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The Canadian Journal.

TORONTO, APRIL, 1853.

## On the Probable Number of the Native Indian Population of British America: Captain J. H. Lefroy, Royal Artillery.

(READ BEFORE THE CANADIAN INSTITUTE, MAY 1, 1852.)

There are probably few persons who, in the course of their reading in history, have not dwelt with peculiar interest upon the glimpses we catch through the mists of the past, of whole races of men that have vanished from the face of the earth, leaving no heirs or representatives to inherit the richer blessings of our age: of nations whose part in the great drama of human life we can never ascertain, whose sages are forgotten, whose warriors lie with "the mighty that were before Agamemnon" in the obscurity of oblivion. Then we may remember "how small a part of time we share" whose interests are so momentous for eternity; and may recognize, in the force of our sympathy, in the eagerness with which we interrogate the monuments that have descended to us; in the curiosity which all their reserve cannot baffle; a testimony to the truth of the declaration of the sacred historian, that the Creator 'hath made of one blood all the nations upon earth'; as well as the tie of relationship which unites all the descendants of our common parents, whatever their place in the stream, or their fortunes on the stage of life.

Naturalists have been able to number some half-dozen birds or animals that have become totally extinct within the period of authentic history. We have lately seen what general rejoicing, the discovery of a living specimen of one previously ranked in that number (the *Apterix*), has created among them. The skull, the foot, and a few rude pictures of the Dodo, have furnished ample material for a quarto volume. How many might be written on the varieties of the human race that have ceased to exist within the same period! The Dodo was perfectly common at the Isles de Bourbon two centuries ago, it was neglected, hunted down, exterminated accordingly: and the Dutch seamen who made an easy prey of whole flocks, twenty or thirty at a time, in 1602, (the Dodo, page 15,) no more suspected that we should now be ransacking all the museums of Europe for scraps to elucidate its affinities, than the first settlers of Newfoundland did that we should also be seeking in vain for one relic of its aborigines. When happy and hospitable crowds welcomed the Spaniards to the shores of Hispaniola, those cavaliers little dreamt that in three centuries or less the numerous and warlike Caribs of that Island, like the Gauchos of the Canaries, would be extinct, as completely so as the Architects of the Cyclopean remains of Italy, or the race that preceded Saxon and Dane, and Celt, in the occupation of the British Isles. In half a century there will be no trace of a native race in some of the British colonies in the east. The natives of Van Dieman's Land, for example, who numbered 210 in 1835, were reduced to 38, in 1848.* It even appears doubtful, whether that most interesting of all savage races, the Maoris of New Zealand, with its wonderful force of character, and faculty for civilization, will not die out faster than it can conform to its altered condition. Like those silent yet ceaseless operations of nature, which are wearing down, while we speak, the solid matter of every mountain chain, and water course on the globe, and substituting the luxuriant vegetation of the tropical coral reef for the barren waste of the sea; so, slowly and imperceptibly, are the great changes effected, by which one race supercedes another in the occupation of portion after portion of the globe, bringing higher qualities, a different moral and physical organization, to work out higher destinies, and fulfil higher ends of the same controuling Providence.

These reflections have been suggested by the subject of the paper which I now propose to lay before this Society, containing the result of some enquiries I have made with a view to forming something like an authentic estimate of the number of the Indian race inhabiting the British possessions in America. A portion only, it is true, of the whole race, yet one which by reason of the great extent of those possessions, is commonly regarded as a very important one. If, as I think, it can be shown, that number is vastly smaller than most persons would suppose, and very rapidly diminishing, under circumstances which are nevertheless by no means unfavourable to its preservation; then it must be admitted that the prospects for the race at large are anything but encouraging—that the time may not be far remote when posterity may be counting its last remnants, and wishing that we in our day had been more alive to the facts, and more industrious in setting up marks by which they might measure the ebbing tide, and comprehend the destiny about to be consummated.

What constitutes density of population, is a question not easy to answer, when it relates to civilized communities, so wonderfully has Providence ordained that with fresh demands, and the heavier pressure of necessity, fresh resources should be found in nature for human sustenance; but in reference to uncivilized man, linked to nature by stronger ties, and having his existence bound up as it were, with those of her provisions which do not greatly vary from age to age, and are not so beyond our means of estimation, it does not seem impossible to assign limits beyond which his numbers can never far extend, and within which there is no reason that they should much vary, unless by the operation of external causes. However, I have no intention of attempting such an estimate here. We have evidence in the great Earthen Works of Ohio, requiring an immense number of hands for their erection, that at some period a considerable population occupied the fertile vallies of that region. We know that Agricultural pursuits prevailed among many tribes, which have since almost completely abandoned them; but with all this, it is difficult to avoid the conclusion, based on the desolating habits of Indian warfare, on the severity of the climate, and on the degraded position of the female sex, that upon the whole, the population of the middle and northern portion of the continent must, at all times, have been small in proportion to its area, and never on a par with the simplest of all natural resources, the animal life of the region. The materials for a specific estimate of their numbers at any one early period, are exceedingly scanty. The early travellers dealt in round numbers to an alarming extent. "*Qui dit un Canton d'Iroquois*" says de la Hontan, "*dit un douzaine milliers, d'ames. Il s'en est trouve jusqua quatorze mille et l'on calculait ce nombre par deux mille Vieillards quatre mille Femmes, deux mille Filles, et quatre mille Enfans.*" And as there were then five such cantons or Nations, this people, if the Baron or his authorities can be trusted, counted considerably less than

* Our Antipodes by Colonel G. Mundy, 1852—Vol. II.

two centuries ago, from sixty to seventy thousand souls. Yet he gives as informants persons who had lived twenty years among them. Little reliance can be placed on the estimate—the ancient *Coureurs des Bois* were addicted to romancing, and the habit of perverting facts in reference to the more remote tribes they visited, by way of discouraging rivalry in their lucrative trade, must have clung to them when discussing those nearer home. Equally apochryphal, I cannot but suspect, must be the 20.000 warriors whom King Oppecancanough somewhat earlier, is related to have led against the settlers in Virginia. Yet these and other similar estimates, which it would be easy to multiply, if they fail to furnish a numerical basis for comparison, convey a general idea of populousness which, as compared with what is known to our times would justify anything that can be said as to the decline of the race. "There are abundant proofs," says Catlin, "in the History of the country, to which I need not at this time more particularly refer, to show that the very numerous and respectable part of the human family, which occupied the different parts of North America, at the time of its first settlement by Anglo Americans, contained more than *fourteen millions*, who have been reduced since that time, and undoubtedly in consequence of that settlement, to *something less than two millions*." (Catlin II., p. 238.) In the elaborate alphabetical enumeration of Indian tribes and Nations, upward of 400 in number, prefixed to Drake's well-known Book of the Indians: 10th Edit., 1848.—we find the estimated numbers of a large proportion of them stated, but being of a great variety of dates, and the data probably of very variable authority, no general estimate can be based on it, without an analysis much more laborious, than the result is likely to be accurate.

In the course of a couple of summers spent a few years ago in the Hudson's Bay territory, I took pains to arrive at an estimate of the actual numbers of Indians inhabiting that country, by enquiries among the resident traders, and by procuring whenever possible, a specific statement of the number of hunters frequenting each Post, the number of young unmarried men, and an estimate of their families. The two first were, no doubt, ascertained very correctly, as far as the enquiry went; the last does not admit of much doubt. With respect to the districts which I visited but from which I did not procure these data, it is not difficult to base a tolerable approximation on the information derived from observation and inquiry, and in respect to those which I did not visit, which however form but a small part of the territory, I am guided in the estimate by the facts that where there are no trading posts, there are no Indians, and that where there are trading posts, all the Indians of the district frequent them, habit having rendered the articles of European trade essential to their existence; consequently we may infer the number frequenting any given post, pretty nearly, when the scale of the establishment is known. There are, perhaps, a few exceptions to this remark in the district of Mackenzie's River, where our intercourse with many tribes is of recent origin; but it is true almost everywhere else. Whenever a conjectural addition was made, by well-informed persons, on the spot, to the more precise numbers, it has been included in the following enumeration.

The British territory in relation to its native population, may be divided into four regions. *First.*—The region west of the Rocky Mountains, and north of the parallel of 49°. *Second.*—The region east of the Rocky Mountains, but north of the parallel of 55°; the whole of which is inhabited by tribes of a common origin, and grouped by Ethnologists under the generic designation of "Tinné." *Third.*—The region from the parallel of 55° to 49°, occupied partly by tribes of what is called the Eythinyuwuk or Algonquin stock, and partly by tribes of an intrusive race kindred to the Iroquois or Five Nations. Lastly,—the British Colonies.

Beginning with the *Second* of these subdivisions, we have—North of Latitude 55°:

| | Men. | Estimated Total. | |
|---|---|---|---|
| (1.) Esquimaux—*Inn-it* not included- - - - - | Unkno | wn. | |
| (2.) Loucheux—*Kutchin* - - - - - - - - - - | | | |
| On the Youcon and Tributaries,— | | | |
| Richardson, Artez-Kutchi - - - | 100 | | |
| " p. 231. Tchue - - - - - - | 100 | | |
| " On the Tathzey - - - - - | 230 | | |
| " authority of Kutchcha - - - - - | 90 | | |
| " Mr. Murray Zi-Unka - - - - - | 20 | | |
| " Tanna - - - - - - | 100 | | |
| " 1850, Teytsè - - - - - - | 100 | | |
| " Vanta - - - - - - | 80 | | |
| " Neyetsè - - - - - | 40 | | |
| | 860 | | |
| On Peel's River, 1844 - - - - - - - | 413 | 5000 | |
| Fort Good Hope Mountain Indians- - - - | 75 | 375 | |
| Loucheux - - - | 15 | 75 | |
| Francis Lake, 1847–8 - - - - - - - - - - | 45 | 216 | |
| Pelly Banks " - - - - - - - - - | 73 | 368 | |
| | | 6028 | |
| (3.) Dogribs, Hares, Chipewyans, &c. *Tinnè.* | | | |
| Fort Good Hope, Lowland Indians - - - - | 28 | 150 | |
| " Rapid Indians - - - - | 11 | 55 | |
| Fort Normon Da-ha-Dinne, Dog-rib, Hare - | 140 | 600 | |
| Fort Simpson—Hares - - - - - - - - - - | 107 | | |
| " Do. Irregular - - - - - - | 320 | | |
| " Dog-rib - - - - - - - - - | 10 | | |
| " Do. Irregular - - - - - - | 50 | | |
| " Nahanies - - - - - - - - | 2 | | |
| " Do. Irregular - - - - - - | 4 | 2100 | |
| Fort Liard*—Hay River Indians, (Hares) - | 20 | | |
| " Beaver or Chipewyan - - - | 30 | | |
| " Slaves or Hares - - - - - - | 10 | | |
| " Thecanies - - - - - - - - | 30 | | |
| " Nahanies - - - - - - - - | 14 | 600 | |
| *Fort Resolution—Chipewyans* - - - - - - | *80* | *420* | |
| " Yellow Knife - - - - - - | 51 | 260 | |
| Big Island or Great Slave Lake Hares - - | 20 | 100 | |
| Fort Chipewyan, Chipewyans - - - - - - | 140 | 730 | |
| Vermilion Beaver Indians - - - - - - - | 62 | 250 | |
| Dunvegan Beaver Indians - - - - - - - | 87 | | |
| " Seccanies - - - - - - - - | 4 | | |
| Chipewyans- - - - - - - - - - - - - | 12 | 350 | |
| Unenumerated Chipewyan Stations - - - | | | |
| Churchill - - - - - - - - - - - - - | 100 | 400 | |
| Isle a la Crosset - - - - - - - - - - - | 110 | 660 | |
| Dogrib and Martin's Lake Indians, said by Mr. Isbester, not to be decreasing in numbers - - - - - - - - - - - | 150 | 600 | 7575 |

*Franklin gave, in 1820, 685 hunters.

† Franklin rated them at 200 men and boys.

The foregoing enumeration, although it embraces a large extent of country, does not bring us into contact with the more numerous tribes, which are to be found only on the plains, where countless herds of Buffalo furnish ample means of subsistence. Without going into any nicety of classification, founded upon affinities of race, upon which subject Dr. Latham and Sir John Richardson, (Arctic Expedition,) have given much information the tribes are referred to here by the designations they commonly bear among the traders. Mr. Harriet, then, a gentleman who had passed his life among them, estimated the six or seven tribes going by the general name of Blackfeet, as mustering 1,600 to 1,700 tents, at 8 per tent, 13,200.

Mr. Rowand, one of the oldest resident traders, gives them thus:—Sir John Franklin's estimate in 1820, is added—

| | | Franklin, 1820. |
|---|---|---|
| Blackfeet, proper................ | 300 | 350 |
| Pe-a-gans ....................... | 400 | 400 |

| | | |
|---|---|---|
| Blood Indians | 250 | 300 |
| Gros Ventre's, or Fall Indians | 400 | 500 |
| Circees | 45 | 150 |
| Cotone's } Mountain tribes | | 100 |
| Small robes } Mountain tribes | | 150 |
| | 1645 at 8 p. t. | 13,160 |
| Mr. Shaw allowed to the Blackfeet, only | | 12,000 |

Considering that these are perfectly independent estimates, they agree remarkably, and we may take by their mean—

The Blackfeet tribes ................ 12,900

We have next the Assiniboines, a tribe of the Sioux, and said to be of the Iroquois stock: they are distinguished into those frequenting the woods, and those frequenting the plains, or Strongwood and Plain Assiniboines:—

| | | |
|---|---|---|
| Mr. Harriet, in 1842, gave Strongwood | 80 tents. | |
| Mr. Rowand gave Plain Aissiniboines | 300 | 3,200 |
| Mr. Shaw gave, both together | | 4,000 |
| Giving for Assiniboines | | 3,600 |

| | TENTS. | |
|---|---|---|
| For the Strongwood Crees about Edmonton, Mr. Rowand gave | 100 | 4,000 } |
| Other Crees of the plains | 200 | 2,000 } |
| Mr. Shaw gave | | 4,000 |
| (3.) Crees | | 3,500 |
| (4.) Ojibbways, or Chippewas of the Saskatchawan—Mr. Rowand | 20 | 200 |

I. The aggregate, then, of the tribes inhabiting the Plains, in the British Territory, by competent authorities was, in 1843, not more than 23,400. Catlin's estimate for the same tribes, is 35,000; but I found that all his numbers were regarded by better authorities (for Mr. Catlin did not visit the region here in question,) as too high.

II. We have next the various divisions of that widely diffused race, the *Eythinyuwuk* or Crees, which form the population of the wooded country east of the Great Plains, and south of the Churchill River, extending however in some instances *on* to the one, and *north* of the other. The Crees of the Plains we have already counted. There are a few Crees trading at Fort Chipewyan, at Isle a la Crosse, and at Lesser Slave Lake.

| | Families. | Souls. |
|---|---|---|
| At Fort Chipewyan | 26 | 140 |
| " Lesser Slave Lake | 83 | 341a |
| " Isle a la Crosse, and Green Lake | 100 | 600 |
| " Cumberland House | | 300* |
| " The Pas, or Basquau | | 150* |
| " Norway House | | 300* |
| " Oxford House | | 100* |
| " York Factory | | 200* |
| " Beren's River | | 100* |
| " Red River dependencies | | 2000* |
| " Albany River, Martin's Falls | | 500* |
| " Moose Factory and outposts | | 500* |
| " Lake Tamiscaming | | 200* |
| | | 5431 |

(a) About one-third half-breeds. * Estimates only.

To this division belong the Chippewas or Ojibwas, Saulteurs and Tetes de Boule of Lake Superior, Lake Huron, and their tributary waters. It was ascertained by the Honourable W. B. Robinson, Indian Commissioner in 1851, that the Indians on the north side of Lake Superior, from the Sault St. Mary to Pigeon River, and inland as far as the possessions of the Hudson's Bay Company, forming 6 bands, or sub-divisions, were in all 1102 souls; and that the Indians on the north side of Lake Huron, from the Sault to French River, forming 17 bands, amounted to 1,422 souls, giving a total of 2,521. The bands were found to vary much in number, some comprising no more than 15, some as many as 241 souls. We have then—

| | SOULS. |
|---|---|
| Brought forward | 5431 |
| At Fort Alexander—Lake Winnipeg | 200* |
| " Rat Portage—Lake of the Woods | 120* |
| " Fort Francis—Rainy Lake | 400* |
| " Lake Superior as above | 1,102 |
| " Lake Huron as above | 1,422 |
| | 8,675 |

With respect to the Indians in Canada proper, it is stated, in a very interesting Report concerning them, (Journals of House of Assembly, 1844-5, Appendix 2,) that the earliest document received by the Government, which contains any detailed statement relative to the tribes, is one prepared by Major-General Darling, Military Secretary to Lord Dalhousie, in 1828. The total number of Indians who then came under the observation, and within the influence of the Government, in both Provinces, did not exceed 18,000. I am indebted to Col. S.P. Jarvis, late Indian Superintendent, for the following authentic returns of their more recent numbers. In 1835, the number of resident Indians receiving presents, as they are improperly called, being rather annuities or rent charges upon the soil of Upper Canada, was stated as follows:—

TABLE I.

| | Men. | Women | Boys und'r 15. | Girls und'r 15. | Total. |
|---|---|---|---|---|---|
| Iroquois, or Six Nation Indians, including the Mohawks on the Bay of Quintè | 598 | 727 | 543 | 545 | 2413 |
| Hurons, or Wyandots | 25 | 25 | 10 | 18 | 78 |
| Chippewas | 414 | 438 | 313 | 276 | 1441 |
| Chippewas, called Mississaugas | 208 | 246 | 157 | 125 | 736 |
| Munsees, Delaware, or Lenne-lenape | 44 | 51 | 36 | 26 | 158 |
| Moravian Indians | 78 | 79 | 55 | 44 | 256 |
| | 1397 | 1566 | 1114 | 1035 | 5082 |

The following Table contains a statement in detail of the Indians in Upper Canada in 1838, compiled from a return made in answer to enquiries of the Secretary of State for the Colonies (Lord Glenelg.) The corresponding numbers in 1844 and 1846, where they are given under the same denomination, are added from the returns of the Indian Department.

