the babe at its mother's breast, the captain, the clerk, the physician,

"The lady in bour full of beantie;" &c.

The correspondence between the scenic devices of the painter and the poet is still more obvious in the vision of Antichrist, introduced in the twenty-first passus of "Piers Ploughman's Vision." This poem, the production of an ecclesiastic, and a Wyckliffe, and written somewhat earlier than the Canterbury Tales of Chaucer, abounds in satirical allusions to the excesses of the clergy. In the passage referred to, Antichrist enters, with Pride bearing his banner proudly about, and speedily hundreds crowd to follow him. The pageant is then described in a singularly vigorous passage, in which Nature sends forth diseases at the command of Conscience. The scene is pictured with a frightful vividness, and is supposed by Ellis—but without any sufficient ground,—to have suggested to Milton his sublime, though harrowing description of the Lazar-house, in B. xi. of the Paradise Lost. This loathsome procession having gone by, the poet continues his vision thus:—

" And then met these men,
E'er minstrels might pipe,
And ere heralds of arms
Haden describéd Lords,
Eld, the hoary
That was in the van-ward,
And bare the banner before Death;
By right he it claimed.

* * * * *

Death came driving after,
And all to dust passed
Kingés and Knightés,
Kaysers and Popés,
Leréd and Lowéd.
He let no man stand
That he hit even.
Many a lovely lady
And leman of Knightés
Swonéd and sweltéd
For sorrow of his dints."

The general idea of the pomp and pageantry of Death, as pictured to us in those passages of the elder poets, fully accords with the conceptions embodied in the artistic production of contemporary painters and sculptors; but the obvious derivation, not only of this general idea, but of some of the most characteristic details of the favourite medieval depiction of Death's doings, can scarcely be disputed in relation to a curious passage which occurs in Chaucer's *Canterbury Pilgrimage*.

The passage to which we refer is to be found in "The Knight's Tale," and serves to show that "the Dance of Death" was familiar to the English readers of the 14th century.

The poet there describes, in accordance with the anacronisms common alike to the poets and the painters of medieval times, the lists erected by Theseus, wherein the rivals were to contend in tourney for the hand of the fair Emely; and whosoever was fortunate enough to

"Slay his contrary, or out of listés drive,
Him shall I yeven Emelie to wyve."

The narrator then goes on to tell:

"Of Theseus, that goeth so busily
To maken up the listés really,
That such a noble theatre as it was,
I dare well sayn in this world there n'as.
The circuite a milé was about,
Walléd of stone, and ditchéd all without.
Round was the shape, manére of a compass,
Full of degrees the height of sixty pace,
That when a man was set on o degree,
He letted not his fellow for to see."

Above the gates, and in the turrets of the wall, are further constructed "oratories" or chapels, dedicated to Venus, Diana, and Mars, each decorated with appropriate carving and "portraiture," or paintings. The oratory of Venus is adorned with

"Pleasance and hope, desire, foolhardiness,
Beauty and youth, bauderie and riches.
* * * * *
Feasts, instruments, and carols, and dances,
Lust and array, and all the circumstances of love."

The oratory of Diana is in like manner

"Depeinted by the wallés up and down,
Of hunting and of shamefaced chastitie."

While for the "Temple of mighty Mars," the poet fitly selects "the Dance of Death" as its most appropriate decoration. The thoroughly mediæval sources from whence alone Chaucer borrowed this latter theme, become the more apparent from their contrast with the classical figures of Narcissus, Medea, Hercules, Circe, Cræsus; and again of Danæ, Actæon, Melcager, Atalanta, &c., with which the temples of the Goddesses are adorned; though "*The folie of King Solomon*" is not omitted among the reminiscences of the amorous goddess. After the description of that of Venus:

"The noble kerving, and the portreitures,
The shape, the countenance of the figures
That weren in the oratorie."

The Knight thus proceeds with his tale:

Why should I not eke, as well, tell you all
The portraiture that was upon the wall,
Within the temple of mighty Mars the red?
All painted was the wall in length and bread,
Like to the estres of the grisly place
That hyght the great temple of Mars in Thrace,
In the ilk northern frosty region
Where as Mars hath his sovereign mansion.

First on the wall was painted a forest
In which there dwelleth neither man nor beast;
* * * * *
There saw I first the dark imagining
Of FELONY, and all the compassing;
The cruel IRE, red as any gled,
The PICKPURSE and eke the palé DREAD;
The SMILER with the knife under the cloak,
The shipping burning with the blacké smoke.
The TREASON of the murdering in the bed;
The open war, with woundes all bebled,
CONTEKE with bloody knife and sharp menace:
All full of chirking was that sorry place.
The slayer of himself, yet saw I there,
His heartes blood had bathéd all his hair;
The nail ydriven in the shode on hight;
The coldé death with mouth gaping upright.

Amiddes of the temple sat MISCHANCE,
With di'scomfort and sorry countenance.
Yet saw I MADNESS laughing in his rage,
Armed COMPLAINT, OUTORIES, and fierce OUTRAGE;

The carrion in the bush, with throat yeorve,
 A thousand slain and not of qualme ystorve;
 The tyrant with the prey by force yrest,
 The town destroyéd, there was nothing left.
 There saw I burnt the shipés hopésteres,
 The hunter strangled with the wildé bears;
 The Sow freting the child right in the cradle;
 The Cook yscalded, for all hi's long ladle.
 Nought was forgot by the infortune of Mart;
 The Carter over-ridden with his cart,
 Under the wheel full low he lay adown."

Many of the scenes and characters depicted by the poet,—including some of those which appear the least poetical among the figures introduced,—are directly borrowed from familiar allegorical paintings, in examples of the "Dance of Death" which have been preserved; and are no doubt derived from some well known picture of the time, which the poet knew to be familiar to his readers. Several of them are reproduced among the curious wood-cuts of Mr. Bohn's publication. There was a famous representation of this ancient suggestive Morality, on the cloister walls of old St. Paul's, London, and if that existed, as is by no means improbable, in the time of Chaucer, its mortal pageantry would be readily recognised by his readers.

Stowe tells us, in his "Survey of London," printed in 1618, that there was a great cloister on the north side of St. Paul's Church, surrounding a plot of ground, known of old as Pardon Churchyard. He then states that about this cloister was artificially and richly painted the Dance of Machabray, or Dance of Death, commonly called the Dance of Paul's; the like whereof was painted about St. Innocent's cloister at Paris. The metres or poesie of this Dance were translated from French into English, by John Lydgate, Monk of Bury; the picture of Death leading all estates being executed at the expense of Jenkin Carpenter, in the reign of Henry VI. Again we learn from the same authority, of the destruction of this curious relic of Medieval Art. "On the 10th of April, 1549, the cloister of St. Paul's Church, called Pardon Churchyard, with the Dance of Death, commonly called the Dance of Paul's, about the same cloister, costly and cunningly wrought, and the chapel in the midst of the same churchyard, were all begun to be pulled down." This destruction was the work, as we learn, of the Protector Somerset, in order to obtain materials for building his own palace in the Strand.

The poem of Chaucer's immediate successor, Lydgate, referred to by Stowe, entitled "The Dance of Death," is affirmed by Warton to have been translated from the French at the request of the Chapter of St. Paul's, for the purpose of being inscribed under the painting in the cloister; but it is stated by the poet himself to have been rendered: "not word by word, but following in substance," and was doubtless adapted to the details of the painting it was designed to accompany, in so far as that differed from the celebrated depiction of the ancient morality on the walls of St. Innocent's Cloister at Paris; with its French version of the older lines, derived as some suppose from a still earlier German original.

The *Thief*, or *Pickpurse*, the *Cook*, the *Waggoner*, the *Child in its Cradel*, and others of the series figured by Chaucer in the "Knight's Tale," are all familiarly known to those who have had opportunities of examining the ancient representations of the pictured pageant of Death; or who have studied the learned dissertations of the antiquary Douce—now reprinted in this more popular form,—on the origin and characteristics of this obscure subject of Medieval Art.

Instead of a critical review of a text already well known, at least to the antiquary, we prefer availing ourselves, in this article, of the opportunity it affords of drawing the reader's attention to some curious or interesting passages, illustrating the subject of Douce's elaborate investigation.

In one of the most beautiful of Chaucer's minor poems, "The Romaunt of the Rose." The allegory is represented under the same figure of a series of paintings on a wall:

"When I had a while ygone,
I saw a garden right anon,
Full long and broad, and everidele
Enclosed was, and walled well,
With high walls embatailed,
Pourtrayed without, and well entayled
With many riche portraitures;
And both the images and peintures
Gan I behold busily,
And I will tell you readily
Of thilke images the semblance,
As far as I have remembrance."

The allegory is not in this, as in "The Knight's Tale" borrowed from the medieval paintings and sculptures referred to; but there are

sufficient elements of comparison traceable between them, to render it most probable that the mode of treatment and even some of the details were suggested by the contemporary pictured "Moralities," familiar alike to the poet and his readers. "Hate," "Felony," "Villany," "Covetice," "Avarice," "Envy" and "Sorrow" are all successively described, after which comes "Elde," the same that is introduced in *Pier's Plowman* as the Standard-bearer of Death. After the description of Elde's portraiture, the following beautiful passage on the fleeting nature of time occurs :

"The time that passeth night and day,
 And restlesse travayleth aye,
 And stealeth from us so privily,
 That to us seemeth sikerly
 That it in one point dwelleth ever,
 And certes it ne resteth never,
 But goeth so fast and passeth aye,
 That there n'is man that thinké may
 What time that now present is,
 Asketh at these clerkis this,
 For men think it readily
 Three times been passed by
 The time that may not sojourn
 But goeth and may never return,
 As water that down runneth aye
 But never drop returné may.
 There may nothing as time endure,
 Metal, nor earthly creature,
 For all thing it fret and shall,
 The time eke that changeth all;
 And all doth wax, and fostered be,
 And all things destroyeth he.

The time that eldeth our ancestors
 And eldeth Kings and Emperors,
 And that us all shall overcommen
 Ere that death us shall have nomen;
 The time that hath all in welde
 To elden folk, had made her elde
 So inly, that to my witing
 She might help herself nothing,
 But turned ayen unto childhede;
 Ne wit, ne pithe in her hold
 More than a child of two year old."

Turns round to look at him ; and Death, meanwhile,
Is putting out the candles on the altar !

ELSIE. Ah, what a pity 'tis that she should listen
Unto such songs, when in her orisons
She might have heard in heaven the angels singing.

The subjects thus gracefully rendered by the poet, appear among the wood cuts ascribed to Holbein ; and Douce remarks, in his elaborate dissertation : “ We find the Dance of Death often represented, not only on the walls, but in the windows of churches, in the cloisters of monasteries, and even on bridges, especially in Germany and Switzerland.” Here is the modern prose comment, in the work under review, on the subject so beautifully rendered in Longfellow’s verse. It illustrates the motto : *Est via quæ videtur homini justa : novissima autem ejus deducunt hominem ad mortem.* Proverb, iv. The woodcut is entitled THE NUN ; and the editor remarks : “ Here is a mixture of gallantry and religion. The young lady has admitted her lover into her apartment. She is kneeling before an altar, and hesitates whether to persist in her devotions, or listen to the amorous music of the young man, who, seated on a bed, touches a theorbo lute. Death extinguishes the candles on the altar, by which the designer of the subject probably intimates the punishment of unlawful love.” We doubt, however, the necessity of the concluding remark. The idea is sufficiently accordant with the general theme of the old pictorial moralist, that Death claims all seasons for his own ; and the hour of devotion is alike his, with that of the lover’s interview, or of the wandering thoughts of the youthful devotee, divided in thought between this world and the next. But, like the older Bible illustrations, that which embodied only grave and solemn lessons for simpler ages, is more apt to excite ludicrous thoughts in the modern student’s mind ; and where the ancient “ Dance of Death ” has not already been defaced or obliterated, it owes its preservation far more to the archæological zeal, than to the pious reverence of modern ages.

D. W.

SCIENTIFIC AND LITERARY NOTES.

PHYSIOLOGY AND NATURAL HISTORY.

ACCIDENTAL FERTILIZATION OF PAPILIONACEOUS PLANTS.

We extract from the correspondence in a recent number of the *Gardener's Journal*, the following observations on accidental fertilization, furnished by a correspondent signing himself J. B. W., and corroborating, from his own experience, statements contained in a previous communication on this subject, by Wm. Darwin. I am in the habit, he observes, of growing the Black Belgian Kidney Bean (*Haricot d'Algiers*) and a small seeded white *Haricot* side by side with the common Scarlet Runner, and I find a great tendency to seminal variation in the two first-named, but none in the Scarlet Runner except a slight variation in the color of the seeds, which is probably not greater than would occur if that variety was grown alone. When I first obtained from the Horticultural Society the very distinct kind known as the Black Belgian, its seeds were of a jet black color, and the pods they produced were of a creamy white, and much more fleshy than those of the common Runner. I find, however, every year many pods that are thinner in substance and almost green in color, while the seeds they contain are not black but darker or lighter slate color, so that it is only by making a selection of seeds that I am enabled to keep the sort true. I imagine that this variation must be caused by cross impregnation with the White *Haricot*, although that plant is so different in appearance from the black one that many botanists would certainly make them distinct species. The seeds of the small *Haricot* ought to be pure white, but there are always some among them of a pale dun color which are picked out and thrown away, so that I have no notion of what they would produce if sown. It is well known to gardeners, that the dwarf varieties of Kidney Bean are extremely liable to cross when two or more sorts are grown side by side, although some strongly-marked varieties, such as the Newington Wonder, are less readily affected by foreign influence. With regard to Peas, I think it certain that some at least of the new varieties which are annually sold at high prices to a confiding public, are the result of accidental cross impregnation; and yet such crosses cannot be of frequent occurrence, for I have grown both the Auvergne Pea and the Champion of England intermixed with other kinds during several years, and they are still perfectly true. It is well known that many of the most valuable varieties of the Brassica tribe of vegetables have been originated by hybridization, and the facility with which they cross, many a poor gardener discovers to his sorrow when his "Unapproachable" Cabbage, or his "Unmatchable" Broccoli, has been hopelessly spoiled by intermixture with the vile "Greens" of his slovenly neighbor. I have heard it said, however, that none of the culinary Cabbages will cross with the Turnip, which is a very curious thing if true.