TABLE II.

*Indians of Upper Canada. The details are from the very complete returns of* 1838, *unless otherwise stated; and where corresponding totals are not given for the years* 1844 *and*

1846, *it arises from a more general form having been adopted in those years.*

| No. | DENOMINATION. | 1838. Men | Women | Under 15. B'ys | Girls | Tot. | 1844 Tot. | 1846 Tot. |
|---|---|---|---|---|---|---|---|---|
| | **CHIPPEWAS.** | | | | | | | |
| 1 | St. Clair Rapids | 113 | 124 | 84 | 85 | 396 | 197 | |
| 2 | Walpole Island or Chenail Ecarté | 47 | 60 | 28 | 39 | 176 | 307 | a. 1129 |
| 3 | R. aux Sables Lake Huron. | 11 | 6 | 4 | 10 | 27 | 117 | |
| 4 | Up. St. Clair from Saginong. | 80 | 92 | 68 | 52 | 312 | " | |
| | The same in 1844 | 218 | 234 | 159 | 130 | " | 741 | 684 |
| 5 | Amherstburg | 28 | 32 | 25 | 15 | 100 | 258 | a. 491 |
| 6 | Delaware, River Thames | 121 | 120 | 79 | 57 | 377 | 378 | 438 |
| 7 | Manitoulin Island L. Huron | 64 | 61 | 25 | 38 | 188 | " | " a. |
| | The same in 1846 | 284 | 330 | 229 | 255 | " | " | 1098 |
| 8 | LaCloche & Mississaugeen. | 69 | 77 | 59 | 20 | 225 | " | " |
| 9 | St. Joseph's Island L. Huron | 23 | 26 | 17 | 24 | 90 | " | " |
| 10 | Sault Ste. Marie | 24 | 36 | 19 | 20 | 99 | " | " |
| 11 | East Shore of Lake Huron. | 68 | 59 | 49 | 26 | 202 | " | " |
| 12 | Owen's Sound, in 1846. | 42 | 54 | 20 | 20 | " | " | 139 |
| 13 | Saugeen, Lake Huron | 55 | 57 | 55 | 51 | 218 | " | 209 |
| 14 | Yellowhead's Tribe, Rama | 83 | 103 | 35 | 21 | 242 | 267 | 327 |
| 15 | John Aisence's Tribe, do. | 51 | 71 | 36 | 20 | 184 | 211 | 213 |
| 16 | Lake Nipissing | 18 | 16 | 10 | 15 | 59 | " | " |
| | **MISSISSAUGAS.** | | | | | | | |
| 17 | River Credit, L. Ontario | 68 | 77 | 52 | 43 | 240 | 251 | 245 |
| 18 | Rice Lake | 35 | 47 | 28 | 25 | 135 | 145 | 151 |
| 19 | Mud Lake: Balsam Lake | 45 | 52 | 35 | 27 | 159 | 175 | 194 |
| 20 | Alnwick; on Rice Lake, from Grape Island | 63 | 71 | 45 | 35 | 214 | 233 | 218 |
| 21 | Bedford, near Kingston 1846 | 26 | 24 | 10 | 19 | " | " | 79 |
| | **IROQUOIS OR 6 NATIONS** *On the Grand River.* | | | | | | | |
| 22 | Mohawks, Upper | 81 | 105 | 87 | 90 | 363 | 374 | 406 |
| 23 | " Lower | 67 | 72 | 60 | 61 | 260 | 310 | 336 |
| 24 | " from the Bay of Quinté | 19 | 24 | 23 | 25 | 91 | 94 | 88 |
| 25 | " on the Bay of Quinté. | 87 | 74 | 77 | 99 | 337 | 354 | 415 |
| 26 | Oneidas, Joseph's | 16 | 19 | 5 | 17 | 57 | 42 | 42 |
| 27 | Onondagas, Clear Sky | 51 | 68 | 36 | 25 | 178 | 219 | 225 |
| 28 | " Bear or Barefoot. | 17 | 28 | 11 | 12 | 68 | 64 | 56 |
| 29 | Senecas, Nekarontasas | 8 | 13 | 11 | 10 | 42 | 55 | 70 |
| 30 | " Kaghneghtasas. | 13 | 18 | 13 | 10 | 54 | 52 | 43 |
| 31 | Cayugas, Upper | 45 | 31 | 23 | 25 | 124 | 114 | 117 |
| 32 | " Lower | 105 | 97 | 48 | 69 | 319 | 287 | 311 |
| 33 | Tuscaroras | 38 | 55 | 30 | 39 | 162 | 192 | 202 |
| 34 | Aughquagas, Joseph's | 13 | 22 | 18 | 17 | 70 | 82 | 67 |
| 35 | " Peter Green | 23 | 22 | 20 | 22 | 87 | 75 | 68 |
| 36 | Tutulies or Tutiloes | 15 | 17 | 6 | 9 | 47 | 40 | 32 |
| 37 | Minor denominations | 12 | 28 | 22 | 25 | 87 | 96 | 102 |
| | **OTHER TRIBES.** | | | | | | | |
| 38 | Ottawas, Manitoulin Island | 26 | 22 | 14 | 18 | 80 | " | " |
| 39 | Hurons or Wyandots | 34 | 21 | 13 | 17 | 85 | 88 | " |
| 40 | Munsees or Delawares. | 2 | 2 | 1 | 1 | 6 | 22 | " |
| 41 | " on River Thames. | 64 | 74 | 55 | 49 | 242 | 242 | 157 |
| 42 | " on Grand River. | 42 | 54 | 18 | 26 | 140 | 127 | 122 |
| 43 | Potawatomies, at Saugeen. | 55 | 57 | 55 | 51 | 218 | " | " |
| 44 | " St. Clair Rapids, 1844 | 141 | 170 | 101 | 94 | " | 507 | " |
| 45 | " Upper St. Clair, 1846. | 27 | 33 | 21 | 14 | " | " | 95 |
| 46 | Shawanoes, at Amherstb'g | 2 | 4 | " | " | 6 | " | " |
| 47 | Moravian Indians, River Thames | 41 | 42 | 9" | 31 | 143 | 143 | 187 |

(a) Potawatomies and Ottawas are here incl ‑ ‑d.

(b) Two bands called tl c old and the new, or Young Nanticokes, are included in these; they numbered 29 and 17 s. uls, respectively, in 1844.

The total numbers, as they appear at the foot of the above Returns, exclusive of what are termed visiting Indians, most, or all of whom, come from regions beyond Lake Superior, and, if British Indians, are included elsewhere—are as follows:—

TABLE.

| | 1838 | 1844 | 1846 | 1847 |
|---|---|---|---|---|
| Deserving Chiefs | 52 | 31 | 29 | |
| Warriors. | 38 | 38 | 51 | |
| Women | 62 | 41 | 41 | |
| Ordinary Chiefs. | 134 | 162 | 178 | |
| Warriors | 1712 | 1274 | 2207 | |
| Women | 2091 | 2131 | 2599 | |
| Boys 10 to 15 years | 422 | 492 | 573 | |
| 5 to 9 " | 430 | 475 | 595 | |
| 1 to 4 " | 553 | 433 | 690 | |
| Girls 10 to 14 years | 310 | 421 | 455 | |
| 5 to 9 " | 442 | 414 | 567 | |
| 1 to 4 " | 497 | 481 | 773 | |
| Totals | 6643 | 6874 | 8756 | 8862 |

The Chiefs and Warriors in the first class, are those who served in the last war. The numbers in 1847 are taken from the Quebec *Gazette.* The apparent increase in 1846 is due to the permanent settlement of many Indians within the Province, previously residing beyond its limits, and was occasioned, as is well known, by the objection made on the part of the United States to our continuing to supply arms and ammunition to friendly natives belonging to their territory, the details of the table however, when they are comparable, give satisfactory grounds for supposing that as regards the small portion of the Indian race inhabiting Canada, the worst is over. They appear to be slightly on the increase, and are at the same time acquiring to some extent, the habits of civilized life.*

The following Table, of the number of Indians in Lower Canada, is taken from the Report presented to the Legislative Assembly, 1845, (Journal 1844–5—App. 2) to which reference has been made before:—

| DENOMINATION. | Men | Women | Boys. 15 to 10 | 9 to 5 | under 5 | Girls. 15 to 10 | 9 to 5 | under 5 | Tot. |
|---|---|---|---|---|---|---|---|---|---|
| Iroquois, Caughnawaga | 266 | 306 | 61 | 67 | 72 | 53 | 66 | 64 | 955 |
| " St. Regis, L. St. Francis | 118 | 127 | 33 | 35 | 33 | 17 | 33 | 54 | 450 |
| " Lake of Two Mountains | 87 | 103 | 17 | 19 | 24 | 22 | 21 | 23 | 316 |
| Algonquins, Lake of Two Mountains | 95 | 116 | 23 | 20 | 19 | 29 | 26 | 5 | 332 |
| " near Three Rivers. | 25 | 34 | 5 | 9 | 10 | 3 | 3 | 9 | 92 |
| Nipissings, Lake of Two Mountains | 75 | 85 | 23 | 15 | 12 | 17 | 29 | 7 | 263 |
| Abenaquais, St. Francis | 100 | 111 | 14 | 27 | 32 | 14 | 26 | 26 | 353 |
| " Becancœur | 24 | 33 | 7 | 5 | 3 | 2 | 7 | 2 | 84 |
| Hurons or Wyandots, la Jeune Lorette | 61 | 55 | 8 | 6 | 11 | 16 | 13 | 16 | 189 |
| Tetes de Boule, St. Maurice | 31 | 22 | 1 | 10 | 8 | 6 | 6 | 3 | 86 |
| Micmacs, Abenequois, and Amaleites, of uncertain residence. | 65 | 66 | 11 | 7 | | | 3 | 28 | 180 |
| Totals | 950 | 1058 | 203 | 220 | 224 | 179 | 233 | 234 | 2401 |

* The fact that the Mohawk Chief, John Brant, was once elected member of the House of Assembly, although he lost his seat for want of sufficient freehold property, deserves to be remembered.

It is to be regretted that the Lower Canadian returns do not distinguish the Iroquois according to the distinct nations of that once powerful confederacy. It will be observed, however, that the above numbers, combined with those of the Upper Canada return for 1846, make the number of chiefs and warriors still to amount to 1,220, and the total number to 4,301*. That their ancient loyalty to the British Crown is unabated, was shown by many incidents of the Canada rebellion, and by the language of their chiefs on the very interesting occasion of the meeting to restore General Brock's Monument in 1841. There is no native race entitled to claim, on so many grounds, the interest and respect of British inhabitants of Canada.

The following numbers of Indians in the several *Counties*, taken from the Census Returns of 1852, are added, to bring down the information on that subject to the latest date. It is evident, however, that the enumerators in Upper Canada did not always distinguish them from the rest of the population. There are, for example, none returned for the Counties of Lambton and Essex, on the St. Clair,—thus the total is far below the truth,—but the list appears to be complete for Lower Canada.

| UPPER CANADA. 1852. | | LOWER CANADA. 1852. | |
|---|---|---|---|
| Brant | 1758 | Beauharnois | 754 |
| Carleton | 20 | Bonaventure | 451 |
| Dundas | 54 | Champlain | 31 |
| Grey | 374 | Drummond | 27 |
| Grenvillle | 48 | Huntingdon | 1259 |
| Haldimand | 310 | Kamouraska | 55 |
| Kent | 259 | L'Islet | 21 |
| Northumberland | 222 | Megantic | 14 |
| Peel | 12 | Montmorency | 26 |
| Perth | 8 | Ottawa | 5 |
| | | Portneuf | 12 |
| | | Quebec | 218 |
| | | Rimouski | 103 |
| | | Saguenay | 663 |
| | | Terrebonne | 11 |
| | | Two Mountains | 408 |
| | 3065 | | 4058 |

The number of Indians on the lower St. Lawrence, frequenting the King's posts of the Hudson's Bay Company, is not known, but must be insignificant. I believe this to be also the case of the Indians in Nova Scotia and New Brunswick, but have no access, at present, to authentic returns.

We have still to consider the population west of the Rocky Mountains, in New Caledonia.

In 1820 Harmon, who had lived long among them, stated that the number, of all ages, did not exceed 5,000; they have diminished since with fearful rapidity, probably faster in that quarter than in any other. Mr. McGillivray, in Ross Cox's Travels, of somewhat earlier date, makes the tribes inhabiting the country about Frazer's River, the most populous part of the country, to number no more than 1,012 souls, including the Chilcotins, Naskotins, Tolkotins, and Atnahs—four tribes. Commodore Wilkes in 1840, upon a very careful survey, and doubtless upon much more complete and authentic data, than either of the others, makes the total population of Oregon and New Caledonia together, amount to 19,354 souls, about two-thirds of what M. Duflot de Mofras estimates for Oregon alone. So that on the whole, I consider that 2,000 for the interior of New Caledonia, (Oregon no longer being British territory,) is an ample allowance.

*The Mohawks of the Bay of Quintè are included, but the Delaware of the Thames are excluded, as never belonging to the Six Nations although at present associated with them in all the returns of the Indian Department.

We have also to include the large Islands of Quadra or Vancouver's, and Queen Charlotte, together with the seaboard of that region. The population of the former has been estimated at from 10,000 to 20,000, and that of the latter at from 7,000 to 10,000.

By the kindness of Mr. Kane, whose labours as an artist in the least known parts of this continent, have yet to be fully appreciated, I am enabled to present an abstract of a very full census of Indian tribes inhabiting the north-west coast, which he procured in 1847. If it can claim anything like the general accuracy and fidelity of his pictures of Indian life, we need not hesitate to adopt it.

TABLE III.

| Common Designation among the Traders. | Tribes. | Adults. | | Children. | | Slaves. | Houses. |
|---|---|---|---|---|---|---|---|
| | | Men. | Wo'en | Boys. | Girls. | | |
| *Nass Indians | 4 | 543 | 438 | 314 | 308 | 12 | 32 |
| Chimseyans | 10 | 737 | 778 | 465 | 466 | 68 | 257 |
| Skeena Indians | 2 | 131 | 72 | 64 | 59 | 7 | 30 |
| Sabassas | 5 | 474 | 407 | 243 | 191 | 111 | |
| †Milbank Sound Ind'ns | 9 | 1007 | 961 | 391 | 462 | 47 | 122 |
| ‡Chilcat, &c. | 7 | 1249 | 961 | 469 | 418 | 479 | |
| §Stekene Indians | 8 | 562 | 410 | 240 | 190 | 144 | 59 |
| *Port Stuart | 3 | 180 | 185 | 141 | 156 | 15 | 37 |
| ‖Kygarney | 6 | 431 | 454 | 414 | 436 | | 111 |
| *Queen Charlotte Sound | 6 | 1029 | 1035 | 962 | 1003 | | 257 |
| †About Queen Charlotte Sound | 25 | 7370 | 8890 | 9949 | 11491 | 1372 | 735 |
| Cape Scott and vicinity | 4 | 730 | 8 5 | 1290 | 1290 | 210 | 74 |
| Total | | 14443 | 15466 | 14972 | 16474 | 2485 | 1724 |

* Trade at Fort Simpson, Vancouver's Island, and generally reside in its vicinity.
† Trade at Fort McLaughlin.
‡ Trade at Sitka, Stikene and Tacca.
§ Trade generally at Stikene, but frequently visit Fort Simpson.
* Trade generally at Fort Simpson.
‖ Frequent Fort Simpson, Stikene, Zacca and Sitka.
* Frequent Fort Simpson.
† Frequent Fort McLaughlin.

I confess that I was not prepared for the comparative density of population evinced by this table: it makes, in fact, the north-west coast the great centre of the Indian race at the present day; and the very detail of the returns from which it has been compiled, almost provokes a doubt of their accuracy. Mr. Kane had them however from the highest authorities—and his own observation confirms the general fact. I adopt the result therefore as entitled to confidence—and it gives for the Indians inhabiting the north-west cost of America, including, however, in part, the Russian Territory, of which the Hudson's Bay Company has at present the partial occupation, for trading purposes—a total of no less than 63,340.