INFLUENCE OF THE MOON'S LIGHT UPON PLANTS.

We borrow from the *Annals of Natural History*, the following observations by Professor Zantedeschi, of Venice, on a subject which has of late attracted considerable attention, and led to much diversity of opinion:

The Abbé Tessier having made a great number of experiments upon etiolated plants, which had become white or yellow from being kept in the dark, observed that those exposed to the light of the moon, and kept in the dark during the day, were evidently less yellow or white than those kept in the dark day and night.

The Abbé Antonio-Maria Vassalli, Professor of Physics at Turin, relates that the Sensitive Plant is susceptible of the influence of moonlight. "Having," he says, "procured some sprouted seeds of the Sensitive Plant, 12 days after their germination I transplanted them into earth contained in glass bottles, and into other vessels filled with earth.

"I observed that their sleep had a regular periodicity. Exposed to the east two hours before sunrise, their leaves, which were perfectly closed at 1 A. M., began to open at dawn, and unfolded completely some little time after sunrise, more or less quickly according to the state of the air. If they are carried during the day into a dark place, or covered with an opaque vessel, the leaves close, but not so exactly as during the night. Exposed afresh to the light, they open again slowly. In making these observations I was careful to shake all the pots equally, without covering them, in carrying them, in order that the variations might not be attributed to these shocks. After repeating the various observations, for greater certainty, I exposed the pots to the light of the moon.

"I did not remark any variation in the leaves when the exposure, commencing at 1 A. M., had lasted one hour; but after three hours the leaves were less closed though still not open.

"Having one evening exposed the pots to the rays of the moon until midnight, when the leaves were not completely closed, I found them very well opened about 1 A. M.

"I attempted to arrange a lens so that its focus should fall on a closed leaf; but I could not detect any variation in the short space of time during which the light of the moon was condensed." (Opuscoli scelti di Milano, 1794.)

These observations have been renewed in our own time on Vetches, by Prof. G. Giulj; he caused Vetches to germinate and spring up in a cellar entirely shut up from the light both of the sun and moon; and the little plants were very white. Some of them were exposed for several nights to the action of the moon's rays, while others, also in full growth, were kept in complete darkness: the former acquired a green colour like that of the same plants exposed in the open air, and even to the sunlight; those, on the contrary, kept constantly protected from the light of the sun and moon were not at all coloured, and ultimately rotted. More than this: Prof. Giulj ascertained by direct experiment that the light of the moon falling upon certain plants, or certain leaves, has the property of causing the liberation of oxygen (Dei Lavori della Reale Accadem. delle Scienze, 1844).

I have successfully repeated the experiments of Tessier and Giulj on the power possessed by the rays of the moon in developing the colors of the leaves of plants, and I took the greatest precautions to maintain the pots in all the conditions which

were necessary to avoid the objections which might be founded upon the influence of humidity or any other atmospheric variation. They were kept in the dark during the whole day; when the days preceding the full moon arrived, they were carried, after 8 A. M., always to the same place to be exposed to its rays: but two of the pots were uncovered, and two protected from the rays by an opaque body; the others were freely exposed to the open air and all its influence.

After six nights' exposure, the difference in the coloration was very marked: the little plants constantly protected from the influence of light were white; and those exposed to the lunar rays had a yellowish tint, which appeared to be changing to the green colour.

I desired to repeat also the experiment of Vassalli. I had only made observations upon leaves perfectly closed, and little shoots, of no vigour, drooping over the edges of the pots wherein they had germinated. After that, I tried exposing various specimens of *Mimosa pudica* to the action of the moon's rays for an hour during full moon. I was delighted to see the little shoots rise after a quarter of an hour's exposure; the plants were at the distance of a few millemetres from the edge of the pot; in half an hour the stems were straighter, and in an hour and a half they had attained the height of more than 2 inches; but I could not detect any sensible opening of the leaves. This experiment appeared necessary in order to confirm what has been said of the influence of the rays of the moon upon the growth of the *Mimosa*, because this fact, more or less established by Vassalli, has not been received with entire confidence by other authors; and in this last experiment I took precaution of placing near the *Mimosa* exposed to the lunar rays another of the same plants covered with an opaque body, which shielded it from the light: in this no movement was produced. The experiment was repeated six times with constant results. We may therefore believe that the growth of the little stems of the *Mimosa* is to be attributed solely to the influence of the moon's rays.

I made these experiments in the summer of 1847; and I have thought it necessary to enter into details, because I was able to make certain, by a great number of observations, frequently repeated, that the difference of temperature, of the movement of the air, and exposure to different degrees of light, had an influence upon the more or less prompt and more or less perfect manner in which the leaves of the *Mimosa* open and close.

One morning in the month of July, about 5 o'clock, in the Botanic Garden of Venice, two plants of *Mimosa pudica*, kept in a conservatory (perfectly expanded), presented an aspect of luxuriant vegetation. Another, exposed in the open air, had its leaves entirely closed and the stems bent. A fourth, placed in another part of the garden was half-closed. On the day preceding, the gardener had, at my orders, shut up the last in a dark place three hours before sunrise.

I took care also to verify the influence exerted upon the *Mimosa* by the artificial light of a lamp, and I found the growth was from 3 to 5 centimetres.

CARPENTERIA AND DUJARDINIA.

The number of the *Annals of Natural History* for November, contains an interesting communication from Dr. J. E. Gray of the British Museum, on the discovery of an animal forming a connecting link between Rhizopoda (*Foraminifera*) and

Porifera or sponges. The specimens examined by Dr. Gray had been supposed to be Cirrhopoda, allied to Balanus. Minute examination satisfied him that this was a mistake, and at length led to the conviction that he had obtained a new form of Protozoa, occupying the position indicated above. This ingenious conjecture being sanctioned by Professor Busk and Dr. Carpenter, is now given to the world, and the two genera which Dr. Gray feels authorized to establish are named *Carpenteria* and *Dujardinia*, in honor of two of the most eminent observers of the allied forms, Dr. W. B. Carpenter, and Professor Felix Dujardin, of Rennes.

W. H.

ETHNOLOGY.

At the Montreal meeting of the American Association for the Advancement of Science, Lewis H. Morgan, Esq., of Rochester, N. Y., communicated some of the results of a curious investigation pursued by him, relative to the laws of consanguinity and descent of the Iroquois. Further investigation induces him to believe that the system traced out by him, in relation to one of the most important of the aboriginal nations of this continent, is by no means confined to them; but, on the contrary, it embraces such wide ramifications as to furnish a means of no slight value for tracing the connection between the Indians of America and any Asiatic or other tribes or nations of a common origin.

Following out the scheme of investigation thus indicated, Mr. Morgan sets forth his views in a letter, of which the following abstract embraces the most significant suggestions:—

“It has occurred to me, after a careful examination of the system of consanguinity and descent of the Iroquois, that we may yet be able, by means of it, to solve the question whether our Indian races are of Asiatic origin. Language changes its vocabulary not only, but also modifies its grammatical structure in the progress of ages; thus eluding the inquiries which philologists have pressed it to answer; but a system of consanguinity once matured and brought into working operation, is, in the nature of things, more unchangeable than language;—not in the names employed as a vocabulary of relationship, but in the ideas which underlie the system itself. The Indo-European nations have one system, identical in its principal features, with an antiquity of thirty-five centuries, as a fact of actual record. That of the Iroquois is original, clearly defined, and the reverse of the former. It is, at least, to be presumed that it has an antiquity coeval with the race. That of the Chippewa is the same as the Iroquois, with slight modifications; thus establishing the fact of its existence in two of the principal generic stocks. Besides this, there are traces of the same system among the Aztecs, Mohaves, Creeks, Dahcotas, Delawares, Winnebagoes, and other races, all tending to show that the system has been, and now is, universal upon this continent. Should this last fact be established, the antiquity of the system, as coeval with the Indian race upon the continent, will also become established. Upon the basis of these two facts, and assuming that these races are of Asiatic origin, we may predict the existence of the same system in Asia, at the present moment, among the descendants of their common ancestors, if any remain.

"A brief explanation of the principal features of the system of the Iroquois is annexed, which will assist in working out every other, particularly if they are founded upon the same ideas.

"The institutions of the Iroquois were founded upon the family relationships; in fact, their celebrated league was but an elaboration of these relationships into a complex system of civil polity. At the base of this were their laws of descent. They were unlike both the civil and the canon law; but yet were original and well defined. The chief differences were two: first descent among the Iroquois followed the female line, or passed through the mother; while in each of the former systems it follows the male, or passes through the father. In the second place the collateral lines, with the Iroquois, were finally brought into or merged in the lineal; while, in the other cases, every remove from the common ancestor separated the collateral lines from the lineal, until after a few generations actual relationship ceased among collaterals.

"To bring out distinctly this code of descent, it will be necessary to give a brief explanation of the division of the Iroquois into tribes, the union of the several tribes into one nation, and of the several nations into one league. Without a reference to their civil organization, it would be impossible to present it in an understandable form.

"In each of the five nations who composed the original league, there were eight tribes, named: Wolf, Bear, Beaver, and Turtle; Deer, Saïpe, Heron, and Hawk. The Onondaga nation, therefore, was a counterpart of the Cayuga, each having the same number of tribes, and of the same name; so also, interchangeably, of the Oneida, the Mohawk, and the Seneca nations. In effect, the Wolf tribe was divided into five parts, and one-fifth part of it placed in each of the five nations. The remaining tribes were subjected to the same division and distribution. Between the individual members of the Wolf or other tribe thus divided, or, in other words, between the separated parts of each tribe, there existed the tie of consanguinity. The Mohawk of the Turtle tribe recognized the Seneca of the Turtle tribe as a relative, and between them existed the bond of kindred blood. In like manner the Oneida of the Hawk tribe received the Onondaga or the Cayuga of the same tribe as a relative, not in an ideal or conventional sense, but as actually connected with him by the ties of consanguinity. Herein we discover an element of union between the five nations, of remarkable vitality and power. A cross-relationship existed between the several tribes of each nation and the tribes of corresponding name in each of the other nations, which bound them together in the league with indissoluble bonds. If either of the nations had wished to cast off the alliance, it would have broken this eight-fold bond of consanguinity. Had the nations fallen into collision with each other, it would have brought Hawk tribe against Hawk tribe—in a word, brother against brother. The history of the Iroquois exhibits the wisdom of these organic provisions; for, during the long period through which the league subsisted, they never fell into anarchy, nor even approximated to a dissolution from internal disorders.

"At no time in the history of the Iroquois could a man marry a woman of his own tribe, even in another nation. All the members of a tribe were within the prohibited degrees of consanguinity; and to this day, among the descendants of

the Iroquois, this law is religiously observed. Husband and wife, therefore, were in every case of different tribes. The children were of the tribe of the mother. Here, then, we discover one of the central ideas of their laws of descent: to place the father and mother in different tribes, and to assign the children to the tribe of the mother. Several important results followed, of which the most remarkable was, the perpetual disinheritance of the male line. As all titles, as well as property, descended in the female line, and were hereditary in the tribe, the son could never succeed to his father's title of sachem, nor inherit even his tomahawk.

"A tribe of the Iroquois, it thus appears, was not, like the Grecian and Roman tribes, a circle or group of families, for two tribes were necessarily represented in every family; neither, like the Jewish, was it constituted of the lineal descendants of a common father; on the contrary, it involved the idea of descent from a common mother; nor has it any resemblance to the Scottish clan, or to the canton of the Switzer. It approaches, however, nearest to the Jewish. Denying geographical boundaries, a tribe of the Iroquois was composed of a part of a multitude of families, as wide spread as the territories of the race, but yet united together by a common tribal bond. The mother, her children, and the descendants of her daughters, in the female line, would, in perpetuity, be linked with the fortunes of her own tribe; while the father, his brothers and sisters, and the descendants in the female line of his sisters would be united to another tribe, and held by its affinities. No circumstances could work a translation from one tribe to another, or even suspend the nationality of the individual. If a Cayuga woman of the Hawk tribe married a Seneca, her children were of the Hawk tribe and Cayugas and her descendants in the female line, to the latest posterity, continued to be Cayugas and of the Hawk tribe, although they resided with the Senecas, and by successive intermarriage with them had lost nearly every particle of Cayuga blood. Neither could intermarriage with one of a foreign nation confer the Iroquois nationality upon the wife or children of the marriage, and the same *vice versa*. If a Mohawk married a Delaware woman, she and her children were not only Delawares still, but ever continued aliens, unless naturalized as Mohawks, with the forms and ceremonies prescribed in case of adoption.

"Such property as they possessed, as planting lots, orchards, articles of apparel, etc., descended in the female line; that is to say, the wife and children took nothing from the father and husband, as they were of another tribe, except it was given to them by the deceased before his death, in the presence of witnesses. The property went to the brothers and sisters of the deceased, or to the children of the sisters. The property of husband and wife was kept distinct during the marriage, and held by separate ownership; and upon the death of the mother, her property was inherited by her children. Usually, planting lots, orchards, etc., belonged to the female. In case of divorce, each took their separate effects. The children belonged to the mother, and the authority and control of the father over them ceased from the moment of separation.

"The next feature of importance in their system of descent was the breaking up of the collateral line, by merging it in the lineal, whereby the number of those who were bound together by the nearer family ties was largely multiplied. In

three removes from the common ancestor, in most cases, and in four, absolutely, this result was effected. It was accomplished by bringing the degrees of relationship nearer to each other than they are in the civil or the canon law. Thus a mother and her sisters stood equally in the relation of mothers to the children of each other; the grandmother and her sisters were equally grandmothers, the father and his brothers were fathers, the grandfather and his brothers were grandfathers to the children of each other, and so up in the ascending series. The children of two sisters were the children equally of each other, and the grandchildren of the one were the grandchildren of the other, and so down in the descending series. On the side of two brothers the degrees were reckoned in the same manner. A difference, however, was made between the children of a brother and the children of a sister, in their relationship to each other. Thus the children of two sisters were brothers and sisters to each other; they were all of the same tribe. So also were the children of two brothers, although they might be of different tribes. But the children of a brother and the children of a sister were cousins, as in the civil law; they were necessarily of different tribes. The sister was aunt to the brother's children, and the brother was uncle to the sister's, and the children of these nephews and nieces were the grandchildren equally of each. Again, the cousins themselves were interchangeably either uncles and aunts, or fathers and mothers, to the children of each other, and grandfathers and grandmothers to their children. By this simple process of reckoning degrees, the subdivision of a family into collateral branches was rendered impossible. A cousin who stands in the fourth degree of the civil law was the most remote collateral recognized in their code of descent, or rather, allowed from the lineal line.

"The grandchildren of the two sisters were also brothers and sisters to each other; and the descendants of two sisters standing in equal degrees from their respective ancestral heads, continued to be brothers and sisters to the remotest generation. The name of the relationship was changed from brother and sister to a descriptive term; but yet they recognized each other as brother and sister. With the descendants of two brothers the rule was the same. But the descendants of a brother and the descendants of a sister continued in like manner to be cousins; this last degree being as far asunder as it was possible for the descendants of brothers and sisters to fall, under the system of the Iroquois. In case one was farther removed from the ancestral head than the other, the rule which changed the collateral into the lineal line at once applied; thus the son of the son of my father's sister, or my cousin's son, becomes my nephew, and the son of this nephew becomes my grandson. In like manner, the son of the son of my mother's sister becomes my nephew, although his father was my brother. For this last result, the reason is apparent—this nephew is necessarily out of my tribe; but the reason for the same rule in the case of a cousin's son is not apparent. For example:

Description of Relationship.	Name in Seneca Iroquois.	Same in English.
My father's sister's son,	<i>Ah-gare'-seh,</i>	Cousin.
do do son's wife,	<i>Ah-ge-ah'-ne ü,</i>	Sister-in-law.
do do daughter,	<i>Ah-gare'-seh,</i>	Cousin.
do do daughter's husband,	<i>Ha-ya'-o,</i>	Brother-in-law.

Description of Relationship.	Name in Seneca Iroquois.	Same in English.
My father's sister's son's son,	<i>Ha-sok'-neh,</i>	Nephew.
do do son's daughter,	<i>Ka-sok'-neh,</i>	Niece.
do do daughter's son,	<i>Ha-ah'-wuk,</i>	Son.
do do daughter's daughter,	<i>Ka-ah'-wuk,</i>	Daughter.
do do great-grandson,	<i>Ha-yä'-da,</i>	Grandson.
do do great-granddaughter,	<i>Ka-yä'-da,</i>	Granddaughter.
My mother's sister's son,	{ <i>Hä'-je,</i> (if older,) <i>-ä'-ga,</i> (if younger,)	Older brother, or Younger brother.
do do daughter,	{ <i>Ah'-ye,</i> (if older,) <i>Ka'-ga,</i> (if younger,)	Older sister, or Younger sister.
do do son's son,	<i>Ha-sok'-neh,</i>	Nephew.
do do son's daughter,	<i>Ka-sok'-neh,</i>	Niece.
do do daughter's son,	<i>Ha-ah'-wuk,</i>	Son.
do do daughter's daughter,	<i>Ka-ah'-wuk,</i>	Daughter.
do do great-grandson,	<i>Ha-yä'-da,</i>	Grandson.
do do great-granddaughter,	<i>Ka-yä'-da,</i>	Granddaughter.

"To render these degrees of relationship intelligible, it must be remembered, that a part only of the kindred of an individual were of the same tribe with himself. Thus, Sa-go-ye-wat-hä, or Red Jacket, was of the *Turtle* tribe of the Seneca nation. His brothers and sisters, his mother and her brothers and sisters, and his maternal grandmother and her brothers and sisters, were necessarily of the *Turtle* tribe; so also were the children of his sisters, and thus down through the female line. But his father, and his brothers and sisters, and his paternal grandfather, and his brothers and sisters, would be of a different, and might be of several different, tribes; so, also, his sons, and the children of his sons, would be of a different tribe, unless these sons should marry back into the *Turtle* tribe, against which there was no prohibition.

These laws of descent were not confined to a special class, but were of universal application; and to this day, among the descendants of the ancient Iroquois, they are preserved and recognized unchanged, and are as familiar to the rudest Indian as the alphabet is to us.

To understand the practical use of this code of descent in its most important relation, namely, the descent of the title of sachem, it will be necessary to examine briefly the structure of the League of the Iroquois. At the institution of the league, fifty permanent sachemships or hereditary titles were created and named. They were then distributed among the nations as follows: nine of them were assigned to the *Mohawk*, nine to the *Oneida*, fourteen to the *Onondaga*, ten to the *Cayuga*, and eight to the *Seneca* nation. These titles were made hereditary in certain tribes, some of which received two or more, and others none. These sachemships could never pass out of the tribe to which they belonged, except with its extinction. While the office of sachem was absolutely hereditary in the tribe, it was, at the same time, elective as between certain of the male relatives of the deceased sachem of the same tribe with himself.

"The title of sachem was surrounded by insuperable barriers against the designs

of talented and ambitious men, for reasons of policy ; and the safeguards against usurpation were too deeply integrated in their institutions to be overcome or superseded. How this was accomplished was, for a long period, difficult to be understood ; but the intricacy is removed by the single fact, before stated, that the title was hereditary in the tribe, but elective as between certain of the male relatives of the deceased sachem. It will not be necessary to explain minutely how the choice was made, further than to say, that, if the title belonged to the Wolf tribe, the new sachem must be "raised up," to use their own expression, from the same tribe. As the son of the sachem was of another tribe, he was out of the line of succession ; but his brothers were of the Wolf tribe, and so were his sister's sons ; hence we find that the succession fell upon a brother of the deceased ruler, or upon a nephew. Between a brother of the deceased and the son of a sister there was no law establishing a preference ; neither as between several brothers on one side, or several sons of a sister on the other, was there any law of primogeniture. They were all equally eligible, and the law of election came in to decide between them. The choice was made by the wise men and matrons of the tribe ; and among the latter the mother of the deceased ruler exercised a decisive influence.

Upon the decease of a sachem, and the choice of a successor, a council of all the Sachems of the League was convened to "raise up" the new ruler, and invest him with his title. To this council belonged the exclusive power of investing with the office ; and no one could become a sachem in fact, until this ceremony of investiture was performed. These councils lasted several days, and were attended with many forms and ceremonies. They are still held in Western New York as often as each alternate year.

"These sachems were the rulers of the people, partly by elective, and partly by hereditary right ; but their duties and authority were confined exclusively to the affairs of peace. When assembled together, they formed the general council of the league, and possessed, in themselves, the executive, legislative, and judicial powers of the Commonwealth. In the same manner the several sachems of each nation composed the national council, which exercised a separate government over all the affairs of their respective nations, such as did not relate to the general welfare.

"Many years after the formation of the league, a new office was created—the office or title of *chief*. It was of lower rank than that of sachem, and was not hereditary. It was in the strict sense elective, and the reward of merit, and ceased with the life of the individual. To this class the most distinguished of the war captains and orators of the Iroquois belonged ; among them, Tä-yen-dä-nae-ga, or Joseph Brant, and Sa-go-ye-wat-ba, or Red Jacket. At the present time the Seneca nation, in Western New York, have eight sachems, as of old, who hold their titles by the original tenure, and about seventy chiefs, who hold by election.

"It is an interesting fact, that the sachems of the Iroquois at the present day, although the league is dismembered, and the nations are scattered, still bear the same individual names which were borne by their predecessors at the establishment of the league. Thus Ho-no-we-na-to, which means "Keeper of the Wam-

pum," was the name given to one of the fourteen original Onondaga sachems. All of his successors, through many generations, down to the present Ho-no-we-na-to, now at Onondaga, have held the same title, and borne the same name. Do-ne-ho-gä-weh, the "Keeper of the Door," was the name of one of the eight original Seneca sachems. This title, in like manner, has been held by all of his successors, down to the present day. Ely S. Parker, an educated Seneca, at the present time in the civil service of the United States, now holds this sachemship. When he was raised up, a few years since, his former name, Hä-sel-no-an-da, was "taken away," to use again their mode of expression, and the name Do-ne-ho-gä-weh bestowed in its place, by which alone he is now known. The office of sachem, therefore, is a title of nobility, but descending in the female line, instead of the male, and having attached to it the authority and powers of an hereditary ruler of the Iroquois."

Having thus set forth the Iroquois laws of descent, and the singular polity based upon them, Mr. Morgan proceeds to show in what ways it may aid as an instrument towards solving the great problem of the origin of the Indian races of this continent. Believing in the inevitable permanency of the primary institutions of a people, unless under the influence of such a revolution as the transmutation of the wild hunter-tribe into a civilized community. Mr. Morgan conceives that he has thus mastered the fundamental element of Indian society; and he is now in search of the same, or some corresponding social elements, along the supposed Asiatic path of migration to the New World.

"Nearly all of our Indian races," he observes, "are divided into tribes. The theory of the tribe is, that all of its members are consanguinii. It is a method of preserving, under a general name, the relationship which subsists among them. But since several tribes are united in one nation, and these are mingled by intermarriage, a system of relationship was still necessary to render definite the kindred ties. Among the European races, as we have seen, every remove from the common ancestor separated the collateral lines farther and farther, until, after a few generations, relationship ceased—terminating in a total dispersion of blood, except as it was preserved by the national tie. With the Iroquois it was the reverse. By merging the collateral lines in the lineal, the integrity of the bond of kindred blood was maintained, in a sensible form, through all generations. A confusion of kindred would appear to be inevitable; but in practice it was otherwise, as is demonstrated by the fact, that it is at the present moment a practical working system, perfectly and readily understood.

"Descent in the female line does not appear to have been universal among our Indian races. It had special reference to the descent of the office of sachem, or civil chief. It obtained among the Aztecs, where the sachem was succeeded either by a brother or a nephew, to the exclusion of the son; also among the Iroquois, and the Wyandotts. There are glimpses of it in several other races, but it does not appear to have been made a subject of special examination. Dr. Gulick found the same system in the Micronesian Islands—(Missionary Herald, 1853, p 90); it is said also to prevail in New Grenada in South America, and in Australia. Dr. Livingstone furnishes some evidence of its existence in the tribes of the Banyi, on

the Zambesi River, in Africa, (Livingstone's Travels, pp. 660-669.) Herodotus found the same thing among the Lycians of Asia Minor.—(Herod., Lib. 1, c. 173.)

“Of the universality of the Iroquois system of relationship upon this continent we have more evidence. In addition to the Iroquois, it obtains among the Creeks and Chippewas. The system of the Dakotas, as far as it is given in Riggs' Lexicon, is precisely that of the Iroquois. Without looking beyond these, it is sufficient, for the present, that it prevails in the principal branches of four of the great Indian families: the Hodenosaunian, the Appalachian, the Algonquin, and the Dakotan.”

Following out his idea, accordingly, Mr. Morgan has printed a very elaborate and minute series of queries relative to degrees of relationships, and the names by which such are designated. These he has distributed, with a view to obtain, in the first place, a full knowledge of the systems pertaining among all the Indian tribes of the continent. Some of these placed in our hands for the purpose of co-operating in this interesting inquiry, we have recently had the satisfaction of entrusting to the efficient hands of Sir George Simpson, who has kindly undertaken to distribute them among the most experienced officers of the Hudson's Bay Company, and others most fitted to aid in such investigations; especially with a view to ascertain if any traces of a similar social system survive among the Esquimaux. Should such prove to be the case, they must next be sought among their Kamscnatkadale congeners on the further side of the Straights, and so westward into the Asiatic, or “Eastern” continent, as Europeans regard it.

D. W.

A CURIOUS COMPUTATION—NUMBERING THE HAIRS OF THE HEAD.

The *Medical Times* says:—A German *savant* has taken the trouble to count the number of hairs existing in four heads of hair of different colours. He found in a blond, 140,409 distinct hairs; in a brown, 109,440; in a black, 102,960; and in a red, 88,740.

MATHEMATICS AND NATURAL PHILOSOPHY.

MAGNETIC ACTION OF THE SUN.