We may now proceed to reckon up the result, not forgetting that the region under discussion is equal in extent to nearly one-twentieth part of the habitable surface of the globe, and has been generally looked upon as the asylum and stronghold of the race of North American Indians. Excluding the Esquimaux, whose numbers, notwithstanding the great extent of sea-line they occupy, cannot be large—probably not more than two or three thousand, we have the following enumeration:—

Chipewyan tribes—namely, Chipewyans proper, Dog-ribs, Hare or Slave Indians, Yellow Knives, Beaver

| | |
|---|---|
| Indians, Da-ha-dinnies, and Carriers | 7,575 |
| Northern Indians of the *Kutchin* stock | 6,082 |
| Ethiny-u-wuk Indians of the Plains | 23,400 |
| Chipeways and Crees, exclusive of the above | 8,675 |
| Indians of the Seaboard and Islands of the Pacific | 63,840 |
| Indians of New Caledonia—Interior | 2,000 |
| Indians of Canada | 13,000 |
| Grand Total | 124,518 |

Or to drop the appearance of precision conveyed by the broken numbers, 125,000, being barely double the number at which de la Hontan estimated the six Nations of the Iroquois alone, in 1690.

I am conscious that this number, for the gross population of so large a portion of the whole Continent, may appear almost incredibly small. In going over carefully and re-considering the details, I do not believe them to be, upon the whole, under estimated; no important region of the British territory appears to be omitted. It is presented, therefore, as an approximation, which may at least serve to direct further attention to the subject. It is, of course, to be taken as representing only a portion of the race. I have no means of estimating the native population of Russian America, and we have not considered the native population of the United States, Texas, Mexico and Oregon. The first of these was estimated in 1835 at 330,000, which, however, I take to be too high. Mr. Cuthbertson, a naturalist travelling for the Smithsonian Institution at Washington, gives the following for the probable number of Indians on the Upper Missouri, and its tributaries, in 1850. (Fifth Annual Report of Board of Regents 1851.)

| | |
|---|---|
| Sioux | 30,000 |
| Cheyene | 3,000 |
| Ariccaree | 1,500 |
| Mandan | 150 |
| Gros Ventres | 700 |
| Assiniboine | 4,800 |
| Crow | 4,800 |
| Blackfoot | 9,000 |
| Total | 54,550 |

Among whom, appear to be included, some of those frequenting the British trading posts, and previously reckoned. It is scarcely possible that the Indians of the Lower Missouri, Texas and Mexico, can make up even an approximation to the 330,000 of the Baptist Committee. (Religion in America, p. 56.) Putting the whole together, it would scarcely seem that the present aggregate can be placed so high as 250,000, instead of the two millions of Catlin.

To this remnant, then, has been reduced a race supposed to have numbered from ten to twenty millions, not more than three centuries ago. "War, death or sickness hath laid siege to it," and is still laying seige at a rate in no degree less rapid than at any former period. Not to mention the cruel destruction effected by the American fur traders and trappers in the South; by utter lawlessness and wanton disregard of humanity; by Florida wars and wholesale deportations; we find that even in regions where the more obviously depopulating agencies have been held in great restraint, the process goes on. The Indians themselves are fully aware of it, and fully conscious also that the whites cannot always be directly charged with it. Sir John Richardson has given us a curious mythological tradition which serves to account for it to the Kutchin (p. 239.) A friend of mine, who conferred on the subject with a sage old native of New Caledonia, found that his only theory was that the white men's tobacco poisoned them. The white's fire water in this case, and throughout the Hudson's Bay Territory, is happily guiltless, for none enters the country.* If we charge it, in the case of the Carrier, to the unbounded licentiousness which prevails among them, we have to account for the same causes not having had the same effect at earlier periods; for, with the sole exception of the Indians of Virginia, boundless licentiousness appears to have been the rule among the natives on our first acquaintance with them. The travels of Lewis and Clerk beyond the Mississippi, only half a century ago, fully corroborate the accounts of all travellers of the seventeenth century in Canada and the more Eastern regions, in respect to this characteristic.

Doubtless, some causes can be assigned which tend to reduce the physical stamina of the race—such as the substitution of inferior European clothing for their native robes of fur; the use of stimulants, tobacco almost universally, alcohol partially; the gradual loss of native arts and appliances, without the acquirement of anything better; the introduction of new forms of disease; a marked deterioration in their dwellings, from the skins of which they were formerly made, acquiring a market value, but being exchanged for nothing so essential to their health. There are also moral causes tending to depress the race—such as the consciousness of decline; the pressure of new necessities; the hopeless sense of inferiority to the whites in many respects, which, with all their reputed pride, is a general feeling among the Indians. Lastly, we must add the influence of practices which have a frightful prevalence in certain districts. I mean the administration of potions destined sometimes to produce abortion, sometimes to cause absolute sterility, in females. Dr. Hodder, in an Essay on the Poisonous Plants of Canada, read since the date of this paper, has alluded to the former as one of the secrets of the Indians in Canada, which he has not succeeded in discovering, but to which he attributes, in a very great degree, their decrease in number. Many instances of the latter were related to me in the interior—the Crees, more particularly, have a bad eminence as medicine men, which, shews a general disposition among them to these unnatural arts. In fact they are stated to be among the commonest resources of jealousy and revenge. However, some of these causes have not been found to check the reproductiveness of other races; and it may be doubted whether any or all of them are adequate to explain the broad fact, the final solution of which can probably be found only in the supposition of a design of Providence, to make way for one race by removing the other.

* I cannot avoid referring Temperance advocates to the amusing Essay, "Sur l'Yvrognerie des Sauvages," in the Histoire de l'eau-de-vie en Canada, 1705; re-printed by the Literary and Historical Society of Quebec. It is well to know that, *il n'y a qu'une mesure d'yvresse qu'ils appellent* Ganontiouaratonseri, c'est a dire, *Yvrognerie pleine!*

## The Horse and its Rider.

BY J. BAILEY TURNER, ESQ., QUEBEC.

It may as well be mentioned here, that the several original breeds or stocks of the horse are evidently, though cursorily alluded to in several places in Scripture, both in the vision of the ancient Hebrew Prophets, and in the Revelations of St. John. In the 1st chapter of Zechariah, and the 8th verse, the bay Syrian race, the white Armeno-Persian, and the piebald Macedonian, are evidently referred to in these words:—"I saw by night, and behold a man riding upon a red horse, and he stood among the myrtle trees that were in the bottom, and behind him were there red horses, speckled, and white." Again, in the 6th chapter of the Revelations, we have the white horse, the red, the black, and the pale horse; again, the Persian, the Syrian with the Median and Scythian, or Roman—types of the four great monarchies, not imaginary, but taken from existing races and actual localities.

As there is no trace whatever of the existence of an indigenous breed of wild horses in Arabia or the adjacent countries, we must conclude that to great care taken in breeding and training the imported races, and to the selection of the finest forms, may be attributed the excellence of the Arabian stud—the natural quality was more fully developed by the sunny climate—the allowance of scanty but highly nutritious food, and the abstemiousness in drink—and the constant attention of the owner; and we may safely conclude that, as at this day, the superior excellence of the English horse may be attributed to the careful and judicious intermixture of races; so did the Arabs derive their small but superb chargers from the Egyptian, Persian and Armenian breeds. This may account for the fact that, in very remote times, the Arab chiefs received presents of beautiful horses from neighbouring kings with joy; not that they wanted them, but that they might add to the excellence of their own breeds. And this, too, accounts for the great intermixture of colour in the Arab races. The Arabian horse was carefully bred, and this was not, and could not have been the case among the riding nations of Higher Asia, when the immense herds ranged wild over the interminable pastures, almost independent of human intervention and control. Such a nation as this care more for aggregate number than individual value; the whole people were mounted, and in the saddle performed nearly all their necessary avocations. They crossed rivers by swimming their horses, or attaching them to rude rafts Of all the human families, this alone eat the flesh of the horse; they drank the milk of their mares, and discovered how to form from it an intoxicating beverage. On horseback the marriage ceremony was performed; on horseback the Council of the nation debated its affairs ; treaties of peace and declarations of war were dated from the stirrup of the Chaghan. In our own times the Polish nobles met on horseback to elect their king. Among many of the Riding nations the horse, man and colt, were fixed standards of value, as the cow was among the Celtic tribes; and they invented the bridle, saddle and stirrup, and probably the horse-shoe, of which latter we shall speak more at a future period. Tahtar tribes at various periods in history, from the time of Attila to the 13th century, poured their swarms of cavalry westward, penetrating northward to Silesia, and southward to the Nile; twice, in the middle ages, they passed eastward, invaded and conquered China. There is no nation at this day that can oppose an equal force of cavalry to Russia. A cavalry officer of rank, in Canada, told me that he saw 60,000 Russian horsemen reviewed at one time by the Emperor Nicholas; and that among these there were very few Cossacks. Yet, just before the French Revolution, the Russian cavalry could not stand before the Turks, unless in squares eight deep, with guns at the angles, and the fronts further protected by portable *chevaux de frizes*, and even then they were often broken by the furious charge of the Spahis.

When all these facts are carefully compared and considered, no doubt can exist but that the aboriginal region in which the wild horse was first subdued to the use of man, must be sought for in High Asia, about the fortieth parallel of latitude, the vast table from whence for ages past riding Nomade tribes have continued to issue, penetrating east, south and west, from periods long prior to all historical record.

It now remains to notice the various breeds of the horse as we find them mentioned in ancient writers, and rapidly trace them to our own times, it being primarily assumed that each race or tribe of men derived their own stock from the wild horses in their immediate vicinity—as the pied horse, or tangum, in the central mountains of Asia; the tarpan, or bay stock, more to the east and south; the pale horse, dun or edbach, on the banks of the Caspian; the white or villous stock, on the Euxine; and the black, or crisped-haired, in Europe: notwithstanding the intercourse among the nations in commerce, and the invasions of war, the distinctive features of these races are still to be discerned, though there has been an intermixture for 3,000 years, as clearly and decidedly as at this day distinguish the different races of men. The tarpan or bay stock, originally seated on the banks of the Caspian, was most probably that which mounted the armies of the Hyksos, the Shepherd Kings, the first horsemen invaders of Arabia and Egypt; this breed was that which fell into the hands of the Egyptians on the expulsion of the Hyksos, and afterwards into those of the Arabians, and may be considered the parent stock of the Arab stock of this day, improved, as we have seen, by the most careful breeding and training. This horse is figured on the monuments of Egypt, as about the size of the modern Arab, with a somewhat shorter back, large eyes, small ears, and clean limbs, and when the sculpture is painted, the colour is invariably red. It may be assumed that all the bay, chestnut and brown horses, are of this race, for we know that in the time of Crœsus, the Lydian cavalry were mounted on brown horses, and Lydia bordered on the region in which the Tarpan was indigenous. We find various breeds of this race mentioned in ancient writers, such as the Scenite Arabian, and the Syrian of Apamœa, at which place Strabo tells us 300 stud-horses and 30,000 brood-mares were maintained for the service of the state; in Egypt, on the Upper Nile, at Syene, and at Calambia, in Lybia, a bay stock flourished, highly spoken of by the ancients; from Egypt the bay stock followed the line of the coast through Numidia and Mauritania, where it mounted in the Roman times the armies of Hannibal, and in later days the Moorish cavalry, who introduced it into Andalusia, when they came over into Spain to make war on the Goths. This breed was also taken into Italy and Sicily by Phœnician and Carthagenian ships.

The next stock is the Median or Nisœan, a pale dun or cream-colored horse. In the time of Darius there was an immense breeding establishment at the place—Nisea—whence it is recorded that that monarch obtained 100,000 horses to oppose the invasion of Alexander, and still left 50,000 in its pastures, which Alexander saw when he marched through that country. Other circumstances, however, lead to the conclusion that the white Nisœan was a peculiar and choice breed, originally from Cilicia, and that the majority of the horses in these famous pastures derived their origin from the Dun breed, now, as then, existing in the Ukraine, and marked down the back and on the shoulders with the bars which distinguish the ass. Several varieties of this Dun race, with the peculiar marking, are yet found in the south of Russia and east of Germany, and in the Danubian principalities, Wallachia and Moldavia; an accidental specimen is occasionally met with in the British Islands. The white horses of Nisœa were especially dedicated to the service of the Sun God, and used in the state pageants of the Persian Sultauns. A breed of white horses, curiously mottled with black, is still in existence on the Euythean Sea, and sold at high prices to the grandees of the Court of Teheran for purposes of parade.

We now come to the Tannian or Tangum, the primœval spotted stock; that is, horses of a pure white, irregularly marked with large chesnut spots; in England known as a skewbald, in contradistinction to the piebald, which is black and white. This species of the horse is still found wild in the highlands of Thibet. It was with horses of this breed that the Parthians mounted their hordes of cavalry; it was known in European legends from the arrival of the Scythian Centaurs; it constituted the cavalry of Thessaly and Thrace; of this stock was the famous charger of Alexander, Bucephalus; and lastly, we find it ridden by the Huns, who, coming from the north side of the wall of

China, were as far as we know, the last tribe of Gothic blood that reached the west about the time of Theodosius. In the time of Charlemagne the spotted breed was in great demand as chargers for the heavily armed knights. In the Homeric ballads they are called "variegated and swift-footed;" Statius describes them in the same terms, and distinctly tells us that they were reputed to have descended from the Centaurs, and we also find a similar account in Virgil.

It is unnecessary to enter into any minute detail of the varietie of the horse found at later periods in Greece and Italy, after the extensive commercial intercourse that obtained throughout the Mediterranean and the adjacent countries in the most flourishing ages of those great monarchies. It is sufficient to say that they can all be traced either to the bay, white, dun or dappled stock, all of Central Asiatic origin. The fifth variety is the crisp haired sorts or black stock, which became known to the world only when Roman valour had carried the Imperial Eagles to the Rhine, Danube, and Britain. The Helvetian and Gallic horses were marked by the same characters, and were believed to be indigenous—they were long-backed, high-hipped and heavy maned, with small eyes and thick lips. In Guelderland and on the Lower Rhine there was found a lighter and cleaner limbed horse of the same colour, which the Romans imported for military purposes, but that wealthy and warlike people procured during the times of the Emperors horses from almost every part of the known world, hence the great intermixture of the European races, and it is certainly remarkable that notwithstanding this the varieties of race can still be so accurately traced. In the British Islands there was an indigenous horse, of very small size, at the time of Cæsar's invasion, and found wild for many years after in many parts of the island; relics of this race may still be traced in the Welsh, New Forest, Dartmoor, and Scotch ponies. The first intermixture in England was without doubt with the various breeds imported by the Roman invaders, and then with those of the Anglo-Saxon, Danish, and Norman conquerors. Having now rapidly run through the detail of what are considered by natural historians to be the five primitive stocks or races from which all the modern breeds are derived, I will proceed as shortly to notice the most celebrated modern breeds, beginning with the Arabian, because it is to Arabian blood that England owes her superiority in horses. I have already stated that the horse was not originally found in Arabia—that it was probably, nay, almost certainly derived from the Scythian Hyksos invaders—that it was of the Tarpan or Bay primæval stock, and that to climate and great care in feeding and breeding it owes its present excellence, unrivalled indeed in the world, except by the English race-horse, originally bay, is now found of nearly all colours, though the bay still predominates—and this is owing to its having been crossed at different times with the other races, particularly with the white or grey stock from Persia and the black race from Tourkistan. With horses of this race, more or less pure the whole of South-Western Asia, and the northern coasts are supplied, and as we have before stated, it was carried by the Moors into Spain. The perfection of the bay blood is due to the Arabs; though for centuries they have bred, in and in, as it is termed, from their own stocks, they still produce horses unrivalled in form, with fine bone, firm sinewy legs, limbs small and hard, elastic and close-grained muscle, every part of the animal free from vascular superabundance and useless weight. The Arab is generally rather narrow-chested, but the band is well expanded, the head small and most beautifully set on, the eyes large, soft, yet brilliant; the ears firm and beautifully pointed, every blood vessel prominent beneath the silken coat; though the English race horse is fleeter, no animal in the world has more speed combined with endurance than the Arabian horse, and they are remarkably kindly tempered and intelligent. Among the Arabs themselves, it is said proverbially, that the land of Nedgid claims the noblest—Hedjas the handsomest, Yemen the most enduring, Syria the richest in colour, Mesopotamia the most gentle, Egypt the swiftest, Barbary the most prolific, Persia and Kurdistan the most warlike. At present the five recognized races are the Tanweya, Monakge, Kohayl, Saklawge and Zulfer—the matter is, however, involved in some obscurity, the very best breeds being classed together as Kochlani, their genealogy preserved with great care, and claiming for them an unbroken descent from the stud of King Solomon; some Arabs, of great piety, aver that the five races are descended from the five favourite mares of their prophet Mahomet.

The next conspicuous breed of the Tarpan stock is the Morocco Barb, intermixed, as among the Arabs with a few greys, and some blacks, probably introduced by the Vandel conquerors of Africa. The barb is a somewhat smaller horse than the Arab, of graceful action, with flat shoulders, round chest, joints inclined to be long, and a singularly beautiful head; they are far inferior to the Arab in spirit and speed. To the south of Morocco, on the borders of the Desert we find the Shrubat-ur-Reech, or swallows of the wind, reared among the tents of the Mangrabins, they are brown horses of the Tarpan conformation, of high spirit and great endurance, but from the poverty of their owners and the barren nature of the country, always found in bad condition. In Bornou, more towards the centre of Northern Africa, there is found a fine variety of the Arab; one of these horses was brought to England a few years ago, but was so incurably vicious that his owner was obliged to destroy him. In Nubia there is a breed commonly known as the Dongola Arabian, introduced at the time of the Mahometan conquest, and of fabled descent from the five horses ridden by Mahomet and his four companions Abubekei, Omar, Atmar, and Ali, on the night of the Hegria, when they fled from Mecca. These horses often rise over sixteen hands high, but the head is not well placed, the shoulders are flat, the back carped and the eyes small; the limbs are excellent in shape and very sinewy. Good horses of the Bay Tarpan race are found among the various tribes far down the eastern coast of Africa; on the Guinea Coast no horse is produced of the slightest value. At the Cape of Good Hope the Dutch settlers crossed the old black Dutch horse with an inferior Arab race, named Kadischi, the result is a small active horse, still capable of great improvement. The present Turkish horses are a mixture of Arab blood with the Armenian brown stock, but as both are of Tarpan origin it is unnecessary to say more than they are spirited and beautiful, but without vigour or durability; their skins are so irritable that they can be cleaned only with the sponge, and they are extremely docile. The Persian horse, on the frontiers between that country and Arabia is essentially an Arab: further in the interior it is strongly crossed with the Tourkoman; in form they much resemble the Arab, but have a tendency to low-neck; their endurance of fatigue is almost unsurpassed by the purest Arab. A Persian courier, if we may believe Major Keppel, rode one horse from Teheran to Bushin, 700 miles in 10 days. There are various other breeds in this region of Asia of minor value, among the small nomade tribes, but all referable to the bay stock.

In India, the bay race is not the horse of the people; it has been introduced by conquerors, and still is so, and the result is, that in India there are various breeds resulting from crosses of the native horse with Arabs and Persian studs, and of these again with blood horses brought from England, until a splendid race of Indian horses has been obtained and is rapidly increasing, and the cavalry of the East India Company is now entirely mounted on horses bred in its own establishments. As everything connected with Australia is now of interest, it may be stated that the Arab blood has been introduced into that country, and that a race of blood horses has been obtained, whose performances on the race course will bear a fair comparison with Epsom or New Market. Some years ago one gentleman in Australia had a stud of horses 300 in number, each of which was valued at £100. Returning to Europe we find in Transylvania a superb breed of the bay stock, averaging 15½ hands, with slender bodies, fine heads, and high withers, with long silky manes and tails, and in Greece a chestnut variety of the same stock, but with a much coarser head, though of great vigour and endurance, and excellent temper.

We have already noticed the Spanish horse of this stock, imported at an early period from the coasts of Asia Minor, and highly increased in all its good qualities by the infusion of pure Arab blood at the period of the Saracenic conquest. Spain has now no good horses to boast of; the brutal order of one of Bonaparte's Marshals to disable and put out the right eye of every serviceable horse in Andalusia, and the subsequent and long-continued civil wars have utterly extirpated the once celebrated Spanish blood-horse. It must be observed, however, that in those countries in South America, once Spanish colonies, the Andalusian blood is found in all its purity, while in speed, safety of foot and endurance, the horse of the American Pampas far surpasses its European progenitors. In Jamaica there are beautiful horses of English origin, with an Arabian cross, generally brighter and smaller than the English thorough-bred, but elegant in form, fleet of foot, and gentle in temper. From the Tarpan Bay stock, originally imported from England, are derived the horses of the United States, where, towards the frontier, there is a mixture with the Canadian horse, originally brought from Normandy, and also of Tarpan descent. The English is the last on our list of horses derived from the Bay stock; and of it, it may be simply said, that at this day, whatever be the species, race horse, hunter, charger, coach horse or dray horse, it has not its superior in the world, such has been the care bestowed on the breeding and after treatment of this noble animal. From the monarch to the humblest peasant, there is hardly a man in England that does not take more or less interest in the horse, and statutes passed at different times by the earlier English Kings, and in later periods the encouragement to the production of the thorough-bred horse by the munificent kings plates given at the different races, have contributed to render the English thorough-bred horse the finest in the world, far surpassing in speed the original Arabian horse, from which the pedigree of every well-known racer can be distinctly traced. The prevailing colors of the best English horses—bay, brown and chesnut—sufficiently mark the Tarpan origin; the most celebrated race horses have been bays, with the exception of Trumpeter, a black, and some of his descendants, no horse of any other color has ever done any thing on the turf. A very few words will suffice to dispose of the remaining primitive stocks. The white or grey race, originally indigenous on the great table land of Pameic, on the Steppes to the north of the Euxine, and in Armenia and Cilicia, spread gradually over all Asia. This breed was originally of higher stature than the bay, with greater breadth and more solid limbs, and at all times mixed better with the Bay stock than any other race, and added to its bone and stature. This [illegible] at all times attracted attention from its color, and was regarded as a fit distinction for kings and divinities; the Sun Gods of the old mythologies, Apollo, Odin and Kinsha, had all either possession of or access to the original locality of the white primæval stock, and in the migrations of the tribes, it was carried over the whole civilized world. For ages this breed has existed in the Spanish Pyrenees, the primæval companions of that race now known as the Basques, the descendants of the Ouralian Finns; we find the race again in the Lower Alps, and in the neighborhood of Arles in France, and in the Belgian Forest of Ardennes, where the worship of the Christian Saint, Hubert, the patron of huntsmen, supplanted the worship of Arduenna, a type of the Goddess Ertha; and again we hear of it in the Holy Isle of Ruga, where our Northmen fathers sacrificed white horses to their deified hero-progenitor, Odin. The distribution of this race was evidently connected with the religion of the Teutonic races, and accords with what is known of the western migration of their different tribes. The Plantagenet Kings of England paid great attention to this breed, importing grey horses from the Pyrenees and Gascony, and from a judicious intermixture of these with the Bay stock, has resulted the superb grey breed now so common in England.

The sooty, crisp-haired or black stock, originally indigenous in Europe, has, like the Bay and Grey races, now spread over the who' world. The gigantic black horses which we see in England, particularly in London, were originally derived from Flanders, and it is generally believed that the first were brought over by the Flemish knights who accompanied William the Conqueror. The great Brewer's dray horse is chiefly bred in Lincolnshire and Staffordshire, and of this stock also is the celebrated Clydesdale breed, stallions of which race have been sold for from 5 to 400 guineas. A judicious cross with the bay race has produced the superb chargers of the Queen of England's household troops, against whose weight and speed it is acknowledged that no equal number of horses in the world could stand for a moment. This race prevails through every part of Germany.

Of the Dun and Tangum, or Skewbald race, I shall say but little more than this, that neither of them have produced any marked effect on the Equine race by intermixture; the Skewbald is a worthless animal, generally speaking, devoid of all good qualities, except that of a gentle temper; the Dun is a hardy animal of great endurance, but possesses little spirit or speed. Both varieties are met with in every part of the world, and the Dun particularly in the South of Russia, where it forms the Cossack cavalry,

In conclusion, I will state that the Tarpan or Bay stock is to the Equine family what the Caucasian family is among the human race; wherever it is found it either obliterates the other races or assumes over them an indisputable pre-eminence; from it are derived the best and most beautiful horses in the wide world.

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[At a late meeting of the Canadian Institute, a distinguished and highly respected member directed attention to a passage in the essay "On the Horse and its Rider," which appeared to call in question the Divine origin of a certain portion of Holy Writ. It was then distinctly stated by several gentlemen directly interested in the editorial management of this Journal, that the introduction of the objectionable passage was quite accidental and much to be regretted. In a report of the proceedings of the Institute, published a few days afterwards in a Toronto paper, notice was taken of the explanations elicited at that meeting. We find, however, that one or two of our co-temporaries have again called attention to the subject, apparently in ignorance of any explanation having been offered. We do not desire to shelter ourselves under the "*fig leaf covering,*" that we are not responsible for the sentiments of our correspondents, we wish rather to state explicitly that no one can regret the appearance of such sentiments as those alluded to, in any form or publication whatever, more than ourselves, and that their introduction into our pages was the result of misapprehension of instructions received by the person to whom the correction of the proofs was intrusted.]—(ED. CANADIAN JOURNAL.)

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## On the Fruiting and Flowering of Plants.

The following scanty notes of a few of the phenomena to which the article, on page 182, in the March number of the Journal refers, may serve to assist persons commencing this very interesting class of observation. They were made in or near the College Grounds, Toronto. Any person addicted to out of door pursuits, can follow up the subject with little trouble: it would be difficult to name one of which the interest grows more upon the observer; or which, when full data have been collected, will throw more valuable light upon many points of climate and meteorology. It should be remarked that differences of soil and position, frequently cause two, three, or even more days difference, between the epochs of the same event in trees or plants of the same species, very near one another. It will generally be found that these differences are constant. An early and a late specimen should be selected. There is also a considerable interval between the opening of the first flowers on shrubs—like the Lilac, Almond, &c.,—and any general display of blossom—both periods should be observed. It should be added, when the flowering is completely over. Again, it is not altogether easy to decide, exactly, when leaves are to be considered fully expanded: the observer should note the date at which it can be first asserted doubtfully, and when it is past a doubt. Remarking also the condition of the weather, which may be supposed to hasten or retard the phenomena. Such as a prevalence of fine or cold days, about the time each is expected—warm or cold rains—high winds, and so on. Lastly, no observer can be certain that his observation is the first that might have been made in the neighbourhood, and a considerable number of independent records must be consulted to fix the epochs exactly.

| | In Flower. | | |
|---|---|---|---|
| | 1850. | 1851. | 1852. |
| Phlox Setecca | | May 7 | Ap'l 28 |
| Hepatica triloba | | " | May 29 |
| Flowering Almond, first flowers | May 26 | May 22 | June 3 |
| " fully covered | June 4 | May 26 | " 13 |
| Flowering over | " | " | May 27 |
| Lilac, Common, first flowers | " | May 27 | June 3 |
| " fully covered | June 6 | June 3 | " 18 |
| " flowering over | " | " | May 8 |
| Rock Maple | " | Ap'l 28 | " 8 |
| First Dandelion | " | " | May 26 |
| Horse Chesnut, first flowers | " | May 23 | June 2 |
| " fully covered | " | May 28 | " |
| " flowering over | " | June 21 | May 21 |
| Indian pear, Poire | | May 11 | |
| Syringa | | June 17 | June 22 |
| Common Honeysuckle, first flowers | | June 5 | June 13 |
| " fully covered | | June 20 | " |
| Red Trumpet Honeysuckle | | " | June 18 |
| Common Red Peony | | June 5 | June 11 |
| Acacia (Locust) | | June 23 | |
| Persian Lilac | | June 17 | June 12 |
| Guelder Rose | | May 26 | June 2 |
| Canadian Thorn | | | June 12 |
| Mountain Ash | | | |
| Shadbush | | | May 25 |
| Apple | | May 25 | May 27 |
| Cherry | | May 18 | May 20 |
| Plum | | May 18 | |
| Birch | | | |
| Beech | | May 18 | |
| Larch | | | |
| Elm | | | June 18 |
| Strawberries, first ripe | | June 15 | |
| Scarlet Tanager seen | | May 13 | |
| Pigeons in passage | | May 18 | |
| Black Plover | | May 24 | |
| Wax-wing seen | | | June 5 |
| Fire-flies seen | | June 15 | June 7 |
| Humming Birds seen | | | May 27 |

Errata.—In the March number of this Journal several articles, thro' an accidental misunderstanding, were sent to press without having been corrected. Subjoined is a list of the most important corrections which should have been made.—Pages 183—184 :—

| | | |
|---|---|---|
| Fraxinus Sambricifolia, | read | Fraxinus Sambucifolia. |
| Ribes Oynorbati, | " | Ribes Cynosbati. |
| Thalictrum Divicum, | " | Thalictrum Dioicum. |
| Actæa Alba, | " | Actæa Alba. |
| Cratægus Coccinea, | " | Cratægus Coccinea. |
| Impatiens Fuloa, | " | Impatiens Fulva. |
| Rhus Torricodendon, | " | Rhus Toxicodendron. |
| Supinus Perennis, | " | Lupinus Perennis. |
| Fiarella Cordifalia, | " | Tiarella Cordifolia. |
| Astir, | " | Aster. |
| Trientalis Americana, | " | Trientalis Americana. |
| Gerardia Guercifolia, | " | Gerardia Quercifolia. |
| Scuetllaria Golericulata, | " | Scutellaria Galericulata. |
| " Parvula, | " | " Parvula. |
| Gentiana Ptheumonanni, | " | Gentiana Pneumonanthe. |
| Phytolacca Decanda, | " | Phytolacca Decandra—Pokeweed. |
| Cypropedium Spectabile, | " | Cypripedium Spectabile. |
| Noularia Perfoliata, | " | Uvularia Perfoliata. |
| Veronica Beccabunza, | " | " Beccabunga. |
| Lithospernum Canesceus, | " | " Canescens. |
| Abile, | " | Abele. |
| Dandylion, | " | Dandelion. |
| Parslane, | " | Purslane. |
| Supine, | " | Lupine. |
| Mullen, | " | Mullein. |

Page 186—Line 29 for 6 sec., read 6 min.

## INCORPORATED BY ROYAL CHARTER.

### Canadian Institute.

### FIFTEENTH ORDINARY MEETING.

#### ANNUAL CONVERSAZIONÉ.

The very gratifying nature of the proceedings at the Annual Conversazionè of the Institute, held in the Hall of the Legislative Assembly, on Saturday, April 2nd, induces us to adopt a method of recording them, which savours less of originality than of respectful submission to the opinions of the Press, as shown in the very flattering descriptions which we beg leave to subjoin:

*(From the North American.)*

"On Saturday evening the most interesting, Literary, Scientific, and Pleasurable meeting ever witnessed in Toronto, was held in the Legislative Assembly Hall.—It was the Annual Conversazione of the Canadian Institute, and some 300 gentlemen, including all the friends of Literature and Science in the City—from the Bishop downwards—graced the very pleasing scene. The Council of the Institute had made great preparations to render oblivious all previous similar efforts. The Hall was tastefully decorated with Science, Literature, and Art; cases of stuffed birds, cases of insects, and insect architecture, models of machines of various kinds, paintings, engravings, scientific instruments, &c, &c., embellished the Hall. The fine painting of the Queen by Berthon, was suspended above the Chair, and to the right was an excellent portrait, and striking likeness of Capt. Lefroy, President of the Institute, taken by the Council as a memorial of his able services. The Lobby of the House was used, for the nonce, as a refreshment room."

*(From the Colonist.)*

"On Saturday evening, the 2nd instant, this Society entertained a large number of their fellow-citizens, in the Hall of the Legislative Assembly, which was suitably prepared for the purpose. On the dais, and grouped around the President's Chair, were numerous instruments, as Telescopes, Theodolites, Levels, and the like. Immediately in front was a very beautiful model of Jerusalem, mounted on an elegant iron pedestal. In the centre, and around the sides of the room, seats were arranged, divided by long tables laden with objects of vertu, statuary, and carving in figures, vases, &c., &c. Amongst them we observed one of the late Duke of Wellington, Paul and Virginia, the Dying Gladiator, and other examples of Copeland and Minton's beautiful statuettes, and a large collection of Minton's Gothic tiles and porcelain ware. There were some good bronzes, and a number of elegantly designed and well executed bread platters, in the olden style. Several books containing a large collection of medallions after the antique, and some excellent specimens of Daguerreotypes on glass, attracted much notice, as did two excellent models of new steamers for our Lake, especially that of the *Peerless*. Cases of birds occupied the piers between the windows, and at one end of the room were arranged various parts of the locomotive engine, as tubing, springs, steam guages, safety valves, &c., exhibited by Mr. Good. The tables were spread with illustrated books of elegant character connected with the arts and sciences, comprising Portraiture, Sculpture, Architectural Decoration, Engineering, &c., &c.

"At eight o'clock, nearly 300 gentlemen had assembled, among whom we observed the Bishop of Toronto, the Chief Justice, Mr. Justice Draper, Vice-Chancellor Spragge, Dr. McCaul, Dr. Beaven, Dr. Ryerson, Dr. Cronyn, of London, many Members of the Corporation, the Professors of both Universities, and, indeed, a representation of all the public bodies in the City. After having partaken of the hospitality of the Society, the meeting was called to order by the President, Captain Lefroy, R.A., F.R.S. He expressed the pleasure which the Society had in receiving their fellow-citizens on these annual occasions,—referred to the progress which the Society had made during the past year,—alluded to the valuable papers which had been communicated at the weekly meetings of the session now closing,—and enlarged upon the advantages resulting from such Societies as these, not only in direct relation to the cultivation of Science and the Arts, as affording opportunity for closer communication between scientific and professional men; but in a social view, as an agreeable and profitable link uniting those who, although engaged in widely different paths of business, possess congenial tastes and aspirations. He made a graceful and feeling allusion to the portrait of himself which the Society had secured in anticipation of his departure, and expressed a confident belief that the Institute possessed elements guaranteeing its permanent stability and success.