Mr. Brayley gave a lecture last month, at the London Institution, “On the Magnetic Action of the Sun, and its connexion with the Spots, the Earth's Magnetism, and the Polar Lights.” The principal object of this lecture was to give an illustrated outline of one great result of the discussion (by Major-General Sabine) of the observations made at the British Colonial Magnetic Observatories; by which as it has been said, we are “landed in a system of cosmical relations, in which both the sun and the earth, and probably the whole planetary system, are implicated.” In the opinion of the Joint Magnetic Committee of the British Association for the Advancement of Science and the Royal Society, expressed in their Report just published by the latter body, that discussion has not merely brought into view, but fully established, the existence of a very extraordinary periodicity in the extent of fluctuation of all the magnetic elements, which connects them

directly, with the physical constitution of the Sun, and with the periodical greater or less prevalence of spots on its surface,—the maxima of the amount of fluctuation corresponding with the maxima of the spots, and these again with those of the exhibitions of the Aurora Borealis, which thus appears also to be subject to the same law of periodicity. The discovery made by General Sabine of a decennial period in all those magnetic influences at the surface of the globe, which, by their dependence on the hours of solar time, led him to recognize the Sun as their primary cause—operating, however, in some other manner than by its heat—was explained by reference to the observations of Arago on the diurnal variation of the declination, which were purposely selected by the lecturer, as giving independent evidence on the subject, having been made before the establishment of the British Magnetic Observatories, and because that philosopher was evidently unaware of the existence of the periodicity they demonstrate, in common with the later and different observations in which the decennial period was first recognized by Sabine. A general view was then taken of the phenomena of the Solar Spots, and of the analogy between them and the revolving storms of our own atmosphere, first inferred by Sir John Herschel, and since remarkably confirmed, it was stated, by the observations of the Rev. R. Dawes, on the rotation of the spots about their own centres, and those of Mr. Carrington, on the currents in which they appear to drift across the Sun; and the discovery of a decennial period in their amount and frequency by Schwabe of Dessau, in the observations which he has carried on for the third part of a century, was described by reference to tables comparing the periods of the maxima and the minima of the spots with those of the magnetic fluctuations as made known by Sabine, which were thus shown to be, when complete, corresponding periods of ten years. The enormous activity in certain regions of the Sun, indicated by the magnitude of the spots, and the rapidity of their motions and changes, it was suggested, was adequate to any conceivable exertion of force upon the Earth. In proceeding to the third subject of this law of periodicity, the Polar Lights, after a brief description of their characteristic phenomena, Mr. Brayley stated that, in his opinion, the only suggestion of their cause hitherto enunciated, in the nature of a *vera causa*, had been made by Professor Faraday, and had been amply verified by facts subsequently observed,—a statement now made for the first time. In the Bakerian Lecture, read before the Royal Society in 1832, relating his discovery of terrestrial magneto-electric induction, Mr. Faraday showed that effects similar to those he had obtained by instrumental means, but infinitely greater in force, might be produced by the action of the globe, as a magnet, upon its own mass, in consequence of its diurnal rotation; and, in the sequel, he asked whether the Aurora Borealis and Australis might not be the discharge of electricity thus urged towards the poles, and endeavouring to return, above the earth, to the equatorial regions; citing, as in accordance with an affirmative reply, the effect of an aurora upon the magnetic needle recorded by Mr. R. W. Fox. He did not pursue the subject; but the hypothesis has been abundantly verified, with respect to the production of terrestrial currents of electricity, in the manner inferred, by the earth's rotation, and the other natural motions of conductors cutting the magnetic curves, by facts which the electric telegraph, land and submarine, has disclosed, and some of which were recited; while all the

phenomena of the Polar Lights themselves, especially those which are susceptible of precise measurement and instrumental observation, conspire to verify Faraday's suggestion as to their immediate nature and cause. That they are truly electrical in their nature, an inference rendered so probable by their obvious phenomena, Mr. Brayley considered to be proved by their (electro-magnetic inductive) effects on the magnetic elements; nothing hitherto known having the power of producing such effects but magnetism itself, and electricity, while no phenomena of the former are luminous,—there is no magnetic light;—and the absence of atmospheric electricity during the display of the aurora, paradoxical as it may seem, is a necessary consequence, the electricity being absorbed, as it were, by its conversion into the correlate magnetism, or, in other words, ceasing to be statically manifested while being dynamically exerted. Some experimental illustrations of the electrical nature of the Polar Lights were then exhibited, in which the luminous disruptive discharge was taken in exhausted tubes, that is, in excessively rare media, resembling in their attenuation the atmosphere itself, at the elevations where the aurora occurs; one of the tubes, prepared by M. Gassiot, showing the stratified discharge, (originally obtained by Mr. Grove,) recently cited by Humboldt in evidence that the dark spaces in the Aurora may be real, and not merely the effect of contrast. The source of the electricity in these experiments being the apparatus termed the Ruhmkorff coil, the close accordance between them and the natural phenomena was pointed out, in the fact that the electricity was obtained by a process of magneto-electric induction, exactly analogous, on the small scale, to the natural process to which, operating in the globe itself, Faraday has referred the electricity manifested in the Polar Lights. The actual influence of the Aurora on the magnetic elements was exemplified by three photographs from the self-registering apparatus at the Kew Observatory, on which the vertical, the horizontal, and the total-force magnetometers, respectively, had recorded the disturbances produced in them by the Aurora of December 3, 1858. The facts establishing the participation of the Polar Lights in the great law of solar periodicity which it had been the object of the lecturer thus generally to explain, were then briefly stated; and the conclusion was deduced, that the relation of the periodicity to the electrical causation of the Polar Lights, is simply this,—that the magnetic action of the Sun periodically affects the terrestrial magnetism, which, being converted into electricity by the earth's rotation and moving conductors, agreeably to the theory maintained, exhibits the period in the polar discharges of that electricity.

MISCELLANEOUS.

CHINESE RIVERS.

At a recent meeting of the Geographical Society of London, one of the papers read was entitled "Notes of a Voyage up the Yang-tse-Keang, from Wosung to Han-kow, by Lawrence Oliphant, Esq., Secretary to the Earl of Elgin. With a Chart of the River, by Capt. Sherard Osborn, R.N., in command of Her Majesty's Ship Furious." We borrow the following abstract of it from the report furnished to the Athenæum:—The author commented on the importance of the voyage of the Earl of Elgin, in a political, commercial, and geographical sense, and observed

that the ascent for the first time of an unknown river for a distance of upwards of 600 miles is a great achievement. In absence of information as to the breadth of the river and the nature of its channels, and as some of the principal cities were known, and several of the fortified places were suspected, to be in the hands of the rebels, it was deemed prudent to proceed with an efficient squadron; accordingly, Her Majesty's ships Retribution, Furious, and Cruiser, and gunboats Dove and Lee were selected for the purpose; the Retribution, however, owing to her great draught of water, was left at Kew-Shien, about 90 miles above Nanking, and the remainder succeeded in ascending the river—overcoming all obstacles in the shape of rebels and shoals—to Han-kow. Within the last few years the channel of the river up to Nanking is so entirely changed, shoals existing where the charts indicated deep water, as to neutralize the advantages derived from the experience of former surveyors; nor is this transformation confined to the bed of the river—the same occurs with its banks, and former landmarks had either disappeared altogether, or were so completely altered as to be undistinguishable. The direction of the current follows the same law of change, and to such a degree, in the opinion of the author, as to render, in our altered relations with China, an extended survey essential to the interests of commerce. Passing the Imperialist fleet, which was blockading Nanking, then held by the rebels, the latter fired on a flag of truce which was hoisted, the result of which was the silencing and partial demolition of their batteries. Continuing the ascent, and leaving behind several towns, here, held by the Imperialists and there by the rebels, the squadron entered the comparatively narrowed passage by the Eastern and Western Pillar Hills; the former rising to a height of from 300 to 400 feet out of the water, crowned with a crenellated wall with batteries—the latter shaped like Gibraltar, on a smaller scale, and covered with fortifications extending some distance along the shore, effectually commanding the passage, and rendering such a position, in the hands of a European Power, impregnable. Leaving Kew-Shien, the expedition proceeded on their voyage—the hills on the banks rising to a height of 2,000 feet, richly wooded—and reached Ta-Keang, where this range winds rapidly away in a southerly direction, the river following an opposite course, and widening into noble reaches of great depth; and a range of hills to the north then commences. Up to this point the navigation is unattended with any great difficulty, and the soundings are regular. Continuing their course, large lakes were visible from the mast-head on both sides; in summer they are filled by the overflowing waters of the Ta-Keang, and are subject to annual inundations. The author here notices the principal towns and villages, and the chief features and the character of the country on either bank. With the exception of the Tsung-yang river which joins a lake a little above Nanking, all those tributaries marked as such in the maps were mere ditches, almost dry in the winter; but here the Great Lake meets a mighty feeder in the Poyang Lake, discharging into it the whole drainage of the province of Keang-si. Throughout the whole length of the voyage to Han-kow the banks, and the cultivation on them, retain much of the same character. The cotton of the district of Kin-kwoh is celebrated. There can be little doubt that the natural advantages Han-kow possesses must always render it of great importance in a commercial point of view; and it is not easy to estimate the effect which the concentration of a foreign community, and the accumulation of foreign capital may produce upon the river traffic generally.

THE EXHIBITION OF 1861.

The Society of Arts has issued the following resolutions in reference to the establishment of Decennial Exhibitions in Great Britain, the first of which it proposes to hold in London in 1861 :

EXHIBITION IN 1861.

At a special meeting of the Council of the Society for the Encouragement of Arts, Manufactures and Commerce, the following resolutions were passed :—

The Council of the Society of Arts, bearing in mind the part which the Society took in originating the Great Exhibition of 1851, have considered it to be their duty carefully to examine various suggestions for holding an Exhibition in 1861, which have been submitted to them and have resolved :—

1. That the institution of Decennial Exhibitions in London for the purpose of showing the progress made in industry and art during each period of ten years, would tend greatly to the "Encouragement of Arts, Manufactures, and Commerce."

2. That the first of these Exhibitions ought not to be a repetition of the Exhibition of 1851, which must be considered an exceptional event, but should be an Exhibition of works selected for excellence, illustrating especially the progress of industry and art, and arranged according to classes, and not countries, and that it should comprehend music and also painting, which was excluded in 1851.

3. That foreigners should be invited to exhibit on the same conditions as British exhibitors.

4. That the Council will proceed to consider how the foregoing resolutions can be best carried into effect.

P. LE NEVE FOSTER, *Secretary*.

Society's House, Adelphi, London.

The London *Globe* thus discusses the proposition put forward by the Society of Arts to hold an Exhibition in 1861, setting forth, in the first place, some of the reasons for holding such an Exhibition; secondly, what should be its nature; and thirdly, the most suitable site for holding it.

How far is the decennial period likely to afford an opportunity for bringing together such a collection of articles and products as will justify the Society of Arts in entering upon so large and responsible an undertaking? What, we may ask, is ten years capable of, and what are its results in a commercial point of view?

Looking back for that period in England, we find that several new arts and industries have arisen, and old ones have been extended. Scarcely more than ten years have passed since the submarine telegraphs were unknown; the screw propeller applied to our steam-vessels; the glass-duty removed; the great improvements and advancement in the trade and products of the Staffordshire potteries effected; the manufacture of bricks left free to take such form as may be required; the excise duty on soap got rid of; photography and chromatic printing introduced and perfected as arts; gutta percha and many vegetable oils from our Colonies, such as the *Bassia Latifolia* and the *Cahoun Palm*, introduced as new raw materials in commerce; whilst the declared value of our exported manufactures has risen

from 65,756,000*l.*, in 1851, to 122,155,000*l.* in 1857. Add to the above the fact, that within ten years the resources of our Colonies have been largely developed, and the commercial world has acquired three additional emporia: two on the shores of the Pacific, and one on the great American Lakes, viz., San Francisco, Melbourne, and Chicago, none of which are even named in the edition of Mr. M'Cullough's Dictionary of Geography, published in 1849; also that China and Japan have now been opened to trade with England; and we cannot but come to the conclusion that ten years is a period fully sufficient to justify the Society of Arts in proposing to hold an Exhibition in 1861.

It must never be forgotten in the present age, that the great secret of success in commerce is rapidity of action and correspondence. This is greatly aided by a penny post and the electric telegraph, and the merchant or manufacturer who fails to make free use of either or both of these means, inevitably falls into the rear of his competitors. What the telegraph and post are to the merchant and manufacturer, Exhibitions must be to the general public—they are the telegraphs by which the public may be made rapidly acquainted with the new products of our Colonies and the application of those products to our wants.

In 1624 the celebrated Act for the abolition of monopolies was passed, and England's trade has been left free to develop itself in the majority of cases ever since. The extended publication to the world of our capability and power as producers must ever tend to the increase of trade. It is not sufficient to produce, or possess the power of producing, we must make our products known to the greatest possible extent. The recognition of this principle led to the establishment of Exhibitions in France at a time when its factories were full of their finest productions, but no demand existed for them; the demand was created by means of Exhibitions. England did not put forth its full power in 1851; Exhibitions were then a new and unexplored field to our manufacturers. Many were in ignorance of their nature, or prejudiced against them, and therefore withheld their contributions; where prejudice then existed it has since been removed. New firms, and those manufacturers who had scarcely begun life ten years ago, will, by means of an Exhibition in 1861, be enabled to put forth their energy and display their skill as manufacturers, and thus attain to that position which competition in private tends much to retard. The eleven Exhibitions of France prove that, however adverse the times, or unsettled commerce may be, the number of producers has ever been on the increase, and they are ever ready to contribute their productions at such displays. The seaboard of England and its insular position do not afford our merchants and manufacturers the same advantages over the other producing countries of Europe which England had previous to the construction of railways and telegraphs; the latter enabling prices to be learned and purchases effected at great distances, whilst by the former the goods are conveyed from the seat of production in the interior of a country to the coast without delay, and at a little cost. England having attained to pre-eminence as a manufacturing country, such pre-eminence can only be maintained by a full and constant development, and such development will take place only in proportion to the demand for improved machinery or manufactures. It is a fallacy to suppose that Exhibitions will deprive our manufacturers of the advantages they possess, by laying open their

improved means of production to others. Since 1851 almost every producing country in Europe, many of our colonies, and America, have recognized the importance and necessity for holding such industrial gatherings. The nature of the articles produced for home consumption and foreign markets can best be made known by such Exhibitions, and they serve as finger-posts in the history of industrial progress. The producing powers of our colonies demand of England that their capabilities to supply the markets of the world with every description of produce should be made known periodically in the metropolis of the empire. The products of the animal, vegetable, and mineral kingdoms are better understood and more closely studied now than formerly, and are daily adding new substances and increased comforts for our use, and such Exhibitions tend to direct the mind of working communities to peaceable occupations and competitions, and thereby induce more friendly interchanges with foreign nations.