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"We are unwilling to adopt the stereotyped phraseology of commendation in regard to this meeting, nor would it be appropriate. We have no recollection of any occasion when the happy blending of the hospitable, the entertaining and the instructive, gave such unquestionable gratification, and although, as Professor Cherriman observed, being the last occasion of the presence of the President at the Institute, the feelings of the members generally were tinged with regret, yet the proceedings were of so interesting a character that even this failed to mar them."

*(From the British Canadian.)*

"THE CANADIAN INSTITUTE.—It is not often it has fallen to our lot to chronicle such an intellectual treat as we partook of on Saturday evening last, when the annual Soiree of the Canadian Institute took place at the Parliament Buildings, in the Hall of the Legislative Assembly. It was the largest, the most influential, and the most interesting of the meetings of this rising Society which has yet taken place. There could not have been less than two hundred gentlemen present when the chair was taken by the President of the Society, Captain Lefroy, who in his usual happy manner opened and gave an impetus to the proceedings by calling on the Hon. Justice Draper, who delivered an interesting sketch of the rise and progress of Upper Canada since 1775, to the present time. Rev. Professor Irving next ascended the dais, from which he delivered a lecture explanatory of the modern invention of the Stereoscope, and explained the optical delusion by which the magical effects of this new discovery are produced. He was followed by Dr. Hodder who read an interesting paper on the poisonous plants which are found in the country adjacent to Toronto, which was listened to with much attention.

"A short recess took place for refreshments, tea and coffee being served in the Hall, after which the President having resumed the chair;

Professor Cherriman, the Vice-President of the Society came forward and laid on the table a very beautiful silver vase, which the members of the Institute desired through him to present to Captain Lefroy, on the occasion of his now farewell to the Society, previous to his departure for England. Mr. Cherriman alluded to the rapid progress of the Society under him, which from 70 or 80 members last year, had now increased to near 300, and was rapidly rising in character also. He alluded in happy terms to the services of Capt. Lefroy, and concluded by presenting the address and piece of plate to that gentleman, who replied in suitable terms, and evidently under feelings of strong emotion.

"The Rev. Dr. Scadding next read a most interesting paper on a most popular subject, "Accidental Discoveries," which afforded much gratification. T. Henning, Esq., next delivered an animated and most interesting address on the probabilities of Sir J. Franklin and party being yet discovered, and the course he was likely to have pursued in opposition to that first laid down for him. This being ended, F. Cumberland, Esq., moved Dr. McCaul to the chair, and he having assumed the same, a vote of thanks to Capt. Lefroy was moved and carried by acclamation, and after a brief address from Dr. McCaul, the proceedings closed.

*(From the United Empire.)*

"The annual Soiree of this Institution was held on Saturday evening last, at the Hall of the Legislative Assembly in the Parliament Buildings, and truly a better use the room could not have been put to. The President, Capt. Lefroy, R.A., presided; and the most pleasing part of the evening's proceedings, consisted in the presentation of a handsome piece of plate to that gentleman, as a well-deserved testimonial of the high opinion entertained by the members of his services, and very appropriately presented on the occasion of his approaching departure for England.

"The room was well filled by our most distinguished Toronto savans and other visitors; and was ornamented with a large collection of objects of interest, in the shape of casts, medals, natural curiosities, engravings, with the refreshing addition of some shrubs and flowers."

*(From the Globe.)*

"The Canadian Institute gave their annual *Conversazioné*, at the close of the season, on Saturday evening last. The Legislative Assembly Chamber was very handsomely decorated on the occasion. The walls were hung with paintings and engravings; stands covered with flowers from the conservatories of Mr. Fleming, occupied conspicuous places, and long tables were used for the display of models of machinery, books of fine plates, pieces of statuary, and other objects of interest. The paintings of Venetian scenes, said to be by Canaletti, and possessing most of the excellencies of that master, excited the most attention. They are the property, we understand, of Kenneth Cameron, Esquire. Conspicuous, beside the platform, on an easel, stood the portrait of Captain Lefroy, the President of the Institute, painted by Mr. Berthon, and intended to be hung in their place of meeting. Tea and coffee were served in the main hall of the building. About half-past eight, the gentlemen assembled were called to order by the Chairman, Captain Lefroy, who welcomed them in the name of the Society."

During the evening the following address to Captain Lefroy, was read by Professor Cherriman, First Vice-President, on the part of the members of the Institute. Professor Cherriman introduced the subject of the address in very feeling and appropriate terms:

TO CAPTAIN LEFROY, R. A., F. R. S., PRESIDENT OF THE CANADIAN INSTITUTE.

Canadian Institute,
Toronto, April 2nd, 1853.

DEAR SIR,—This being the last occasion on which the members of the Institute may hope to have the honour of your company and presidency, we cannot let it pass without some attempt to express to you our earnest thanks for the services you have rendered the Institute, and our great regret that the call of duty should summon you away from us.

We feel Sir, that not only the Institute, but the Province itself, owes you a heavy debt of gratitude, and in your departure will sustain a loss not easily to be repaired.

The zeal and ability with which you have discharged the difficult and laborious duties that devolved on you, in carrying out the system of Magnetical Observation established by the liberality of the Imperial Government; the investigations of magnetical and meteorological phenomena, with which your name is inseparably associated; and the various scientific memoirs that proceeded from your pen during this period, have not only been of incalculable service in promoting the interests of Science in the Province, but have also caused the name of Canada, and of Toronto in particular, to be honoured in all parts of the world where science is cultivated.

We must not forget also that to you is mainly due the rise and progress of this, the only active scientific Society in Upper Canada,—a result brought about not only by your own exertions and example, but also by that unfailing courtesy and kindliness which has always marked your intercourse with us, and which has inspired us all with the strongest feelings of esteem, and permit us to say, of affection towards you.

We thank you, Sir, for having acceded to our request, that we might be permitted to retain a memorial of yourself, in the form of your portrait, which will always serve to remind the Society of how much it owes you, and will be treasured by it as a choice heirloom.

We now beg of you to accept the accompanying piece of plate, as a slight token of our esteem and gratitude, receiving with it an earnest assurance, that much as we deplore your departure, our best wishes for your happiness and welfare go with you. Signed on behalf of the Institute.

J. B. CHERRIMAN,
FRED. CUMBERLAND,
Vice-Presidents.

**Sixteenth Ordinary Meeting, April 9th.**

The following gentlemen were duly elected members of the Institute:—

| | |
|---|---|
| T. D. Harris, | Toronto. |
| John Worthington, | " |
| E. C. Campbell | Niagara. |
| C. S. Gzowski, | Toronto. |
| J. G. Joseph, | " |
| D. K. Feehan, | " |
| G. W. Strathy, | " |
| E. F. Whittemore, | " |
| W. H. Weller, | " |
| G. B. Wyllie, | " |
| Thos. Hodgins, | " |
| J. D. Phillips, H. Davis, } Junior Members, | " |
| Hon. J. G. Spragge, | " |
| J. L. Robinson, | " |
| Thomas Wheeler, | " |
| E. D. Palmer, | " |
| E. W. Beaven, | " |
| A. Crooks, | " |
| E. H. Rutherford, | " |
| R. M. Wells, | " |

The Hon. P. B. DeBlaquiere was duly proposed a member of the Institute.

The following resolution was carried unanimously:—

That the cordial thanks of the Institute be tendered to those gentlemen who assisted, by their contributions, in decorating the Hall of the Legislative Assembly at the late Conversazioné.

It was also resolved, That it be an instruction to the Council to make arrangements for opening the Rooms of the Institute, at least once a week, to the members, until the commencement of the next Session.

It was then announced by Professor Cherriman, first Vice-President, that the Session of the Institute was now terminated; and that the First Ordinary Meeting of the next Session would take place in December, of which due notice will be given in the Canadian Journal.

**On the Poisonous Plants which are indigenous to, or which have become naturalized, in the neighborhood of Toronto, by Edward M. Hodder, M.C., & M.R.C.S. Professor of Obstetrics &c., in the University of Trinity College.**

In the course of time many wise theories have been held current in physic, and many vain promises made by the empirical, yet I am not acquainted with any apothegm half so wise as that which is condensed by Dr. Cullen, into two lines of small pica, and which are as follows:—

'I have cured weak stomachs by engaging the persons in the study of botany, and particularly in the investigation of native plants.'

This then, being a sovereign panacea for the cure of many of the ills which flesh is heir to in this thriving city, I hope I shall be excused for calling the attention of this meeting to a short (and I fear a very imperfect) history of the poisonous plants which are either indigenous to, or which have become naturalized in the immediate neighbourhood of Toronto.

The district, whose poisonous vegetable productions I propose to examine is very limited, being bounded by the river Don on the east, the Humber on the west, and extends north about four or five miles, while on the south it is washed by the Lake.

Contracted as the area is, it is remarkable for the variety of its soil, from the most stubborn and tenacious clay, to the lightest and most barren sand; yet, it is not distinguished for any peculiarity in its stratification.

It is of importance to remark the geological relations of plants, particularly in a new country, because it throws some light on the laws of vegetable distribution. It suggests the questions whether it be indigenous and coeval with the soil; or if introduced, by what means has that been effected.

Whether arts or commerce, agriculture or manufactures, superstition or medicine, has brought it; or, which is frequently the case, whether the altered state of the earth's surface has not afforded to nature, by her ordinary laws, increased means of diffusion.

We are told that in the days of Gesner, the Fumaria Officinalis, or Fumatory was a very rare plant in the fields of southern Europe, and was supposed to have come from the east; now, it is the commonest weed in corn fields and gardens from Greece to Lapland.

When I first came to Canada in 1834, many of the plants which are now most common were then never seen, in proof of which I may instance, the Agrostemma or Corn Cockle, the Senecio Vulgaris or Groundsel, the pretty little Pimpernel, and the Fumatory. It is remarkable that the Anthemis Cotula (stinking May weed) which in this neighbourhood renders all our road sides white with its blossoms during the greater part of the summer, should not be found fifty miles to the north of Toronto.

Having made these preliminary observations, I shall now commence this grave subject by a description of the most poisonous plants, after which I shall speak of those which are simply acid in their recent state, but, I greatly fear that I shall not be able to relieve its technical dulness by any little excursions into the by paths of literature, or by its useful application to science —you must be prepared, therefore, Mr. President, to find it as dry and uninteresting as a spelling book, or as that engaging and entertaining work Dr. Johnson's Dictionary.

1st. The Datura Stramonium—Thorn Apple—also known under the names of The Devil's Apple, Apple of Peru, and Jamestown Weed. It belongs to the Linnæan class, and order Pentandria—Monogynia, and Natural Family Solanacea.

It is found in various parts of Europe, Asia, and America, growing in gardens on rubbish heaps, and road sides.

The Thorn Apple is an annual, growing to the height of from three to five feet, according to the richness of the soil; it has a leafy, branchy stem, of a purple colour, with green spots; the leaves are large, ovate, sinuous, and deeply cut; the flowers, which make their appearance in August and September, are axillary, long, trumpet-shaped, white, pale purple, or blue, and are followed by a capsule the size of a large walnut, covered with long sharp prickles, four-celled, and filled with blackish, rough kidney-shaped seeds. The whole plant when recent, has a strong nauseous and disagreeable odour, which, when powerful, is stated by Beck to be 'certainly noxious.' All the domestic animals refuse it as food.

It is a powerful narcotic poison, and used as such in the East for nefarious purposes, and in Russia for increasing the intoxicating effects of beer. Medicinally, the Thorn Apple has been found efficacious in asthma, and organic diseases of the heart, when its fumes have been inhaled by smoking.

It is not, however, for its medicinal, but for its poisonous properties, that I wish to direct your attention to it; and, having witnessed these effects in several instances, I can speak of them from personal observation.

Being an early plant, it is occasionally gathered when young in mistake for Lamb's Quarter, (Epilobium?) boiled, and eaten as greens—the effects in many instances being followed by serious consequences.

At first it produces dryness of the mouth and throat, speedily followed by nausea, delirium, loss of sense, a sort of madness or fury, loss of memory—sometimes transitory, and sometimes permanent—convulsions, paralysis of the limbs, excessive thirst, dilatation of the pupils, tremblings, and death.

The severity of the symptoms depend greatly upon the peculiar constitution and age of the person; children, two or three years old, have died in two hours from eating some of the seeds, whereas adults who have partaken freely of it, have recovered after a time, and without any permanent ill effects being produced.

A family whom I attended some years ago, were all attacked in the manner above described; the children vomited before I reached the house, and speedily recovered; but the father and mother, who had partaken more freely of it, continued ill for many days, ultimately recovering, but with permanent paralysis of the extensor muscles of the feet.

In Beverley's History of Virginia, we find the following curious account of its effects:—'The Jamestown Weed, which resembles the Thorny Apple of Peru, is supposed to be one of the greatest coolers in the world. This being an early plant, was gathered very young for a boiled sallad, by some of the soldiers sent thither to quell the rebellion of Bacon; and some of them eat plentifully of it, the effect of which was a very pleasing comedy, for they turned natural fools upon it for several days. One would blow up a feather in the air; another would dart straws at it with much fury; another, stark naked, was sitting up in a corner like a monkey, grinning and making mows at them; a fourth would fondly kiss and paw his companions, and sneer in their faces with a countenance more antic than any in a Dutch droll. In this frantic condition they were confined, lest, in their folly, they should destroy themselves. A thousand simple tricks they played, and after eleven days returned to themselves again, not remembering anything that had passed.'

Numerous cases in which death has taken place after eating this plant, might also be cited.

2nd. Rhus Toxicodendron or Radicans—The Poison Ivy. This plant is very common in Canada and the United States, growing on the borders of woods, in the angles of fences, and road sides; flowering in June and July, and belongs to the Class Pentandria, Order Trigynia, and to the Nat. Family Terebinthaceæ of Decandolle.

The root is generally trailing along the ground, sending up many stems, but when it meets with support, such as a tree or a wall, it will climb like ivy to a considerable height.

The leaves are alternate, supported on long petioles; the leaflets ternate, rhomboidal, acute, smooth and shining; the veins on the under surface, slightly hairy. The flowers are small, greenish white, in panicles which are chiefly axillary. The berries are roundish, of a pale green color, approaching to white.

The fresh juice of this plant is powerfully irritant, producing violent itching, redness, and great tumefaction of the affected parts, particularly the face and those portions of the body where the skin is most delicate.

This swelling is followed by vessications, heat, pain, and symptomatic fever, which continues for two, three, or four days,—the symptoms then subside, the blistered parts being covered with a crust.

These effects usually make their appearance in four or five hours, and though very distressing, are rarely fatal.

The treatment required is strictly antiphlogiotic—viz., rest, low diet, aperients, with cold applications, such as the sugar of lead wash, &c.

It is, however, only in certain constitutions, that these phenomena are produced, for in the majority, I believe, it exerts no influence whatever; the leaves having been rubbed, chewed, and swallowed without injury.

The poisonous property resides in a yellowish milky juice, which exudes from the wounded extremities of the plant, and when applied to linen, forms an indelible black stain, which neither washing nor chemical agents will remove. (Here the lecturer illustrated the effects by reference to several cases.)

3rd. Rhus Vernix.—Poison Sumach. This plant belongs to the same family, and produces, when applied to the skin, the same symptoms as those which I have just described.

It is even said that, in susceptible constitutions, the near approach to this tree is sufficient to produce its effects.

4th and 5th. Cicuta Maculata—American Hemlock. Cicuta Bulbifera—Bulbiferous Cinta.

6th. Œthusa Cynapium—Fools Parsley.

These three plants nearly resemble one another; they belong to the Class Pentandria, Order Digynia, and the Nat. Family Umbellatæ, and are to be found in wet meadows, ditches and ponds.

The root of the Cicuta Maculata is composed of a number of large oblong, fleshy tubers, diverging from the base of the stem, and frequently being found of the size and length of a finger. The root is perennial, and has a strong, penetrating smell and taste. In various parts of the bark it contains distinct cells or cavities, which are filled with a yellowish resinous juice.

The plant is from 3 to 6 feet high. Its stem is smooth, branched at top, hollow, jointed, striated, and commonly of a purple colour, except when the plant grows in the shade, in which case it is green. The leaves are compound, the leaflets oblong, or cuminate, sinuate. The flowers grow in umbels, are white, consisting of 5 petals, which are obovate, with inflected points.

These plants, like their congeners of Europe, the Conium Maculatum and Cicuta Virosa, are violent poisons, and they all produce nearly the same train of symptoms—viz., vertigo, obscurity of vision, pain in the head, vacillating walk, dryness of the throat, ardent thirst, vomiting of greenish matter, irregular respiration, coldness of the extremities, lethargy or delirium, epilepsy, especially in children, which frequently terminates in death.