WHAT IT SHOULD BE.

The Exhibition of 1851 has been described as a piece of barbaric pomp—of gorgeous colours and heaped-up wealth, and not a museum of Western progress. How far such a description is correct the public can judge; it must, however, be the object of the Society of Arts, in carrying out the Exhibition of 1861, to place it before the world in such a form as shall leave no doubt as to its being an Exhibition illustrative of progress. In order to the attainment of that end, it must in every respect be a People's Exhibition, paid for by the people's shillings. The results of the Exhibition of 1851 are conclusive evidence that no necessity exists for special subscriptions or government subsidy. It should be an educational exhibition, enabling us by comparison, in classes, to see wherein we are deficient as a manufacturing nation, and in what direction to look for improved appliances or raw materials, thereby enabling us the better to compete with foreign producers. It must teach us what the people of other lands appreciate, and would purchase from us, if produced by our manufacturers, thereby extending the trade of the country and opening up commerce in directions at present little supplied; as in the case of the Indian market, where, to quote the words of Colonel Sykes, Chairman of the East India Company, "Very little of the personal clothing of 150,000,000 of people in India is exported to India, and none of it in the form of fabrics in which the articles of clothing are worn, an omission which the manufacturers of England might surely supply." It should be a Universal or Free Trade Exhibition, so far as is consistent with the laws of the country. It should be a Comparative Exhibition—the cottons of Manchester and Glasgow side by side with those of France and America—the linens of Ireland by those of Belgium—the wools of England, Australia, and Thibet in close proximity.

It should be a Classified Exhibition: how entirely distinct must it be then from the Exhibition of 1851. Who that had occasion to collect the information contained in that Exhibition, as every member of the press who wrote for the guidance and instruction of the public had, but felt the want of classification? To have been able to have compared the porcelain of Sèvres, Belgium, Austria, Dresden, Berlin, and Prussia, with that of Staffordshire, Worcestershire, and other parts of the United Kingdom, what an incomparable advantage would it have been! How

important to our Yorkshire woollen trade, had our manufacturers been able, side by side, to have contrasted the productions of France, Belgium, Vienna, Saxony, Aix-la-Chapelle, and Prussia, with the cloth and mixed goods produced at Leeds, Bradford, Stroud, and Dublin. What labour and fatigue would have been saved, had we been able to view the metal-work and jewellery of France, Belgium, Holland, and Spain, with that of England in a court by itself. How will those attending the next exhibition divide themselves into groups under such an arrangement? There will be the Swiss side by side with the man of Coventry and Clerkenwell, discussing each the merits of his competitor for the trade in watches; the silk manufacturers of Lyons, Spitalfields, and Manchester, comparing their silks; and chemists and dyers, the effects resulting from the discovery of new sources of supply of colour, and new methods of applying those already known. How interesting will it be to juxtapose the wood-carvings of Switzerland and Italy with the productions of Rogers in England, or the results of the application of machinery in that direction; the inlaid wood of Austria with that of other countries. A court of the cabinet marqueterie and buhl work of the world, how instructive may it be made; and the same principle, if applied to the paper-hangings of France, London, and Manchester, the agricultural machines of America and England, the steel of Germany, Sweden, America and Sheffield, will tend to render the Exhibition of 1861, not merely a monster bazaar, but a book, well digested and arranged for ready reference, affording at once the information so frequently sought for, and oftimes in vain, in its predecessor.

The Exhibition of 1861 should also comprise well-arranged series of raw products, with the prices at which they can be obtained in our markets: the mineral products of our colonies and foreign countries—the cottons of Africa, India, America, and Australia—the oils of the Polar regions—the tallow of Russia—the vegetable oils of India, and of the forests of British Honduras, America, and Australia—the mineral oils of Trinidad, and those obtained from the coal fields of England. Nor must our machinery be excluded from the great gathering of 1861. It is of vast importance to the engineers of this country, that they should know what is being produced in the great workshops of Belgium, France, and America. But it is not desirable that the vast blocks of coal and masses of stone should again be produced for exhibition as they were presented to the public in 1851; nor is it necessary that the world should be searched to produce in our next exhibition building a competitor for the great Koh-i-noor, or masses of gold quartz from California.

It must be a Progressive Exhibition, and should include specimens of articles for which prizes were awarded in 1851, in order that the improvements effected and advances made since that date may be more readily seen. It must be an Industrial and Art-fostering Exhibition, because an increased knowledge of art involves an increased love for art, and gives a higher moral tone to the community employed in its production, and a higher appreciation of it by those who purchase its productions. The greater extent to which art and skilled labour is employed in connection with our manufactures, the larger will be the amount of capital created by labor in the country for future use. It is well known that the value of the metal used in the construction of the hair-spring of a watch can scarcely be estimated,

but by the employment of skilled labor, a ton of iron converted into steel, and then manufactured into watch springs, becomes of enormously increased value; so it will be wherever art is introduced, and a greatly increased value will be given to the material employed. It should comprise a selection of specimens of ancient art, of all ages and from every country, which may serve as types to be studied by our artizans and workers in metal, ivory, wood, stone, or other material. It must be a Fine-Art Exhibition, because in England fine art is an extensive industry peculiar in its characteristics, and was excluded from our former Exhibition. The Exhibition of Industry and Art in Paris, and more recently of Art at Manchester, has proved that the public of this country will appreciate and support such collections if brought together for their instruction, and it is needless to attempt to show that if a high class of music is introduced as a feature, it will be listened to and sought after at a time when it forms, more than ever it did in this country, part of the education of almost every child. The Exhibition throughout must aim at teaching some lesson in each of its departments, so that we may look back upon it hereafter as the point and period in industrial progress from which we may date the increased commercial prosperity and improved social condition of the people of England. That such will be the result of the Exhibition of 1861, if carried out in its integrity, and upon the basis put forward by the Society of Arts, we cannot doubt; and looking forward to its realization, we commend it to the hearty support of our readers and the public both at home and abroad.

WHERE IT SHOULD BE.

The Society of Arts, in proposing to hold another Great Exhibition of the Industry of all Nations in 1861, has not yet put forth any statement in reference to the site upon which it proposes to place such a collection. Does it by its silence on this point imply that the Crystal Palace, or the buildings recently erected at Brompton, in an extended form, are to receive the collection? The former, we presume, is not probable, as it cannot be thought that the Crystal Palace Company would give them the use of its building, unless at a heavy rental, to which would have to be added the cost of all but emptying it of much of its present contents, which when effected would not render it capable of affording facilities for the same brilliant display and bold effective arrangement of goods as did the building in Hyde Park. Neither do the Crystal Palace and other Railways connected with it, afford the necessary facilities for conveying to an Exhibition, held at Sydenham, such large numbers of visitors as frequented the Exhibition in Hyde Park in 1851. Inconvenience is at present experienced, when not more than thirty-five or forty thousand persons visit the Crystal Palace on gala days; and it is known that more than one hundred thousand entered the Hyde Park Exhibition and left it, without inconvenience, in a single day; and it is necessary to provide for a maximum number. With reference to the buildings at Brompton, they are already filled with specimens of all kinds, and are constantly used in connection with the schools of the Educational Department of the Government and the Department of Science and Art, and cannot, we imagine, be cleared out for the purpose of temporary exhibition; nor are the buildings there erected of sufficient extent or of a character suited for a great international display and world's fair of industry, science, and the polite arts. Where, then, is the Exhibition to be held? Is a new building to be put up?

and upon what site? Much has already been written in some of the daily and weekly press, upon the assumption that a new building is to be erected. If such is the fact, the Society of Arts would do well to take immediate steps to secure suitable designs for the building they will require. The experience gained by the Royal Commission, and for which it paid so dearly in 1851, must surely be remembered by them. The work then done in haste was highly creditable to the skill, ingenuity, and perseverance of the contractors: but at what cost was it effected? Why, £35,000 above the contract price is stated to have been allowed to Messrs. Fox, Henderson & Co., the original contract being to erect the building designed by Mr. Paxton for £79,800. Surely, such a result will be sufficient inducement to the Society of Arts to at once set about obtaining designs and contracts for the required building. Where, then, is the Exhibition building to be placed? Government will certainly not allow a second Crystal Palace to be erected in Hyde Park. Is Battersea Park to be the site? We would hope not; as although a fine building placed on the banks of the Thames would form an interesting object to those who pass up and down that river in the steamboats, we much doubt if the land is suited to receive so large a building as will necessarily be required. To form an imposing object, it must be on the river bank; if placed on the flat portion of the park, all picturesque and architectural effect would be lost, at the same time that the foundation would be unsound and exceedingly wet. Moreover, is Battersea Park a desirable site for an Exhibition in point of accessibility? We think not. The great majority of the English and London population reside north of the Thames, and our railways communicating with the seats of industry in the Midland and Northern Counties of England have no connection with the south side of that river, nor are there many direct approaches for the ready carriage of goods through the metropolis to it. Is the new Palace proposed to be built at Muswell Hill a speculation, in anticipation of the possibility of its being opened in 1861 as the successor of the Exhibition in Hyde Park? If so, we fear it also is far too inaccessible. Are Victoria, or Regent's Park, Primrose Hill, the proposed site for the Finsbury Park, available? Regent's Park or Finsbury Park are far more accessible than the others, but is the Government to be called on to aid the Society of Arts to obtain a site, or will the Commissioners of the Exhibition of 1851 lend their land at Kensington for the time being for such a purpose? If the latter can be obtained we believe it possesses many points in its favour. There is an identity of locality in the minds of foreigners and the British public at once effected; it is accessible from many leading thoroughfares—it is not far distant from our railways, and if any of the plans for uniting the London and North-Western, the Great Western, and North London Railways with those on the south side of the river, which are already deposited and advertised to be brought before Parliament next session, can be carried out,—and some such plan must be carried out,—the goods from our great seats of industry might then be delivered at once, by means of a short branch line, on to the grounds of the Exhibition itself without delay, and at a diminished cost. We would urge on the attention of the Society of Arts the above considerations. The year 1861 is not far distant, and if time is lost in settling the design of the building, or the site on which it is to be built, it can only be at a greatly increased cost on its ultimate completion.

CANADIAN INSTITUTE.

SESSION—1858-59.

THIRD ORDINARY MEETING—8th January, 1859.

HON. G. W. ALLAN, President, in the Chair.

I. *The following Gentlemen were elected Members:*

CHARLES H. W. A'COURT, Esq., London, England.

CAPT. JOHN FERRIS, Staff Officer of Pensioners, Toronto.

JOHN KERR, Esq., Toronto.

Professor G. LAWSON, Kingston, C. W.

S. S. MACDONALD, Esq., Windsor, C. W.

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

FOR THE MUSEUM.

1. MAJOR LACHLAN, CINCINNATI, OHIO.

Collection of Silurian Fossils from Mount Auburn, Ohio Parcels \$5

2. REV. V. CLEMENTI, B.A., PETERBOROUGH.

The Skull of a Beaver, (*Castor Fiber*). 1

FOR LIBRARY.

1. MAJOR LACHLAN.

Christy's Letters on Geology.

Second Preliminary report of the Nantahala and Tuckasege Land and Mineral Company, 1858.

2. CHICAGO HISTORICAL SOCIETY.

Charter Constitution and By-laws.

3. PROFESSOR G. LAWSON, KINGSTON, C. W.

Transactions of the Scottish Arboricultural Society. Vol. 1. Parts 1, 2, and 3.

Remarks on *Lopas Anatifera*. Linn.

On the occurrence of Conchonaceous in Galeacea.

On the structure of the *Victoria Regia*.Report on Musci and *Desmidea*, &c.

Papers Read to the Botanical Society of Edinburgh.

Bermuteungen.

III. *The following Papers were read:*

1. By the President, the Hon. G. W. Allan:

The Annual Address.

2. By Dr. Harvey, of Hamilton:

"On the increase and decline of Malarious diseases in the Valley of the Grand River."

IV. A discussion took place on the proposal to change the night of Meeting from Saturday to some other night.

On the motion of F. W. Cumberland, Esq., seconded by the Rev. Professor Kendall, Friday was named as the regular night of Meeting.

It was moved in amendment, by P. Freeland, Esq., seconded by the Hon. W. Robinson, "that it is at present inexpedient to change the night of Meeting;" the amendment being put was carried by a large majority.

V. It was then moved by F. W. Cumberland, Esq., seconded by W. Duggan, Esq., "that it be remitted to the Council to consider and report on some measure for giving expressions to the appreciation with which this Institute continues to regard the liberal provisions made for the Geological Survey of Canada and to the satisfaction with which the Institute welcomes the Publications of Sir W. Logan's staff." Carried.

FOURTH ORDINARY MEETING—SESSION 1858-59.

15th January, 1859.

HON. G. W. ALLAN, President, in the Chair.

I. *The following Gentlemen were elected Members:*

JOHN FRANKS, Esq., Toronto.

GEORGE M. HAWKE, Esq., Toronto.

W. WEIR, Esq., Toronto.

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

HON. J. M. BROADHEAD, WASHINGTON.

1. Patent Office Report for 1857—Agriculture, Vol. 1; Mechanics, Vols. 1, 2, 3.

THE SMITHSONIAN INSTITUTION.