The Cicuta Virosa of Europe is stated by Dr. Churchill to be by far the most poisonous plant of Great Britain; and Doctor Bigelow, (of Boston.) in speaking of the Cicuta Maculata, says, 'This is probably the most dangerous of all our poisonous vegetables, and various instances of speedy death have taken place in children who have unwarily eaten the root.'

For particulars see Vol. I., American Medical Botany.

7th, 8th, 9th & 10th. Euphorbia Helioscopia—Sun Spurge.
" Polygonifolia—Knot-grass Spurge.
" Maculata—Spotted Spurge.
" Hypericifolia—Oval-leaved Spurge.

The numerous species of Euphorbia which are found in various parts of the world, are all eminently acrid, and belong to the class Dodecandria, Order Trigynia, and Natural Family Euphorbia.

The species above enumerated are amongst our commonest weeds in cultivated grounds, road sides, and on the sand at the Island. In their action they are powerfully irritant, and all the effects on the body are subordinate to that action.

The milky juice which exudes when any part of the plant is broken, produces, in children, when applied to the skin, an eruption of vesicles, containing at first transparent lymph, which afterwards becomes opaque, and ultimately forms a dry crust or scab.

I have often been sent for to see children who had been playing with this common weed, and whose anxious mothers imagined were labouring under chicken pock; and so nearly do the two states appear, that I have been in doubt for a time whether to ascribe it to the poison or the disease.

In any of the cases which I have seen, there has not been any symptomatic fever, nor has the eruption appeared on any part of the body usually covered by clothes—but on the hands and arms, face and neck, or legs.

I am not aware of any ill effects having followed the handling of these native plants; but the East and West Indian, and African varieties produce violent inflammation, and even ulceration of the skin, or any part of the body with which it comes in contact.

11th. Arum Triphyllum.... Dragon Root or Indian Turnip. This singular and elegant plant is a native of our swamps and wet woods.

The root is round and flattened, its upper part tunicated like an onion, its lower and larger portion tuberous and fleshy, giving off numerous long white radicals in a circle from its upper edge. On the under side it is covered with a dark, loose, and wrinkled skin.

The leaves are on long footstalks, and composed of three oval acuminate leaflets.

The flower is a large, ovate, acuminate spathe, convoluted into a tube at the bottom, but flattened and bent over at the top like a hood. Its colour is various; in some it is green, in others dark purple, or almost black, mostly variegated, with pale greenish stripes on a dark ground.

It belongs to the class Monœcia, Order Polyandria. Every part of the arum, and especially the root, is violently acrid, and almost caustic; applied to the tongue, or to any secreting surface, it produces an effect like Cayenne Pepper, but far more powerful, so much so, as to leave a permanent soreness of many hours' continuance.

This acrimony is of a volatile nature, and disappears upon boiling or drying.

It consists of an inflammable substance, volatile at low temperatures, and not combining with water or alcohol.

12th. Calla Palustris.............Northern Calla.

This handsome aquatic plant belongs to the same class and order as the foregoing, and is found in the swamps near the Humber.

The root is as large as the finger, jointed, and creeping. The leaves are smooth, entire, heart-shaped, with an involute point.

The flower or spathe, oval, spreading, recurved, clasping at the base, and ending in a cylindrical point.

The root is acrid, like that of the arum, but the pungency disappears in drying. Linnæus says the Laplanders use it for bread.

13th. Anemone Nemorosa............Wood Anemone.
14th. Ranunculus of different species. } Crowfoot, Buttercups.

These well-known plants are amongst the earliest flowers of Spring, and are too common in all our meadows, pastures and woods, to require a particular description.

They are all more or less acrimonious, but like the arum and the calla, this property is lost by drying.*

15th. Sanguinaria Canadensis....Blood Root.
Class Polyandria.........Order Monogyina.

This is one of our earliest spring flowers. The flower and leaf proceed from the end of a horizontal, fleshy, abrupt root, fed by numerous radicles.

Externally, the colour of the root is a brownish red; internally, it is pale, and when divided, emits a bright orange-coloured juice from numerous points of its surface.

The bud or hybernaculum, which terminates the root, is composed of successive scales or sheaths, the last of which acquires a considerable size as the plant springs up.

By dissecting this hybernaculum in the summer or autumn we may discover the embryo leaf and flower of the succeeding spring, with a common magnifier, and even the stamens may be counted.

The leaves are heart-shaped, with large roundish lobes, separated by obtuse sinuses. The flower consists of eight white spreading, and concave petals.

The root is violently emetic.

16th. Phytolacca Decandria...............Poke.
Class X.........Order X.

This is a common plant found on the road sides, and flowering in July and August. The flowers are succeeded by long clusters of dark purple berries, almost black, with which the Indians stain their basket work, and hair for embroidery.

The root is violently emetic.

*(To be continued.)*

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* The greater part of the plants of this order are objects of interest with gardeners, containing, as it does, many of the most elegant or showy of the tribes of hardy plants. It is here that the graceful Clematis, the lowly Anemone, the glittering Ranunculus, and the gaudy Pæony are found, differing indeed, in external appearance, but combined by all the essential characters of the fructification. It is remarkable, however, that the acrid and venomous properties of these plants are nearly as powerful as their beauty is great. They are all caustic, and in many of them the deleterious principle is in most dangerous abundance.

Mons. Decandolle remarks that its nature is extremely singular; it is so volatile that, in most cases, simple drying in the air, or infusion in water is sufficient to destroy it; it is neither acrid nor alkaline, but its activity is increased by acids, honey, sugar, wine or alcohol; and, it is in reality, destructible by water. The Crowfoots of our pastures, and the Anemone Trilobata and Triternata of South America, are well known poisons of cattle. Blistering plasters are made in Iceland of the leaves of the Ranunculus Acris.

The Helleborus, famous in classical history for its drastic powers, and the Nigella, celebrated in ancient housewifery for its aromatic seeds, which were used for pepper before that article was discovered, are both comprehended in the Ranunculaceæ.

The range of this order, in a geographical point of view, is very extensive. A very great number has been discovered in Europe; but they are so abundant in all parts of the world, that an order can scarcely be found more universally and equally dispersed.

## On Accidental Discoveries.

*Read at the Annual Conversazione of the Canadian Institute, April, 2, 1852, by* HENRY SCADDING, D.D., CANTAB., *First Classical Master of Upper Canada College.*

I shall ask you to transport yourselves in imagination, for a few moments, to the sea side. The brilliant blue of the heavens—the stillness, and rather inconvenient glare of light on the surface of the water, may tell you that it is the Mediterranean. The arid aspect of the precipitous shore, with the dark palm-trees that stand out distinctly here and there along the strand, indicate that it is the Syrian coast. Yonder bold promontory on the right is the famous Cape Carmel. The spacious bay which you gaze into is the Bay of Acre. The river which you see entering between the ridge of low rocks and the beach of white sand on the left, is the Belus. To that beach of white sand let me direct your attention. A group of sea-faring men are there rising from their mid-day repast; their vessel—a small trading craft—has been run in close to the shore; their meal and siesta over, they are gathering up their rude culinary utensils, and are about to resume their voyage. The fire upon the beach has smouldered away; the pale ashes have become of the same temperature as the surrounding sand.

But while the party are busy in re-embarking, one—he is possibly the commander of the vessel—observes something in those ashes. Something that glistens strikes his eye; he touches it with his knife; he lifts it out from among the mingled ashes and sand, a bright, irregularly-shaped mass. Something has been fused in that fire; whilst fluid it has "run," as we say, in several directions; where, in one place, it has met with the rock underneath, it has spread out in small sheets, which are, to some extent, transparent.

Now, it will be necessary to explain. Yonder vessel bears in its hold, among other merchandize, some tons of rough nitre—a substance produced naturally in the neighbourhood of the Dead Sea. It was used possibly of old, as now, in the preservation of fish and meats. The sailors, on landing, having failed to find near at hand stones adapted for the purpose, took some lumps of this portion of their cargo to rest their camp-kettle upon. The fire has acted on those lumps, as also on the silicious sand on which they are placed; fusion and amalgamation of the two substances have ensued; the hard transparent material, noticed by the commander of the vessel, is the result. The captain, during the remainder of the voyage, is more silent than usual; he is ruminating on what he has observed—"If this nitre and this sand, thus subjected to fire, will produce this hard, transparent substance once, they will do so again; if this substance spread itself out so readily upon the flat rock, becoming solid and continuing transparent, it will spread more conveniently, and be rendered more transparent by means of surfaces which I can prepare for its reception—nay, will it not assume any form of which I may be able to construct the mould?"

You will perceive that it is *glass* that has been discovered—a substance that contributes so much to the comfort and gratification of man—a substance that excludes from his house the inclemencies of the atmosphere, and yet admits freely the sun's rays; that adorns his hospitable board with a variety of vessels of brilliant hue and graceful shape—that permits him to refresh his eyes in winter with the green leaves and blooms of summer—that helps to repair his vision when defective, and to add incredible powers to it when at its best—a substance that, elaborated into massive plates, lends lustre along the street to his multifarious handywork; and, on occasion, forms walls of what, prior to experience, would be deemed of fabulous extent, to shelter in vast store-houses the gathered masterpieces of his skill.

The narrative just given may or may not be authentic. Pliny met with some such story, and thought it interesting enough to be treasured up in that curious depôt of fact and fancy—his "Natural History." I simply use it as an illustrative introduction to some examples of accidental discovery in Science and the Arts, which I have thought it might not be inappropriate to enumerate to you this evening.

That glass was in some manner discovered at an early period of the world's history, is certain. Articles of this material, very skilfully constructed, have been found in the palaces of Nineveh, and the ancient tombs of Egypt and Italy. The number of glass vessels to be seen in the great Museum at Naples, collected from the buried cities of Herculaneum and Pompeii, is truly astonishing. In that Museum are also preserved numerous fragments of *flat* glass from the latter place, together with bronze lattice-work with panes of glass actually inserted, proving that glazed windows were by no means unknown eighteen centuries ago.

Could we be admitted to the secret history of discoveries and inventions in general, I dare say we should find that many more have originated in what was apparently an accident, than we are now aware of. We know that the devotees of the so-called Occult Sciences in the Mediæval period—the Alchemists—the transmuters of metals and searchers after the elixir of life—lighted on facts that tended largely to the development of the real science of Chemistry.

We have dim traditions from the mythological times of the accidental invention of musical instruments. The wind whistles over the sheaf of broken reeds in the arms of the shepherd-god, and gives him the idea of the syrinx—the pipes of Pan—the embryo that grows at length into the noblest perhaps of all musical instruments—the Church Organ. Again, Hermes strikes his foot against the shell of the sun-dried tortoise, and the tightly-strained tendons give out musical tones. He thus literally stumbles on the lyre—the germ of our harp and piano-forte. The colossal statue of Memnon (Amenophis) in Egypt, emits music from its head—cavities in the sculpture producing vibrations in the air. The fact is converted into a miracle, and gives birth to a series of adroit uses of the simple laws of nature for the creation of surprise in the minds of the ignorant.

Were we living in an age of infantile simplicity, to what myths might we not expect those mystic chords to give rise which in these days are so rapidly encircling the earth as with a zone! Listen to the excellent music which they discourse over your heads as you walk abroad! We overlook the phenomenon as a mere trifle—the principle of which, however, might lead us at least to the Æolian Harp—were we not long forestalled in that; and are absorbed—and justly so—in the sublimer contemplation of a system of artificial nerves, gradually throwing themselves out over the globe, along which may rush impulses from the will and soul of man.

Of chance discoveries hinted at in very ancient history, I find one or two cases more. The gracefully-curling leaves of an Acanthus plant, surrounding a basket left by accident upon it, catch the eye of a sculptor who has a quick sense of the beautiful. A new style of ornament for the column is instantly conceived. The Corinthian capital thenceforward in all after ages gives pleasure to the frequenters of Temple and Forum. Again, the hand of affection, on one occasion, is prompted to delineate on a wall the shadow of a head, to be a memento, during an anticipated absence, of the beloved reality. The art of portrait-painting takes its rise from the circumstance.

The popular tradition is that the falling of an apple first suggested to Newton the idea of universal gravitation. Sir David Brewster, very reasonably, gives no credence to the story. Still, we can well imagine the philosopher in his orchard at Woolsthorpe, using such a casual occurrence by way of illustration to a friend:—"If this earth be a globe, and what is "up" to us is "down" to our antipodes, why does yonder apple, for example, descend to the surface in preference to rising outwards into space?" And may we not ask, in connection with Newton, is it not exceedingly likely that the resolution of white light into its component parts by the prism, may have been suggested to him by the beautiful colours which he must often have seen projected on the walls and ceiling of a room from the crystal drops of a chandelier? But questions like this it is easy to put, in the case of almost every invention, after it has taken place. We are so fortunate as to be put at once in possession of the result, without being obliged so much as to think of the steps which led to it. Still, it is interesting sometimes to conjecture what those steps were.

The bold stroke of Columbus, by which he caused the egg to stand alone, has become a proverb. Any person visiting now the heights behind Genoa, and remembering that the great navigator was once familiar with that scene, can imagine it to be exceedingly natural that he should have discovered America. "If Africa lies yonder, though invisible to the eye, what reason is there, why I should not believe, when I look out on the Atlantic from behind Lisbon, for example, that there is as certainly land to be arrived at, by persevering to the West?"

By a pleasant train of association, the mention of Genoa and Columbus suggests to me the memory of Pisa and Galileo—with another example of happy accidental discovery. It was in the magnificent cathedral at Pisa that the gentle oscillations of a chandelier gave Galileo (1642) the idea of the application of the pendulum, as a regulator in an apparatus for the measurement of time—a combination that ripened at last into that exquisite piece of mechanism—the Astronomical Clock.

The recent ingenious experiment of M. Foucault, to demonstrate to the eye the motion of the earth, was the result of a chance observation. While engaged about a turning-lathe, he took notice that a certain slip of metal, when set in motion, vibrated in a plane of its own, independently of the movement of the part of the lathe on which it was carried round. Hence, he thought he could by a certain contrivance exhibit to the eye the revolution of the earth on its axis. He obtains permission to suspend from the dome of the Pantheon at Paris, a pendulum of some 280 feet in length, and demonstrates the accuracy of the idea which he had conceived. However difficult of brief explanation the phenomenon may be, it is nevertheless a fact—and it is with a degree of awe that one witnesses it—that the pavement of the Church seems very sensibly to rotate, the pendulum at every oscillation returning to a different point on the graduated circle placed below the dome.

The inventor of spectacles was a great benefactor—but having found no chronicler, his name is lost. He was, probably, some one who himself suffered from defective vision—the necessity of an individual often leading to contrivances which benefit a class. Friar Bacon has been mentioned as the inventor, but not with certainty. Spectacles, however, became generally known in Europe about his time (1214—1292). I have often thought that a person afflicted with short sight, would be very apt to hit upon a remedy. I remember, as a boy, discovering that many of the little blisters in common window glass would partially correct short-sight; also, that the polished bottom of a common tumbler would occasionally do the same—facts that might lead any one to the construction of concave lenses.

*(To be continued.)*

## REVIEWS.

### Lake's System of Canal Steam Navigation.

It is a somewhat strange coincidence that whilst reviewing a proposition for a Ship Canal on this side of the Atlantic, of 20 feet depth of water, (See March No. of Canadian Journal,) to supersede a river depth of 8 feet, our notice should be attracted to a system patented in England and proposing to apply steam power to the economic and efficient use of shallow Boat Canals, whereby they shall be enabled to compete in cheapness of transit with Railways. The patentee Mr. John Lake, C. E., has selected half a mile on the Grand Junction Canal, whereon practically to illustrate his system; and the length we are told includes unusual Engineering difficulties, must therefore be considered as affording a severe test. It comprises at "its northern extremity, an extremely sharp curve, and about the middle a rise by a Lock of 7½ feet, approached by another curve though of larger radius—beyond this again and on the higher level, it is continued in a straight and then in a curved direction." The lock above referred to is double, and through one of the Chambers the ordinary traffic of the Canal still flows. The gates of the other have been removed, and their functions superseded by an inclined plane constructed on the principles laid down in Mr. Lakes specification. As the work of the level portions of the experimental line was sufficiently great to admit of two boats abreast, the old and new system were worked simultaneously, and the comparison was accordingly direct and palpable.