2. Smithsonian Report for 1857; Explorations &c., for Railroad Route from Mississippi to Pacific, Vol. 8.

OFFICE OF ROUTINE AND RECORDS.

Appendix 2 to 4, vol. 16 of Journals of House of Assembly, 1858.

Do. 13 to 20 vol. 16 do. do. do.

FROM PROFESSOR KINGSTON, M.A.

Report of Joint Committee of Royal Society and British Association, for continuing Magnetical and Meteorological Observations in certain Colonies of Great Britain.

III. *The following Papers were read:*

1. By Professor Chapman:

"Sketch of the Geology of Ohio," accompanying a series of Specimens illustrative of the same, by Major Lachlan.

2. By Professor D. Wilson, LL.D.:

"Notice of an ancient stone axe, inscribed in unknown characters, recently turned up by the plough in New Jersey."

SIXTH ORDINARY MEETING—SESSION 1858-59.

22nd January, 1859.

JOHN LANGTON, Esq., Vice-President, in the Chair.

I. *The following Gentleman was elected Member :*

JAMES HALL, Esq., Toronto.

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

FOR THE LIBRARY.

REV. PROFESSOR KENDALL, B.A.

1. Theory and Experiment, a lecture delivered before the Board of Arts and Manufactures of Lower Canada.

THE AUTHORS.

1. Defence of Dr. Gould by the Scientific Council of the Dudley Observatory 2nd edition.

FOR THE MUSEUM.

HIS EXCELLENCY THE GOVERNOR GENERAL.

1. Specimens of the Coinage of Canada, in a case containing two 20 cent pieces, two 10 cent pieces, and two 5 cent pieces,—silver.

Two 1 cent pieces,—copper.

III. *The following Papers were read :*

1. By Andrew Russell, Esq. :

“Report upon Explorations in the North-West.”

2. By Professor Croft, D.C.L. :

“On Dust Storms.”

SIXTH ORDINARY MEETING—SESSION 1858-59.

29th January, 1859.

HOD. G. W. ALLAN, President, in the Chair.

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

FOR THE LIBRARY.

THE REGENTS OF THE UNIVERSITY OF NEW YORK ON BEHALF OF THE STATE OF NEW YORK.

Documents relative to the Colonial History of New York. Vol. 2.

Catalogue of the Books on Bibliography, Typography and Engraving, in the State Library, 1858.

Annual Report of the Trustees, Feb., 1858.

71st Annual Report of the Regents, &c., Jan., 1858.

11th Annual Report of the State Cabinet of Natural History, March, 1858.

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

Diary and Correspondence of S. Pepys. Vols. 1, 2, 3, and 4.	Bohn's Hist. Libr.	4
The Pretenders and their Adherents	“	1
Life of John Lœcke, by Lord King.....	Standard Library	1
Neander's Christian Dogmas	“	1

Neander's General History of the Christian Religion 2
 The Bibliographers' Manual of English Literature 2
 Orlando Furioso. Translated by L. Ariosto.....Illustrated Library 2
 Holbein's Dance of Death..... " 1
 Parables of F. A. Krummacher " 1
 A Book for a Corner..... " 1
 Noble Deeds of Woman..... " 1
 Pope's Poetical Works, Vol. 2..... " 1
 Anecdotes of Dogs, by Jesse..... " 1
 Elements of Botany, by M. A. de Jessieu. Translated by
 J. H. Wilson Scientific Library. 1
 Humboldt's Cosmos. Vol.5 " 1
 Mantel's Medals of Creation. Vols. 1 and 2..... " 2
 Vegetable Physiology, by Carpenter " 1
 Total 25

FOR THE MUSEUM.

1. W. HAY, ESQ., ARCHITECT.

Specimens of Brainstone (Meandrina Cerebiformis) from the Bermudas.

2. A. H. ARMOUR, ESQ.

Specimen of Tripe de Roche.

II. The following Papers were read :

1. By Dr. Rae :

"On the Formation of Icebergs and the Transportation of Boulders."

2. By Dr. Morris :

"On a species of intestinal worm found in the white fish."

(To be continued.)

MEAN RESULTS OF METEOROLOGICAL OBSERVATIONS AT HAMILTON,
 CANADA WEST, FOR THE YEAR 1858.

BY DR. CRAIGIE.

1858.	THERMOMETER.					BAROMETER.			DAYS.			YEARS.
	Mean at 9 A.M.	Mean at 9 P.M.	Mean of 12h.	Highest.	Lowest.	Mean.	Highest.	Lowest.	Rainy.	Slight showers.	Dry.		Mean Temperature of
January	31.90°	32.54°	32.22°	56°	12°	29.671	30.32	29.10	0	11	20	1846...50.215
February	19.32	20.14	19.98	47	-10	..609	29.98	28.94	4	4	17	1847...48.163
March	31.935	32.419	32.177	65	-2	...602	30.10	...90	2	8	20	1848...49.295
April	44.43	44.73	44.68	76	21	...53	29.98	29.10	4	5	21	1849...48.105
May	51.74	50.62	51.18	80	35	...614	30.14	...10	6	5	20	1850...48.732
June	71.93	69.76	70.85	96	45	...612	29.93	...36	3	3	19	1851...48.756
July	72.42	70.80	71.61	92	54	...698	...95	...45	3	6	22	1852...48.248
August	72.00	70.84	71.42	92	47	...693	...90	...32	2	5	24	1853...49.474
September...	63.53	62.36	63.20	89	35	...719	30.04	...30	1	6	23	1854...49.013
October	53.03	52.61	52.32	80	32	...71	...03	...05	2	7	22	1855...47.316
November	36.3	37.2	36.75	60	18	...606	29.93	...20	5	8	17	1856...47.888
December ...	30.613	31.225	30.919	56	8	...632	30.24	...08	6	10	16	1857...45.808
Mean Temperature of Year...	48.142					29.645			33	86		

MONTHLY METEOROLOGICAL REGISTER, AT THE PROVINCIAL MAGNETICAL OBSERVATORY, TORONTO, CANADA WEST, - FEBRUARY, 1889.
 Latitude—43 deg. 39.4 min. North. Longitude—5 h. 17 m. 33 s. West. Elevation above Lake Ontario, 108 feet.

Day	Barom. at temp. of 32°.			Temp. of the Air.			Excess of mean above average.			Tens. of Vapour.			Humidity of Air.			Direction of Wind.			Velocity of Wind.			Rain in inches.	Snow in inches.		
	6 A.M.	10 P.M.	Mean.	6 A.M.	2 P.M.	10 P.M.	M.F.	M.E.	M.N.	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.			Re- sult.	Dir- ec- tion.
1	29.840	29.763	29.748	29.780	29.839	29.819	31.4	31.22	7.33	129.128	113.123	81	.65	.64	.70	W S W	Calin.	N E	0.6	0.0	5.8	4.41	5.14	0.4	
2	709	.508	.479	.5338	13.3	13.8	19.1	19.23	4.62	107.073	98.505	89	.63	.62	.77	E N E	N E B E	E N E	12.5	11.5	15.4	10.78	11.11	2.0	
3	340	.267	.270	.2872	13.6	17.8	16.2	15.20	8.67	072.079	68.077	90	.88	.88	.89	N E N	Calin.	Calin.	4.2	4.2	0.0	3.35	3.79	0.2	
4	277	.347	.577	.4192	15.8	22.7	19.0	19.43	4.25	079.071	67.8	88	.58	.70	.76	Calin.	S W	W S W	0.0	10.8	4.2	8.83	8.94	2.5	
5	774	.864	.838	8260	17.7	22.0	20.9	20.33	3.25	087.081	105.089	90	.66	.94	.82	W S W	W S W	N E B E	6.4	9.5	8.5	1.15	6.42	0.1	
6	780	.854	—	—	19.8	24.8	—	—	.90	.79	—	90	.79	—	.80	N W	N W	N W	7.0	2.8	10.4	3.75	9.25	0.2	
7	966	.830	.784	8697	13.3	23.4	25.0	20.93	2.50	073.101	103.092	92	.81	.74	.81	N W	N	S E B E	7.0	8.8	0.0	3.66	3.78	0.5	
8	650	.547	.483	.5572	24.5	34.6	34.0	30.95	4.578	109.148	159.137	82	.74	.79	.78	S E	S E	Calin.	5.2	8.8	0.0	0.66	3.45	0.5	
9	883	.370	.493	.4328	33.2	29.2	19.8	26.42	3.15	181.110	050.111	96	.68	.47	.71	S S W	N N W	N W	3.5	16.5	16.5	12.67	13.45	0.2	
10	687	.789	.937	8262	9.3	13.2	3.9	9.27	4.00	056.071	045.057	84	.90	.86	.84	N S W	N N W	Calin.	15.4	8.0	0.0	5.56	6.43	0.2	
11	980	.969	.836	9252	14.4	20.3	15.8	17.07	6.20	040.063	078.070	76	.55	.88	.75	W S W	Calin.	N W	3.0	0.0	2.5	2.07	2.53	0.2	
12	847	.874	.911	8835	15.1	19.8	11.5	15.07	8.18	050.063	066.069	93	.59	.92	.82	N E	N	N W	4.5	6.2	4.4	3.94	4.03	0.2	
13	907	.820	—	—	5.7	23.0	—	—	.93	.65	—	93	.65	—	.63	N W	N W	N	0.4	5.2	12.5	7.64	8.01	0.2	
14	757	.709	.542	.6573	21.2	25.2	30.1	26.10	2.83	105.116	137.120	92	.85	.81	.84	S W	S W	Calin.	13.0	10.5	0.0	5.90	6.03	0.2	
15	495	.244	.362	.3483	35.7	36.4	35.7	35.87	42.62	185.183	210.196	88	.85	100	.83	S W	S W	S W	4.5	3.8	1.5	1.81	2.43	.035	
16	637	.682	.824	6980	20.7	37.9	27.4	31.08	7.72	134.105	124.126	81	.46	.83	.73	W N W	N W	N W	1.8	2.2	0.0	1.30	2.56	0.2	
17	862	.690	.521	.6815	24.5	37.1	36.1	33.05	9.70	123.142	200.157	93	.65	.94	.83	S W	E N	S E B S	1.2	12.0	4.6	1.18	5.15	.075	
18	499	.620	.729	.6343	35.7	42.6	35.3	37.13	13.70	201.188	170.187	86	.68	.83	.85	Calin.	S S W	S S W	0.0	5.6	0.5	0.68	2.87	0.2	
19	846	.883	.187	.3702	27.1	37.9	39.3	35.25	11.72	131.160	232.179	98	.97	.86	.86	S S W	E N	E N	4.0	6.0	2.4	3.96	4.49	0.2	
20	28.877	28.982	—	—	40.4	38.2	—	—	.245	.147	—	97	.64	—	.64	E	S W	N	5.0	27.5	23.5	26.86	28.05	inap.	
21	29.486	29.622	.752	.6325	25.4	30.2	33.8	25.57	1.83	089.088	110.093	63	.54	.85	.67	W N W	W N W	Calin.	32.0	32.7	3.4	17.08	17.33	inap.	
22	551	.522	.560	.6202	23.4	30.2	24.8	31.53	7.72	093.159	169.140	75	.75	.75	.77	W	E N	N	1.0	5.0	0.0	1.36	2.76	0.2	
23	651	.622	.628	.6332	32.1	42.2	38.2	37.55	43.62	157.177	177.171	86	.65	.76	.73	W	S S W	N W	1.2	1.4	7.5	5.55	6.64	.055	
24	617	.836	.917	.8170	30.3	27.0	22.0	25.83	1.70	156.083	104.103	62	.56	.87	.73	N W	N W	N	26.0	17.0	7.6	12.59	14.70	1.0	
25	873	.788	.631	.7452	15.4	21.6	24.1	20.43	3.00	059.058	093.073	96	.50	.72	.85	E N	E N	S W	15.6	22.0	26.4	20.69	21.23	0.2	
26	803	.285	.513	.3092	20.5	35.8	27.7	30.48	4.95	144.169	113.147	90	.90	.74	.85	E N	S W	N W	20.2	21.8	5.5	7.18	10.63	0.5	
27	457	.832	.671	—	—	—	—	—	.85	.67	—	85	.67	—	.79	W N W	W N W	N	12.6	12.6	6.82	9.73	—		
28	780	.671	.780	.6762	30.3	32.1	27.4	29.85	4.95	145.177	124.131	86	.70	.83	.79	W N W	W N W	N	12.6	15.4	3.8	12.70	14.11	0.2	
M	29.6372	29.6235	29.0334	29.6321	23.67	29.12	25.82	26.04	2.87	115.115	121.117	86	.60	.81	.79	—	—	—	7.77	10.03	6.50	—	—	8.50	

REMARKS ON TORONTO METEOROLOGICAL REGISTER FOR FEBRUARY, 1859.

Highest Barometer 30.002 at 8 a. m. on 11th, } Monthly range =
 Lowest Barometer 28.877 at 6 a. m. on 20th, } 1.125 inches.
 Maximum temperature 48° 2 on a. m. of 20th } Monthly range =
 Minimum temperature 21° on a. m. of 13th } 41° 1
 Mean maximum temperature 31° 25 } Mean daily range = 12° 15.
 Mean minimum temperature 19° 71 }
 Greatest daily range 21° from a. m. to p. m. of 13th.
 Least daily range 3° from a. m. to p. m. of 2nd.
 Warmest day 23rd Mean Temperature 37° 55 } Diff^r-rence = 23° 28.
 Coldest day 10th Mean Temperature 9° 27 }
 Maximum { Solar 64° 3 on p. m. of 18th } Monthly range =
 Radiation { Terrestrial -7.8 on a. m. of 13th } 72° 6.
 Aurora observed on 3 nights, viz.: 1st, 24th, and 25th; possible to see Aurora
 on 11 nights; impossible on 17 nights.
 Snowing on 14 days; depth, 8.3 inches; duration of fall 67.2 hours.
 Raining on 6 days; depth, 0.453 inches; duration of fall, 16.7 hours.
 Mean of cloudiness = 0.74; most cloudy hour observed, 4 p. m., mean = 0.83; least
 cloudy hour observed, midnight, mean = 0.61.