The substance of Mr. Lakes invention (as stated in The London Mechanic's Magazine) admits of being concisely stated, from its extreme simplicity, and we purpose to give a succinct account of it in this place, that the results already accomplished by it may be fully appreciated. First, the permanent way of the works in every level section of the canal consists of a double line of light iron rails, supported at the uniform height of about 18 inches above the usual high-water mark, upon parallel walings, or beams of wood, to which they are attached by countersunk screws. The walings follow the course of the canal and rest upon rows of piles driven into the bed of the canal, about 15 feet apart. Within the trackway thus formed a number of canal boats with square ends are brought together, and coupled rather closely, so as to constitute a train. Immediately in front of them is another boat, which contains the engine by which motion is to be communicated to the train. The piston-rods of the engine are directed upon cranks in a transverse shaft, which carry the driving-wheels, by the reaction of which upon the rails the whole train is set in motion. In order to produce the requisite tractive force, the driving-shaft is pressed downwards to the rails by a pair of levers, through which it passes freely, and which lie in the direction of the rails. The after ends of these levers are attached strongly to fixed points in the engine-boat, while their other ends are united by a transverse beam of iron, which can be raised or depressed by means of a powerful screw and lever. When the transverse beam is depressed, the driving-shaft and its wheels are pressed down upon the rails, and the engine being set in motion, the entire train of boats is drawn along. On level canals, or those without locks, the arrangements described are all that would be necessary in actual practice; but to raise the train from one level to another, an inclined plane of extreme simplicity and perfect efficiency has been proposed by the inventor, which at once does away with the loss of time, water, and enormous expenditure incidental to the present system of locking. This incline is, in fact, a double one. The walings ascend upon the heads of piles gradually increasing in height, and strongly framed together in both directions. As the engine would be utterly powerless to draw its train up even a moderately inclined surface, with a smooth rail, a strong rack-work is fixed upon it, which is continued beyond the summit of the incline for about the length of a train. The driving-shaft of the engine is provided with suitable pinions to geer into these racks; and the continuation of the latter will obviously enable the engine to draw the last boat of the train to the higher level. It is obvious that, by this arrangement, any amount of required fulcrum may be obtained. A line of large rollers or drums, mounted in plumer-blocks about 10 feet apart, which it is proposed to reduce to 5 feet, is fixed upon an inner and lower incline, and over these the bottoms of the boats pass, strips of stout iron being attached to them, to diminish the friction and to protect the botoms, which are also strengthened otherwise. These rollers are continued under water in the upper and lower "pounds" of the canal, so that a support for the boats is provided the moment that the racks and pinions become engaged, and they are deprived of their natural support in the water.

The complete efficiency of this remarkably simple and ingenious mode of working a train of canal boats was amply demonstrated in the trials we witnessed at Grove, though neither in point of power nor in precision of detail is the mechanism at present to be regarded as a fair illustration of it. A small 10-horse engine, with its boiler and fuel, and subsidiary apparatus, was fitted in the leading boat, to which a train of twelve other boats were attached. These were merely old canal boats, with their sharp ends cut off square, to diminish the resistance in the water, and then cut into two smaller ones, which were laden with blocks of granite and bricks to the extent of about 100 tons. At first the engine-boat was at the foot of the incline, and Mr. Lake ordered the train to be backed, or driven northwards along the level and smooth rails. A turn or two of the large screw sufficed to produce a good bite between the driving-wheels and the rails, and the moment the engine was set in motion the train started, and proceeded with the greatest ease of motion through the water—no eddies resulting from it, nor any undulatory effects that would be detrimental to the banks. The train threaded its way, without difficulty, through the sharp curve at the northern end of the piece, the walings guiding it continuously and gently in its assigned course. In these curves, the only preliminary precaution to be observed is, to give a little divergency at the walings to the point of maximum curvature, and then to contract them gradually for the remainder of the curve, until their normal gage is attained at the next straight piece. In going round a curve thus formed, a train of ordinary length will move freely, without risk of being jammed between the walings. In this trial, the readiness with which a train can be backed, even through a sharp curve, was clearly proved.

The engine was now reversed, and the train drawn forward in the usual manner. Its speed was here considerably above four miles per hour, and was then lessened, to show the control which the engine-driver had over it; and the levers were released until the wheels slipped upon the rails, and the train proceeded with the momentum it had acquired to the foot of the incline. There eight of the boats were detached; as the small engine at present in use is not of sufficient power to draw up more than a gross load of about fifty tons. The levers were again screwed down, and the engine set in motion, upon which the pinions geered into the racks, and the engine-boat rose gradually out of the water, commencing its ascent of the incline. As it continued to ascend, it rolled smoothly over the rollers below, and was followed by the four boats attached to it; all of which were landed, without the delay of a moment, in the upper pound of the canal. From this point the train proceeded along the remainder of its course in the upper level of the canal, and being brought back again to the incline was allowed to descend it. The descent was accomplished with perfect ease, and the absence of all danger. All that the engineer had to do now, was to admit the steam into the cylinder on the other side of the piston, so as to render it effective in checking the motion, which would otherwise give to the mass a destructive momentum. Thus, the same engine which propels the train of boats along the level portions of the canal, by the arrangements here adopted, is also available for elevating from one level to another; a feat never before accomplished—or shown only in detail—except by means of stationary power.

The advantages of this arrangement over the present canal system scarcely require to be pointed out. Any rational alteration in the extremely inartificial and unphilosophical application of power we now witness on our canals, cannot fail to be productive of advantage; but it is evident, too, that the train system must be the basis of every approximation to economical working. Past experience, and, indeed, the remonstrances of common sense, declare against the adoption of paddle-wheels, or screw propellers, either in a train of canal baots, or in single ones: as the confined nature of the channel prevents the access of new water to the moving surfaces, and little better than a churning action is the result. We are therefore driven to substitute for the extremely imperfect reaction against canal water, that against fixed and rigid objects in the vicinity of the boats. This being so, it appears to us that Mr. Lake's system of canal steam navigation embraces all the requirements of the case, and has combined in itself all the favorable circumstances that can be brought to its aid. Having given evidence of its efficiency, a few comparisons will prove its great economy.

First, as regards construction—premising here that existing canals can be altered without any stoppage of the navigation, and the locks and other works, if it should be deemed desirable, may be left freely open for the present clumsy method of hauling. A line of level railway can be laid down on this principle at a prime cost of £1200 to £1500 per mile, according as the wood employed is oak, fir, or beech. An inclined plane of average length would cost £1000, which would be an economical substitution for the expensive works of a lock. A flight of locks might be replaced by a sufficiently long incline; and thus, upon the whole, places where locks must otherwise be constructed would become the cheapest portion of the entire work, as the inclines might be built upon land with but little excavation. The outlay incurred by laying down the works for an up and a down line of rails, would be far more than returned in a short time by the saving that would arise in the maintenance of the canal. Besides dispensing with the locks themselves, the heavy expense of lockage-water would be altogether removed; there would also be no charge for lock-keepers, no towing-paths to keep in repair, and all necessity for pumping water would at once disappear. But the greatest economy of all would arise in the cost of haulage. Every canal boat requires at least a staff of three men constantly present, and fresh for duty—one to drive the horse, another to steer the boat, and a third to run forward to get the locks ready. Of course, a large number of persons, and four at the *least must be on board, to enable certain of their number to rest when* necessary. These men, besides the cost of a fresh horse at every twenty miles, must be kept in pay for each boat, which, on an average, conveys only fifteen tons of cargo. Now, under Mr. Lake's system, three men only would be necessary for a whole train of boats, as no steerers are necessary; and with a thirty-horse engine, which Mr. Lake proposes to use in practice, the train might be of almost indefinite length. The resistance of the water to a canal boat, moving at its usual speed, is about six times smaller than that of the resistance to a goods' train moving on a railway at a speed of twenty miles an hour—at which rate it is essential to carry goods on a railway, to keep the road clear for the passenger trains—and a ten-horse engine is sufficient to draw 1000 tons on a level line of canal, at a speed of three miles an hour. As for the inclines, when once the engine has passed their summit with a train occupying the whole length of the incline, it matters little how many boats are on the level below, for they are then certain of being raised. Upon the whole, the greatest gross load which could be on the inclined plane at any one time could not exceed 120 tons, and the present engine of ten-horse power takes over a gross load of fifty tons. Making the most liberal allowance for every detail of expenditure, the calculation gives from 7d. to 8d. per mile as the cost of carrying 300 tons on Mr. Lake's system—an immense advantage as compared with the existing one, which is at least ten times greater, and even with railway transit.

Such are the merits of Mr. Lake's invention, which, if the Report before us may be relied on, and we suppose it may, promises to restore the canal interest in England to something like the position which it held previous to the construction of Railways. That interest suffered almost annihilation at the hands of its more modern competitors; but in view of the heavy carrying trade in iron, coal, and those articles of bulk and weight least profitable to Railways, and better suited to canal purposes, seeing that the charges of the latter may now be very considerably reduced, whilst the time of transport will be much improved, there is strong ground for the belief that canal property may to a great degree recover its value, and be again brought into active and successful operation. To us, whose canals are upon a larger scale, involving the open navigation of our lakes, this invention would appear to be of slight importance, for we shall never embark in any but ship canals, to which it is inapplicable, and which can alone be preferred, (and then only under peculiar conditions and in particular localities,) to railways. We have considered, however, that the proposition is sufficiently ingenious and interesting to justify its insertion in our columns, and to recommend itself to the perusal of our subscribers.

## SCIENTIFIC INTELLIGENCE.

### The Meteorology of 1852.

It is only within comparatively few years that observations of sufficient accuracy have been made to enable us to arrive at any exact conclusions as to the great meteorological phenomena which are constantly occurring around us. By the establishment of certain fixed points in selected localities, where observations are regularly made with instruments that have been carefully prepared, and by the system of registering these upon the forms furnished by the Royal Observatory at Greenwich—to which establishment they are returned, and there carefully reduced by Mr. James Glaisher—we obtain results which will no doubt eventually enable us to deduce some law of action that we cannot at present detect. By the information afforded by Mr. Glaisher's quarterly return, published by authority of the Registrar-General, we may now examine all the meteorological conditions of 1852: a year remarkable for its peculiar character,—presenting very singular conditions of temperature, and yet more extraordinary falls of rain. We have carefully gone through all the returns made by Mr. Glaisher—those for the last quarter not having been yet issued to the public:—and from them we are able to present our readers with a digest which will register all the more remarkable phenomena.

During the quarter ending March 31st, the highest observed temperature was 71°, at Manchester and Wakefield. The maximum temperature at the Royal Observatory was 68°·4:—the lowest observed temperature was 17° at Uckfield and 21°·3 at Greenwich. The mean temperature over the kingdom, from Glasgow in the north to Helstone in Cornwall on the south, was 41°·4. During the same period, the mean of the barometer was 29·818 inches; the height in February exceeding that in January at all places,—the difference increasing with the increase of latitude. It is worthy of remark, that during the winter months of 1851-52—that is, the quarter ending in February, 1852—the mean temperature of the air at Greenwich was 40°·1,—being 4°·2 above the average of eighty years. This appears to have been due to the higher temperature of the gulf stream which flows against our western shores; the ocean having a temperature of from 8° to 10° higher than the land during the whole winter. Thus, if frost appeared, the slightest *change of wind to the southward brought air warmed by the ocean* over the land, and the temperature was immediately elevated.

From the commencement of the year to February the 9th, rain fell on twenty-three days,—but from the 10th to the end of the quarter, rain fell on six days only, and to small amounts:—the entire quantity of rain within the quarter being 4·7 inches.

During the quarter ending June the 30th, the highest observed temperature was 79° at Hartwell House, Norwich,—the maximum at the Royal Observatory being 74°·7. The lowest observed temperature was 22° at Linslade, the minimum at Greenwich being 26°·7,—the mean temperature for the quarter 51°·2, which was somewhat below the usual average. A deficiency of rain prevailed until the end of April; but in June the fall exceeded by more than double the average amount, the sum in inches being 7·0. In April, there fell but half an inch of rain,—in May, nearly 2 inches, and in June, 4·6 inches. The mean of the barometer during this period was 29·764.

The quarter ending September 30th presents some peculiarities; being remarkable for the great heat of July,—very frequent and severe thunderstorms,—frequent and heavy falls of rain,—and a large excess of rain. The highest observed temperature was 95° at Leeds, 93°.7, at Holkham, and 93°·5 at Wakefield. The lowest temperature was 31° at Aylesbury and Wakefield,—thus exhibiting at the latter place the extraordinary range of 62°·5. The highest temperature at Greenwich was 90°·3, the lowest 40°·9:—the mean temperature of the air for the quarter being for the kingdom 61°·8. The mean temperature of July 5 was 14° in excess above its average value, and the following day it was in excess 12°. The rain was 6·6 inches above the average of thirty-seven years:—being in the several months of this quarter 2·3 inches in July, 4·5 inches in August, and 3·6 inches in September,—or, 10·7 inches in the three months.

In this period there were several most remarkable falls of rain in different parts of the country. At North Sheilds 3·1 inches fell in 19½ hours on the 10th of July; and between the 26th and 29th of September the amount of rain at the same place was 6.4 inches. At Grantham the falls of rain were very heavy. On July 5, 1·6 inch fell in about an hour, and on the 2nd of August 0.3 fell in ten minutes. Similar heavy falls, doing much damage to the crops, occurred at Norwich, Southampton, Aylesbury, Newport, Falmouth, Wakefield, and York. Indeed, in every part of the country the rain phenomena assumed a very unusual character. The rain fell on the least number of days at Dunino, Guernsey, Greenwich, Norwich, and Holkham,—and on the greatest number at Royston, North Shields, Wakefield, and Leeds. The least falls took place at Dunino, Leeds, and Gainsborough,—and the mean amount at those three places is 7·0 inches. The largest falls occurred at North Shieds, Stonyhurst, Uckfield, and Ryde,—and their mean is 15·3 inches. The mean atmospheric pressure for the quarter, 29·9111 inches.

The last quarter of the year 1852 presented a temperature 4°·6 above the average of eighty years,—the temperature of the last month, December, being 8°.8, and that of November 6°.5 above the average of the same number of years. Mr Glaisher in his report remarks:—"The daily temperature was below its average value till October 19, and it was alternately in excess and defect from October 20 to October 29. On October 30, a period of warm weather set in, of longer continuance at this season of the year *than any on record.* The mean temperature of the month of November was 48°.9; being 6½° in excess of the average of eighty years, during which period one instance only of a higher temperature has taken place—viz., in 1818, when the average temperature of this month was 49°. The mean temperature of December was 47°·6, exceeding the average of the month by no less than 8¼°, and being of higher temperature than any December as far as our records extend. The nearest approach to this value was in 1806, when the mean temperature of December was 46°.8." The highest observed temperatures were 67° at Jersey, Helstone, and Chiswell Street, and 66° at Manchester. The lowest temperatures for the quarter were 23° at Dunino, 24°·8 at Nottingham, and 25° at York. The mean of the Barometer being 29·710 inches.

The quarter was distinguished by a continuance of the heavy falls of rain which characterized the preceding one. In many places the rain which fell within this quarter was equal to that which occasionally falls in the whole year.

The largest falls of rain were at North Shields, the quantity being 23·6 inches,—at Truro, 22·6 inches—at Torquay, 23 inches—at Guernsey, 22·3 inches—and at Newport, 22 inches. The mean of these gives a depth of rain equal to 22·7 inches. The least falls of rain occurred at Holkham, Grantham, Cardington, and Gainsborough,—the mean of these places being 9.6 inches. The greatest number of rainy days occurred at Bowdon, Royston, Falmouth, and Ryde. The quantity of rain which fell during 1852 is so very remarkable, that we are glad to have an early opportunity of placing Mr. Glaisher's reduction before our readers:—that gentleman having kindly afforded us the means of doing so.

*Fall of Rain in inches*, 1852.

| Names of Stations. | Fall in Inches | No. of Days. | |
|---|---|---|---|
| Jersey | 43·4 | 171 | |
| Guernsey | 49·4 | 173 | |
| Helston | 45·4 | 183 | |
| Falmouth | 50·1 | 184 | |
| Truro | 52·5 | 161 | |
| Torquay | 50·0 | 175 | |
| Ventnor | 43·0 | 182 | |
| Ryde | 48·8 | 171 | |
| Chichester | 39·0 | — | |
| Southampton | 49·7 | 165 | |
| Royal Observatory | 31·4 | 155 | |
| Woolwich Arsenal | 31·7 | — | |
| St. John's Wood | 35·1 | 168 | |
| Abingdon, Berks | 36·7 | — | |
| Rose Hill, near Oxford | 38.0 | 173 | |
| Oxford University | 40·4 | 178 | |
| Stone | 31.3 | 182 | |
| Hartwell Rectory | 33.8 | 189 | |
| Linslade | 31·4 | 168 | |
| Cardington | 30·9 | 161 | |
| Bedford | 32·7 | 185 | |
| Norwich | 32·5 | 162 | |
| Grantham | 32·2 | 180 | |
| Derby | 33·7 | 183 | |
| Holkham | 30·3 | 173 | |
| Nottingham | 37·4 | 201 | |
| Hawarden | 40·2 | 186 | |
| Gainsborough | 25·5 | 175 | I have not visited this station: I think the guage wrong. |
| Liverpool | 31·2 | — | |
| Wakefield | 33·5 | 213 | |
| Leeds | 28·4 | — | |
| Stonyhurst | 58·3 | 191 | |
| York | 27·3 | 157 | |
| Whitehaven | 50·0 | — | 11 in. fell in Dec.: average for Dec., 3 8 in. |
| Durham | 30·6 | 180 | |
| North Shields | 58·2 | 232 | Average for the year at this place, 20·8 in. |
| Glasgow | 45·5 | 188 | |
| Dunino | 31·3 | 133 | |

It will be seen from this, that, supposing the rain which fell through the year 1852 had rested on the surface of the country—it would have amounted to fifty inches in depth nearly over the counties of Devon and Cornwall—and to between 30 and 40 inches at most inland places. There would thus have been spread over the whole of England a depth of nearly 3 feet of water.