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

North. 2107.88
 South. 1033.96
 East. 1300.03
 West. 2782.72
 Resultant direction, N 54° W; Resultant Velocity, 2.72 miles per hour.
 Mean velocity of the wind 8.50 miles per hour.
 Maximum velocity 37.0 miles per hour, from 5 to 6 p. m. on 20th.
 Most windy day 20th—Mean velocity, 23.05 miles per hour.
 Least windy day 15th—Mean velocity, 2.43
 Most windy hour, noon to 1 p. m.—Mean velocity, 10.23 do } Difference
 Least windy hour, 9 to 10 p. m.—Mean velocity, 6.82 do } 3.41 miles.

8th. Solar halo at noon, (imperfect).
 9th. Lunar halo at 6.30 p. m.
 11th. Lunar halo and corona from 6.50 p. m. (Very distinct.)
 13th. Lunar halo, 6.30 to 8 p. m. (Very perfect.)
 17th. Fog from 9.30 p. m.
 18th. Fog from 6 a. m. Very mild day.
 19th. Dense fog from 7 a. m. Very mild day.
 20th. Severe thunderstorm from 1.30 to 3.30 a. m. (First of the season.) Fog from
 6 to 9 a. m. Great storm of wind; mean velocity, from 9 a. m. of 20th to 9 a. m. of
 23rd. Solar halo from 9.30 a. m. to 2 p. m. [21st, = 31.13 miles per hour.

25th. Very stormy day; wind high, and very keen.
 26th. Brilliant meteor at 6.15 p. m.; descending from zenith towards N.W., emitting
 a bright tail, and bursting into small fragments when within about 20° of horizon.
 The Resultant Direction and Velocity of the Wind for the month of February,
 from 1843 to 1859 inclusive, were respectively N 69° W, and 2.93 miles.
 The month of February, 1859, was mild and dry; the mean temperature having
 been 32.1 above the average of 20 years. The depth of rain and snow were both less
 than the average; the former by .688 in. and the latter by 9.0 in. Total deficiency of
 moisture = 1.488 in.

COMPARATIVE TABLE FOR FEBRUARY.

YEAR.	TEMPERATURE.				RAIN.		SNOW.		WIND.		
	Mean.	Difference from Average.	Maximum Observed.	Minimum Observed.	Range.	No. of days.	Inches.	No. of days.	Inches.	Resultant Direc- tion.	Mean Velo- city.
1840	28.0	+ 5.2	49.1	- 8.3	57.4	8	1.475	6	1.475	0	...
1841	22.4	- 0.4	43.4	+ 2.5	43.7	8	0.000	0	0.000	...	...
1842	26.9	+ 4.1	48.7	- 10.2	48.2	1	3.625	9	3.625	...	...
1843	14.5	- 8.3	37.5	- 4.4	47.5	1	0.375	21	14.4	...	...
1844	26.0	+ 3.2	47.1	- 3.9	50.5	5	0.430	7	10.0	...	...
1845	28.0	+ 3.2	44.6	- 16.2	57.6	0	Imp't	9	19.0	...	...
1846	20.4	- 2.4	41.4	- 1.0	43.2	2	0.500	13	16.1	...	...
1847	21.5	- 1.3	42.2	- 0.6	47.5	0	0.775	8	10.8	N 65 W,	2.53
1848	26.6	+ 3.8	46.9	- 0.2	47.5	4	0.240	13	19.2	N 41 W,	1.98
1849	19.5	- 3.3	41.1	- 9.2	50.3	2	0.340	19	19.2	N 80 W,	3.43
1850	26.0	+ 3.2	49.2	+ 1.8	47.9	7	1.235	9	23.1	N 40 W,	6.94
1851	27.6	+ 4.8	50.2	+ 3.2	48.9	3	0.600	4	2.4	N 64 W,	1.69
1852	23.4	+ 0.6	41.2	- 3.2	44.4	7	3.950	11	13.0	S 75 W,	3.34
1853	24.1	+ 1.3	43.4	- 0.6	44.0	4	1.030	15	12.6	N 49 W,	2.51
1854	21.1	- 1.7	42.7	- 5.7	45.4	2	1.460	15	18.0	N 7 E,	1.73
1855	15.7	- 7.4	37.3	- 25.0	62.3	5	1.770	14	31.8	N 40 W,	4.34
1856	15.7	- 7.1	35.3	- 18.7	54.0	8	0.050	8	9.7	N 81 W,	7.70
1857	28.5	+ 5.7	51.2	- 5.9	57.1	11	3.050	11	11.7	S 78 W,	3.68
1858	17.0	+ 5.8	40.9	- 6.6	47.5	1	Imp'd	16	26.7	N 72 W,	8.22
1859	26.0	+ 8.2	43.3	+ 3.9	30.4	6	0.455	14	8.3	N 55 W,	2.72
Mean	22.83	...	43.93	- 5.34	40.27	4.1	1.042	11.2	17.80	...	7.81

REMARKS ON TORONTO METEOROLOGICAL REGISTER FOR MARCH.

Highest Barometer..... 30.255 at 8 a. m., on 2nd } Monthly range =
 Lowest Barometer..... 28.288 at 5.40 a. m. on 19th } 1.969 inches
 Maximum Temperature..... 54°2 on p. m. of 24th } Monthly range =
 Minimum Temperature..... 9°8 on a. m. of 2nd } 44°4
 Mean maximum Temperature..... 42°10 } Mean daily range =
 Mean minimum Temperature..... 30°48 } 11°62
 Greatest daily range..... 20°9 from a. m. to p. m. of 23rd.
 Least daily range..... 2°4 from a. m. to p. m. of 10th.
 Warmest day..... 24th ... Mean temperature..... 46.45 } Difference = 28°13.
 Coldest day..... 1st ... Mean temperature..... 18°32 }
 Maximum { Solar..... 69°4 on p. m. of 24th } Monthly range =
 Radiation. { Terrestrial..... 2°9 on a. m. of 2nd } 66°5.

Aurora observed on 8 nights, viz., on 1st, 16th, 23rd, 24th, 26th, 29th, 30th, and 31st.
 Possible to see Aurora on 17 nights; impossible on 14 nights.
 Snowing on 8 days,—depth. 1.0 inch; duration of fall 13.0 hours.
 Raining on 15 days,—depth 4.034 inches; duration of fall 76.1 hours.
 Mean of cloudiness = 0.65.
 Most cloudy hour observed, 6 a. m., mean = 0.77; least cloudy hour observed,
 10 p. m., mean, = 0.53.

COMPARATIVE TABLE FOR MARCH.

M.	TEMPERATURE.				RAIN.		SNOW.		WIND.		
	M'n.	Diff. from Aver.	Max. ob'd.	Min. ob'd.	Range.	No. of days.	Inchs.	No. of days.	Inchs.	Resultant Direction.	Force or Velocity.
1840	33.3	+3.2	56.9	8.7	48.2	8	1.640	8	...	...	0.51 lbs.
1841	27.7	-2.4	58.5	-6.9	60.4	5	1.170	7	...	...	0.70
1842	35.8	+5.7	68.7	14.3	53.8	4	3.160	8	...	...	1.18
1843	21.3	-8.4	38.6	-2.8	41.4	2	0.625	18	25.7	...	0.57
1844	31.3	+1.2	50.3	9.6	40.7	8	2.470	8	14.0	...	0.66
1845	35.4	+5.3	61.7	9.9	51.8	5	impft.	8	2.8	...	0.80
1846	33.1	+3.0	49.3	7.6	41.7	9	1.965	5	2.3	...	0.71
1847	26.2	-3.9	44.3	4.8	39.5	6	0.860	6	9.7	N 66° W	2.03 5.80 mls.
1848	28.6	-1.5	58.9	0.9	58.0	5	1.220	6	9.2	N 3° W	1.48 5.37
1849	33.5	+3.4	53.4	15.4	38.0	2	1.525	2	2.3	N 52° W	2.62 7.62
1850	29.8	-2.3	46.0	6.0	40.0	2	0.745	7	11.2	N 21° W	1.93 7.65
1851	32.4	+2.3	58.7	13.1	45.6	3	0.770	9	8.8	N 8° W	0.71 5.81
1852	27.7	-2.4	44.8	-3.2	48.0	8	3.050	12	19.5	N 68° W	2.60 5.86
1853	30.6	+0.5	56.3	-0.1	56.4	8	1.050	8	7.1	N 53° W	3.39 8.03
1854	30.7	+0.6	52.8	10.4	42.4	9	2.425	3	2.8	N 88° W	4.76 9.35
1855	25.5	-1.6	48.6	-2.9	51.5	5	1.455	11	18.1	N 71° W	7.08 11.39
1856	23.1	-7.0	39.8	-13.6	52.9	0	0.000	12	10.2	N 63° W	6.63 10.54
1857	27.8	-2.3	56.5	-3.9	60.4	4	0.335	15	11.3	N 58° W	5.45 8.56
1858	28.4	-1.7	54.1	-5.5	59.6	0	0.017	6	0.2	N 64° W	1.96 10.39
1859	36.3	+6.2	53.7	10.4	43.3	15	4.054	8	1.0	...	...
M.	30.07	...	52.32	3.64	48.68	6.0	1.553	8.4	9.25	...	8.11 M1

Sums of the components of the Atmospheric Current, expressed in miles.
 North. 1876.26
 South. 1250.51
 East. 2531.91
 West. 3890.01

Resultant direction N. 64° W.; Resultant Velocity 1.96 miles per hour.
 Mean velocity..... 10.39 miles per hour.
 Maximum velocity..... 47.0 miles, from 5.30 a. m. to 6.50 a. m. on 19th.
 Most windy day..... 19th... Mean velocity 31.16 miles per hour.
 Least windy day..... 9th... Mean velocity 0.82 ditto.
 Most windy hour..... 1 to 2 p. m. Mean velocity 13.28 ditto. } Difference
 Least windy hour, midnight to 1 a. m. Mean velocity 7.94 ditto. } 5.34 miles.

3rd—Rain and Hail mingled, from 10 a. m. to 2 p. m.
 9th—Foggy, 7 to 8 p. m. Lunar Halo from 8 p. m.
 10th—Lunar Halo from 6.40 to 7.20 p. m.
 18th—Solar Halo from 10 a. m. (very perfect).
 17th—Lunar Halo, 3 to 4 a. m. Solar Halo, 9 to 10 a. m.; both well defined.
 18th—Fog 2 p. m. Sheet Lightning in S. W. 7.30 to 8 p. m.
 19th—Violent storm of wind, continuing all day with great fury: Mean velocity from midnight of 18th to midnight of 19th, = 34.37 miles per hour.

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

BY CHARLES SMALLWOOD, M. D., LL.D.

Latitude—45 deg. 32 min. North. Longitude—73 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.	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.	10 P.M.				6 A.M.	2 P.M.	10 P.M.	A cloudy sky is represented by 10; A cloudless sky by 0.
1	30.304	30.301	30.355	1.0	16.8	4.2	.034	.053	.038	84.53	73	SW	WNW	SE	22.25	5.21	0.30	Clear.	Clear.	Au. B.					
2	.004	29.908	29.906	7.9	18.1	20.1	.048	.072	.091	77.75	83	NNW	NNW	SE	5.02	3.92	1.05	Slight Snow.	Cir. Str. 6.	Clear.					
3	29.852	.694	.967	19.5	28.0	10.9	.097	.135	.051	72.88	75	W	NNW	SE	0.22	1.10	12.81	Snow.	C. Str. 10.	Clear.					
4	30.152	30.049	30.098	5.0	13.0	11.1	.029	.054	.057	82.71	79	SE	NE	SE	0.86	0.35	4.27	Do. 6.	C. Str. 10.	Snow.					
5	29.941	29.692	29.574	8.0	18.0	26.0	.054	.088	.129	83.92	84	NE	NNW	SE	13.87	12.57	8.30	Do. 6.	Clear.	Rain.					
6	.760	.950	30.125	30.0	22.0	18.3	.148	.084	.079	89.71	78	W	NNW	SE	2.62	24.63	14.51	Do. 6.	C. Str. 8.	Clear.					
7	30.104	.941	29.700	6.7	22.1	33.0	.049	.090	.168	84.78	89	ENE	ENE	SE	0.20	8.62	6.37	Hoar-Frost.	Do. 2.	Snow.					
8	29.601	.600	.724	32.0	30.2	21.0	.162	.142	.096	89.84	85	W	W	SE	18.76	10.65	6.46	C. Str. 10.	Do. 2.	Snow.					
9	.946	30.027	30.181	7.2	13.1	4.0	.049	.068	.040	81.81	80	W	W	SE	29.81	3.74	3.22	Clear.	C. Str. 10.	Clear.					
10	30.271	.178	29.914	6.1	17.6	20.1	.022	.072	.091	68.76	85	SW	SSE	SE	9.20	14.05	9.60	C. Str. 10.	Clear.	C. Str. 10.					
11	29.901	29.960	30.174	19.1	22.0	7.2	.057	.101	.042	84.86	70	W	NNW	SE	9.20	14.05	9.60	Do. 4.	Clear.	Clear, ft. Au. B.					
12	30.245	30.449	.403	6.5	11.0	5.2	.025	.042	.046	80.55	87	SE	ENE	SE	0.19	0.01	0.16	Clear.	C. Str. 6.	Cir. 4.					
13	.091	29.800	29.816	7.6	33.0	34.4	.049	.175	.190	88.94	93	NE	ENE	SE	1.22	15.48	9.62	Rain.	C. Str. 10.	Rain.					
14	29.800	.510	.820	30.0	36.7	34.2	.154	.177	.182	96.80	95	NE	SW	SE	0.10	0.11	0.75	C. Str. 10.	C. Str. 4.	Rain.					
15	.497	.520	.720	34.0	38.1	23.6	.182	.191	.129	96.90	82	SW	SW	SE	0.93	0.96	7.73	Rain.	C. Str. 2.	Snow.					
16	.861	.854	.900	21.4	38.1	26.5	.096	.199	.117	85.90	82	W	SW	SE	7.56	3.32	14.32	Clear.	Do.	Snow.					
17	30.150	30.142	30.265	4.1	21.0	1.2	.038	.080	.084	78.71	71	NE	ENE	SE	15.32	2.62	3.30	Do.	Do.	C. Str. 10.					
18	.850	.881	.443	6.0	5.2	6.5	.021	.020	.026	80.55	80	NE	ENE	SE	9.63	0.60	0.20	Do.	Do.	Clear.					
19	.414	29.904	29.797	10.7	1.9	8.0	.021	.040	.034	77.85	88	ENE	NE	SE	3.22	9.76	8.70	Cir. Str. 10.	C. Str. 8.	Snow.					
20	29.794	.842	.961	12.0	32.2	12.2	.066	.143	.066	90.79	89	SW	SW	SE	1.63	2.41	13.72	Do. 4.	Clear.	Clear.					
21	.733	.460	.364	10.4	15.2	17.6	.059	.070	.088	89.82	92	NE	NNW	SE	6.63	1.11	18.37	Snow.	Snow.	Snow.					
22	.807	.476	.864	29.0	21.8	5.6	.097	.090	.035	92.78	61	NNW	W	SE	18.57	20.34	21.31	Do. 9.	Ci. Str. 9.	C. Str. 9.					
23	.940	.874	30.004	2.5	5.5	1.5	.032	.035	.040	85.61	85	W	SW	SE	10.55	0.01	0.01	Do. 6.	Do. 9.	Do. 9. [Z. lt.					
24	30.070	30.214	.428	8.9	12.4	4.0	.024	.051	.031	79.69	80	W	SW	SE	0.00	0.00	0.00	Cir. C. 4.	Clear.	Clear. Au. Bor.					
25	.643	.640	.545	14.2	12.1	9.7	.018	.051	.022	74.70	76	SW	SW	SE	0.90	0.03	0.01	Clear.	Do.	Do. Zod. light.					
26	.205	29.945	29.847	10.2	13.0	10.6	.022	.039	.022	78.60	89	NE	ENE	SE	0.00	0.00	0.00	Do.	Do.	C. Str. 10.					
27	29.684	.700	.859	10.1	29.2	21.7	.054	.128	.098	78.77	78	W	NNW	SE	4.30	7.62	5.83	Snow.	C. Str. 8	Clear.					
28	.978	30.049	30.061	12.0	13.7	4.0	.057	.057	.038	79.72	76	W	NNW	SE	12.97	12.90	4.41	Clear.	Do.	Do. Au. B.					
29	30.078	.090	.237	10.0	11.0	15.2	.020	.042	.101	76.59	69	W	NNW	SE	0.11	1.36	0.02	Do.	Do.	Do. Au. B.					
30	.638	.230	.211	17.5	1.8	2.3	.014	.034	.042	70.72	82	ENE	ENE	SE	14.10	11.43	15.62	Do.	Do.	C. Str. 10.					
31	29.967	29.630	29.647	18.5	31.0	30.1	.093	.155	.148	92.90	86	ENE	SSE	SE	19.00	13.79	13.22	C. Str. 10.	Snow.	Do. 10.					

MONTHLY METEOROLOGICAL REGISTER, ST. MARTIN, ISLE JESUS, CANADA EAST—JANUARY, 1859.
(NINE MILES WEST OF MONTREAL.)

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

Latitude—45 deg. 32 min. North. Longitude—78 deg. 36 min. West. Height above the Level of the Sea—115 feet.

Day	Barom. corrected and reduced to 32° Fahr.				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.			WEATHER, &c.
	6 A.M.		P.M.		10 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.		
	A.	M.	P.	M.	A.	M.	P.	M.	A.	M.	P.	M.	A.	M.	P.	M.	A.	M.	P.	M.								
1	29.002	29.714	29.031	32.0	39.0	21.7	102	216	090	50	91	78	WSW	WSW	NWN	NWN	2.41	5.23	19.90	C. St. 8.	C. St. 6.	C. St. 6.	Clear.					
2	30.169	30.225	30.374	7.1	21.6	-0.4	0.45	050	036	77	82	81	SSW	SSW	ESE	ESE	13.40	0.72	1.04	St. 8.	Clear.	Clear.	Do.					
3	4.16	2.00	2.67	-3.6	11.9	-4.1	0.31	051	033	83	70	72	ENE	ENE	ENE	ENE	6.70	8.62	7.18	C. St. 10.	Do.	Do.	Do.					
4	4.41	29.932	29.614	8.9	24.1	22.4	0.51	112	101	77	85	86	ENE	ENE	ENE	ENE	10.21	1.54	0.75	Do.	Clear.	C. St. 10.	Do.					
5	29.621	29.679	29.694	26.4	39.2	35.4	117	200	170	82	84	82	ENE	ENE	SSE	SSE	11.22	1.08	2.12	Do.	C. St. 4.	Do.	Do.					
6	37.0	30.000	30.093	12.0	32.1	18.6	108	102	077	89	84	76	SW	SW	WBN	WBN	23.52	8.60	9.77	Do.	Do.	Do.	Do.					
7	9.77	29.916	29.474	17.1	36.7	21.7	072	191	090	78	90	78	ENE	ENE	WNE	WNE	14.22	1.46	0.51	Do.	C. St. 4.	C. St. 4.	Rain.					
8	5.76	7.34	8.59	-4.1	-1.9	-12.6	0.31	034	018	83	84	74	W	W	WNE	WNE	36.62	13.25	1.33	St. 2.	Clear.	C. St. 10.	Clear.					
9	30.249	30.228	30.430	-29.9	-21.5	-32.1	0.08	010	003	60	63	58	ENE	ENE	WBN	WBN	14.77	8.98	3.03	Clear.	Clear.	Clear.	Do.					
10	6.14	6.20	6.22	-43.6	-14.3	-29.2	0.00	017	004	47	73	52	WSW	WSW	SWS	SWS	0.20	0.01	0.08	Do.	C. St. 9.	Do.	Do.					
11	4.25	3.98	6.23	-37.1	-19.9	-21.6	0.01	012	011	58	67	64	ENE	ENE	SSE	SSE	0.13	0.01	0.02	Do.	C. St. 6.	C. St. 6.	Do.					
12	0.066	29.976	29.928	-18.4	-10.4	-5.0	0.77	021	022	67	70	70	ENE	ENE	ENE	ENE	24.61	14.45	11.76	Do.	Do.	Do.	Do.					
13	29.731	8.24	30.009	-3.1	12.2	10.0	0.23	060	048	66	80	69	ENE	ENE	ENE	ENE	9.62	0.78	0.48	C. St. 10.	C. St. 10.	C. St. 10.	C. St. 10.					
14	8.71	7.57	29.632	8.5	15.6	17.8	0.59	070	058	58	80	92	ENE	ENE	ENE	ENE	10.56	10.01	14.30	Do.	Do.	Do.	Do.					
15	5.26	1.27	2.49	10.7	26.3	21.3	0.93	135	109	30	98	96	ENE	ENE	ENE	ENE	20.27	0.06	7.77	Rain	Do.	Do.	Do.					
16	5.74	7.46	9.79	16.1	19.0	14.3	0.79	077	076	54	76	91	WSW	WSW	S	S	19.93	8.22	10.81	C. St. 10.	C. St. 10.	C. St. 8.	C. St. 8.					
17	8.66	9.67	30.157	12.9	16.8	1.0	0.63	068	038	82	76	85	ENE	ENE	ENE	ENE	6.00	12.05	1.35	Do.	Do.	Do.	Do.					
18	30.314	30.210	1.57	-10.6	15.0	13.5	0.21	070	072	77	89	91	NW	NW	S	S	0.05	7.73	2.77	Clear.	Clear.	Clear.	Clear.					
19	0.948	0.920	0.68	12.5	24.2	19.2	0.69	094	087	60	73	84	ENE	ENE	ENE	ENE	1.02	0.01	1.78	C. St. 10.	C. St. 10.	C. St. 10.	Do.					
20	29.925	29.817	29.614	10.6	4.4	32.7	0.89	169	136	88	84	85	ENE	ENE	SSE	SSE	0.57	0.01	6.22	Clear.	C. St. 9.	Clear.	Do.					
21	5.97	5.19	7.24	36.0	38.8	34.2	1.97	207	169	95	84	85	WSW	WSW	S	S	7.01	5.43	8.67	Rain.	Clear.	Clear.	Clear.					
22	8.21	8.28	30.085	18.0	18.2	5.0	0.82	080	041	84	80	74	ENE	ENE	W	W	9.02	0.35	18.81	Do.	Do.	Do.	Do.					
23	30.250	30.259	30.96	-4.1	8.0	8.0	0.33	043	051	83	77	87	ENE	ENE	SSE	SSE	9.62	0.00	0.92	Clear.	Clear.	Clear.	Do.					
24	2.97	2.74	2.07	6.4	27.6	17.9	0.46	129	072	80	88	85	ENE	ENE	SSE	SSE	1.47	1.16	0.30	Do.	Do.	Do.	Do.					
25	2.61	1.04	1.07	10.9	29.4	24.8	0.69	136	111	80	83	86	NW	NW	SSE	SSE	0.81	0.11	0.20	Do.	Do.	Do.	Do.					
26	0.80	0.78	0.97	23.4	39.1	33.2	1.08	186	156	80	77	86	ENE	ENE	SSE	SSE	1.20	6.65	16.03	Clear.	Clear.	Clear.	Clear.					
27	2.47	3.12	3.80	10.5	20.0	10.1	0.62	075	081	89	70	84	ENE	ENE	ENE	ENE	8.52	6.20	2.90	Do.	Do.	Do.	Do.					
28	29.868	29.762	29.848	11.0	10.0	20.0	0.87	057	091	79	84	85	ENE	ENE	ENE	ENE	30.03	17.39	12.20	Rain.	Rain.	Rain.	Rain.					
29	8.86	8.00	9.24	19.1	27.4	24.2	0.87	141	006	86	98	73	ENE	ENE	SSE	SSE	4.92	0.00	0.20	C. St. 10.	C. St. 6.	C. St. 6.	Do.					
30	9.78	30.034	30.208	16.2	20.2	13.9	0.72	080	008	82	78	81	W	W	SSE	SSE	17.63	13.30	1.06	Clear.	Clear.	Clear.	Clear.					
31	30.939	3.198	3.200	-3.9	25.7	8.0	0.31	111	048	83	80	79	ENE	ENE	SSE	SSE	1.00	0.00	0.00	Do.	Do.	Do.	Do.					

REMARKS ON THE ST. MARTIN, ISLE JESUS, METEOROLOGICAL REGISTER
FOR DECEMBER, 1858.

Barometer.....	{	Highest, the 25th day	30.548
		Lowest, the 22nd day	29.307
		Monthly Mean	30.018
		Monthly Range	1.241
Thermometer...	{	Highest, the 15th day	36° 4
		Lowest, the 30th day	-17° 9
		Monthly Mean	12° 37
		Monthly Range	54° 3
Greatest intensity of the Sun's Rays			40° 4
Lowest point of Terrestrial Radiation			-17° 9
Mean of Humidity .....			.787
Rain fell on 5 days amounting to 1.176 inches, it was raining 39 hours 15 minutes.			
Snow fell on 12 days amounting to 16.19 inches, it was snowing 70 hours 10 minutes.			
The most prevalent wind was N. E. by E.			
The least prevalent wind E.			
The most windy day the 9th; mean miles per hour 18.39.			
Least windy day the 24th; mean miles per hour 0.00.			
Aurora Borealis visible on 4 nights.			
The electrical state of the Atmosphere has indicated high intensity.			
Ozone was present in rather large quantity.			
Zodiacal Light visible.			

REMARKS ON THE ST. MARTIN, ISLE JESUS, METEOROLOGICAL REGISTER
FOR JANUARY, 1859.

Barometer	{	Highest, the 10th day	30.614
		Lowest, the 15th day	29.127
		Monthly Mean	30.021
		Monthly Range	1.487
Thermometer ...	{	Highest, the 26th day	39° 4
		Lowest, the 10th day	43° 6
		Monthly Mean	10° 9
		Monthly Range	83° 0
Greatest Intensity of the Sun's Rays			40° 0
Lowest point of Terrestrial Radiation			43° 6
Mean of Humidity .....			.792
Rain fell on 4 days, amounting to 0.231 inches, it was raining 21 hours and 35 minutes.			
Snow fell on 11 days amounting to 1.73 inches, it was snowing 67 hours and 5 minutes.			
The most prevalent wind the N.E. by E.			
The least prevalent wind was E.			
The most windy day was the 8th; mean miles per hour, 22.73.			
The least windy day was the 10th; mean miles per hour, 0.03.			
Aurora Borealis visible on three nights.			
The electrical state of the atmosphere has indicated high intensity.			
Ozone was present in large quantity.			