A few parallel examples of heavy falls of rain in this country will bring out the phenomena more strongly. Mr. Luke Howard, in his "Climate of London," informs us that in the latter half of June and the first half of July 1810 the amount of rain was 5·13 inches. At Kendal in 1782 83·5 inches of rain fell, the average result being 55 inches. At Perth, on the 3rd of August 1829, four-fifths of an inch of rain descended in half an hour—and Mr. Howard records the fact of 1½ inch of rain having fallen on the 8th May. In the last quarter of 1852 there fell—

| | | Inches. |
|---|---|---|
| October 4 | Southampton | 1·9 |
| " | Uckfield | 2·1 |
| " | Midhurst | 1·8 |
| November 6 | Falmouth | 1·3 |
| " 10 | Nottingham | 1·7 |
| " 13 | North Shields | 1·6 |
| December 17 | Leeds | 1·3 |
| " 19 | Glasgow | 1·8 |

So that for remarkable falls of rain—and for a long continuance of wet—the year just past presents a very striking meteorological condition. The mean of an extended series of observations gives 31 inches as the annual quantity of rain between the latitudes 50° and 55°—the corrected means of the returns obtained gives 34. for 41852.—*Athenæum.*

## New Jersey Zinc and Franklinite.*

Mineral enterprise in this country is rapidly rising to the ascendant. Capital is becoming more ready and anxious, if possible, to invest itself in iron, lead, zinc, copper, and coal mines, than in railroads, which have been, and are now the ascendant interest. It is confidently predicted by careful judges of the signs of the times that, within ten years, more capital will be invested in our mining operations than in our railroads. All the minerals we have named above, are in increased demand, and bear improving prices. The era of fancy mining, for years past potent in fortune-making to a few and in ruin to many, has had its day. Moneyed men are no longer found ready to invest their wealth in paper mines, having no particular existence beyond the ingenuity of their Wall-street creators, and, after a little lapse, to test if the cry for legitimate enterprise indeed meant legitimate, a new sort of enterprise is being inaugurated—to wit: a desire and determination on the part of men of knowledge and means, to enter upon the practical development of some of the vast, undoubted mineral resources of the country.

One mineral enterprise successfully, because energetically, taken hold of and prosecuted, has done more, within two or three years past, to induce the general interest now felt in mining projects, than all others we could name. We allude to the operations of the New Jersey Zinc Company, organized in the spring of 1848, and which, in the face of repeated failures for half a century past to turn the rich zinc mines of New Jersey to practical, profitable account, have been so successful, and that, too, in developing zinc in a more profitable form (paint) than was first contemplated, that its stock, representing $1,200,000 capital, is now considerably above par, and eagerly sought for permanent investments. The success of this enterprise, opposed at first by so many obstacles; the prejudices of legislation, the hesitation of capital, the entire absence of experience in zinc mining and manufacture in this country, has inspired a score of enterprises, most of them legitimate, and many of them destined to great success and profit. It has certainly placed New Jersey in the front rank of mineral States, for, independent of the revelation of her wealth in zinc, it has led to a more thorough examination of her other mineral resources, which are many and rich. But the impetus inspired by the operations of the New Jersey Zinc Company, has not been confined to New Jersey or any particular region; it has spread, and is spreading, over the "Empire" and other States. The working of the zinc mines by intelligent, skillful and energetic minds and hands, has proven that the chief "protection" necessary to develop our mineral wealth is enlightened, practical management, and that mineral operations legitimately entered into and pursued, are no more a speculation or hazard, without tariffs even, than any other business requiring an equal outlay of capital and skill.

As the zinc interest is a new as well as important one, opening another spring of wealth and enterprise, and promising great benefits, commercial, manufacturing and sanatary, our readers will be interested in a brief statistical and general statement of the zinc resources of New Jersey, and the operations of the New Jersey Zinc Company. The zinc mines are located in the township of Franklin, Sussex County, New Jersey. They are the only mines of pure oxide of zinc known. They are mixed in their deposits with other minerals, chiefly Franklinite iron ore and manganese. Vast deposits of this Franklinite lie contiguous, similarly blent with zinc and manganese. The total extent of the two chief minerals, all of their kind located compactly in that region, is not definitely estimated, but it is immense—exhaustion for centuries to come is out of the question. It will be sufficient for the information of our readers to take the data of that portion belonging to the New Jersey Zinc Company, which has been carefully examined by Dr. Charles T. Jackson, State Assayer of Massachusetts, and United States Geologist for the mineral lands of the United States in Michigan, &c., whose estimate is verified by Major A. C. Farrington, the eminent Mining Engineer of the Zinc Company, and other eminent scientific men. Dr. Jackson gives as the amount of the Zinc Company's Franklinite, above water drainage, 1,115,468 tons; amount of zinc, 1,188,572 tons. The veins are perpendicular, and, according to the law of such veins, extend down farther below water drainage than ever plummet sounded, and are richer, if anything, as they descend, so that it is safe to say both zinc and Franklinite are inexhaustible. But if they were not so in the Zinc Company's mines, there is vast store further in reserve. It is difficult to say which of these two minerals is most valuable; both are *sui generis* and precious. As the zinc is furthest developed, we will give its analysis first:—

| | |
|---|---|
| Oxide of zinc say | 60 |
| Franklinite say | 20 |
| Manganese say | 20 |
| Total | 100 |

* Hunt's Magazine.

A close analysis might show a slight but not material difference When taken hold of by the present successful company, the design was to manufacture the zinc of Commerce, zinc ware, &c., but early experiments by the company led to the discovery that a more immediately marketable, profitable and beneficial article could be made—to wit: the zinc paints, now so rapidly supplanting lead and other paints. It was found that a pure and brilliant white sub-oxide could be extracted from the ore with great ease and facility, and two shades of white, one a silver white, and the other a beautiful slate color; while the red oxide could be pulverized in the ore, and rendered into a brilliant brown paint, which, in turn, by admixture with other preparations, *would also make a superior black paint. Here was a new* field indeed. The known poisonous and other deleterious properties of lead, seemed to define the mission of the Zinc Company, and to *demand that it should first become a creator of a healthful and more* durable and brilliant, as well as a cheaper paint. They accepted the summons, and erected extensive zinc paint works at Newark, after long and expensive, but never discouraging experiments, and during ten months of 1852—the first year of comparatively perfected machinery and operation—their paint sales from their warehouse in this city—supervised by Messrs. Manning and Squier, 45 Dey-street—reached $185,577 28, and they were, even at that, unable to meet the press of orders, though their works at Newark turned out ten tons of paints per day. Those works are being enlarged, and will require repeated extension, if, as we think it is, zinc is destined to supplant lead as a paint; for there is now annually consumed by the United States, 50,000 tons of lead in paints.

A glance at the process of making zinc paint, or rather extracting the sub-oxide, will not be uninteresting. The mines are about thirty-five miles from Newark, and the ore requires at present to be carted eight miles, (a rail is being laid for this transport in future,) and is then conveyed to the paint works by water. The ore, on arriving at the works at Newark, is placed in heaps and roasted, for the purpose of softening it. It is then ground into small pieces, when it is mixed with an equal quantity of coal, used for de-oxidizing the different substances of which the ore is composed. It is then put in smelting furnaces, where the action of the carbonic acid gas, supplied through the coal, disengages the component parts of the ore, and causes the zinc to rise in vapor, which vapor is conveyed into a large tube, thro' *which a quantity of atmosphere is constantly driven*, and the zinc, uniting with the oxygen, produces the white oxide of zinc, and this is driven by a blast into a collecting chamber, from whence it is taken for use. The oxide is then mixed with oil by means of machinery, and thus is produced the beautiful white zinc paint. The manganese in connection with the zinc, is found to be, as though specially provided, a natural dryer for the paint.

When the Zinc Company commenced operations, they had comparatively no data to go by. The zinc paint introduced in France by the discoveries of Le Clair and Sorel—for which they were awarded the cross of the Legion of Honor and other dignities—though subsequent to the use of a perhaps inferior article, collected through some experiments (not for that purpose) many years since, and used on the *mansion of the late Hon. Samuel Fowler, of New Jersey, then* proprietor of the zinc mines; being manufactured by a double process, first resolving the zinc (carbonate) to metal, and then extracting the oxide, gave little benefit to the American enterprise. But the Zinc Company had an indomitable man in James L. Curtis, formerly an extensive merchant of our City, at its head, assisted by able coadjutors, and he knew no such word as fail. Collecting at home and abroad such data as could be had, he made Yankee invention, science, and skill, answer for the necessary balance, and the result has been a perfection and simplification in the operations of mining and manufacture of zinc not excelled, if equalled, in the world. Yet the company will doubtless add improvements from time to time, for there would seem to be no limit to the inventive capacity of Americans. The advantages of zinc over lead as a paint are these:—Repeated tests make 60 pounds of zinc white equal to 100 pounds of lead in covering surface, and the relative cheapness, therefore, stands:—

| | |
|---|---|
| 100 pounds best lead, say 7½ cents per pound | $7 50 |
| 60 pounds best zinc, say 9 cents per pound | 5 40 |
| In favor of zinc | $2 10 |

The superior cheapness of zinc is the great commercial advantage in its favor over lead. Besides this, zinc is superior in whiteness, brilliancy, and durability, and is entirely free from the poisons in lead which generate several diseases, well known to workers in lead, painters, tenants of freshly painted rooms, and medical men. The *white zinc resists the action of all gases that yellow and tarnish lead*, and holds brillant as an inside paint for years. In color, it compares with lead as porcelain white does with common earthen white. It can be used with impunity while rooms are occupied, while medical men —vide the evidence in Tanquerel's octavo work on lead poisons and lead diseases—agree that lead painted rooms should not be tenanted under two or three months for safety. The zinc colors, for outside painting, requiring but little oil, dry suddenly, and form a metallic coating on wood, brick, iron, &c., impervious to weather and salt-water, and are more nearly fire-proof than any other paint known.

They act galvanically on metal surfaces. We have before us at this writing the testimony of the Supervisor of the New York and New Haven Railroad, the Superintendent of the Navy Yard at Gosport, Virginia, a special committee of the Common Council of this city —zinc paint has been tested and ordered by the Common Council for the use of the city buildings—and other eminent parties, many of *them practical painters and users of lead all their lives*, who have tested the zinc paints on railroad depôts, locomotives, ships, buildings and otherwise, and their testimony is unanimous—without considering the *sanitary reason—in favor of zinc over lead. To our mind, the sanitary* reason is the greatest of all in favor of zinc. But though the present operations of the Zinc Company are confined to the manufacture of paints, this is but a branch of the prospective interest. Lead is a poisoner, not only in paint but in water-pipes, roofing, cistern-lining, &c., for all of which uses zinc is a cheaper, better, more durable, and healthful substitute. Slightly alloyed with copper, it makes a sheathing for ships much cheaper and far more durable than copper, because impervious to the corrosive action of salt water. Manufactured into culinary ware, covers, spoons, forks, etc., zinc (the New Jersey) makes an article more durable and beautiful than Britannia or nickel, while the strength of the metal will allow it to be made much lighter. We can see, not far ahead, a vast manufacturing interest on these accounts *springing up around the zinc mines of New Jersey.*

The Franklinite, where that is the chief deposit—and the Zinc Co., have, as already intimated, chief deposits both of Franklinite and zinc —bears the following analysis, made by Dr. Jackson:

| | |
|---|---|
| Silica, (si. 03) | 0.299 |
| Franklinite, (Fe. 203) | 66.072 |
| Zinc, (zn. 0) | 21.395 |
| Manganese, (mn., 03) | 12.242 |
| | 100 |

The admixture of zinc with the Franklinite is found to destroy its *tendency (if it otherwise had any,) to granularize*, and renders it thoroughly fibrous, making it when properly worked into iron, the toughest and strongest that has ever been tested. According to Tredgold's test, the Franklinite stands thus:—

| | | | |
|---|---|---|---|
| Best Swedish bar iron, inch square bore | | lbs. | 72.840 |
| Inferior " | " | | 53.224 |
| Best English " | " | | 61.660 |
| Inferior " | " | | 55.000 |
| American Franklinite | " | | 77.000 |

It has been tested in this city and in Baltimore with similar results, and a French test, in the Government Marine Forges at Paris, made the difference in favor of Franklinite much greater. We have seen it *variously tested, every species of trial only adding to the proofs of its* wonderful nerve and strength. Wire of whatever size, made of other iron, is flawed and broken at a few twists, but we have seen wire made from the Franklinite twisted twenty times without inducing a flaw. Resolved to steel, it makes an article of the most brilliant character. Competent judges—our most extensive and practical iron and steel workers—accord a superior value to Franklinite, over any other iron for uses requiring the greatest toughness and strength. For steam machinery, suspension bridges, wires and such lesser forms of iron as require a union of delicacy and strength, the Franklinite must be, as soon as placed before the public, in great demand. It forms an admirable alloy or emollient with inferior iron and ores, changing their hard granular nature into ductility and strength. The residuum formed in the furnaces of the zinc paint works, *from the per cent of* Franklinite discharged, is admirable for admixture with inferior iron; retaining as it does, just enough zinc to neutralize the granular character of such iron. It is beginning to be largely sought and used for that purpose, and for fluxing iron in the process of puddling. It may seem a matter of surprise that an iron ore so near the seaboard and the chief market and mart of capital of the Union, and with such a character, should not have been long ago developed. The same surprise may be expressed over the zinc. Repeated trials for half a century have been made with both minerals, but through lack of practical knowledge, inefficient operatives, and the little interest taken in encouraging mineral enterprises, they all failed, until the energy, genius, and tact of Col. Curtis and his coadjutors, took hold of the work.

The chief credit of the successful operations of the New Jersey Zinc Company, forming an era in American mineral history, is acknowledged to belong to Col. Curtis. He had the faith and boldness to take a matter of "repeated failures" in hand, and allowed no discouragement to daunt him.

"Where there is a will there is a way," is an old adage, and what Alexander the Great said to a halting, doubting subaltern, is true forever, "There is nothing impossible." If the Gordian knot will not be untied by hand nor teeth, untie it with the knife or sword. Col. Curtis who has been the active head of the Zinc Company from the day of its organization until a few days since, when he resigned on account of pressure of private business—but not until the success of the enterprise was perfect—had sagacity enough to know that operators in a new sort of enterprise must first learn how to operate, and as it required a large amount of science, skill, and expenditure, all his predecessors had been wearied or frightened from the work. He was not; he hunted up the science and skill, and the means to pay it well; and the result, after four years of anxious and unceasing effort, is a brilliant reward of triumph to himself and co-laborers, and for the mineral resources of our country.

The great impediment in the way of turning the Franklinite to account, was the trial of its ores in ill-adapted furnaces. In the common iron furnace, Franklinite comes to a state of nature before it leaves the furnace, and it only required the observation of a plain, unpretending iron worker, to see, after a little thought, that furnaces of less height and much cheaper, would obviate the difficulty. The zinc was found, also, to choke the furnaces in its escape from the iron, but the Zinc Company discovered in a little time that this 15 or 20 per cent of zinc, instead of raising the mischief with the Franklinite, could, by the addition of a simple apparatus to the furnace, be collected for paint, and *thus pay, nearly or quite, the cost of making the Franklinite ore into iron*, and the collection of the zinc; opening a splendid field for the manufacture of iron on free-trade principles. The zinc and manganese are finally found admirable, aye, invaluable coadjutors with the Franklinite, in promoting its working into iron.

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**Monthly Meteorological Register, at Her Majesty's Magnetical Observatory, Toronto, Canada West.—March, 1853.**

*Latitude 43 deg. 39.4 min. North. Longitude, 79 deg. 21 min. West. Elevation above Lake Ontario: 108 feet.*

| Magnet | Day. | Barom. at tem. of 32 deg. 6 A.M. | 2 P.M. | 10 P.M. | MEAN. | Temperature of the air. 6 A.M. | 2 P.M. | 10 P.M. | M'N | Tension of Vapour. 6 A.M. | 2 P.M. | 10 P.M. | M'N | Humidity of Air. 6 A.M. | 2 P.M. | 10 P.M. | M'N | Wind. 6 A.M. | 2 P.M. | 10 P.M. | Rain in Inch. | S'nw in Inch. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| c | 1 | 29.281 | 29.303 | 29.323 | 29.308 | 31.8 | 39.5 | 29.8 | 31.72 | 0.191 | 0.218 | 0.151 | 0.185 | 95 | 91 | 94 | 92 | N W b N | N W b W | Calm. | - - | 0.1 |
| cd | 2 | .309 | .315 | .408 | .357 | 33.7 | 37.1 | 29.8 | 33.03 | .174 | .171 | .126 | .159 | 91 | 78 | 76 | 84 | S W b S | S W b S | N b W | - - | 0.3 |
| c | 3 | .495 | .490 | .568 | .523 | 21.2 | 33.9 | 25.5 | 27.03 | .122 | .121 | .107 | .116 | 92 | 63 | 77 | 78 | N W b N | S W b W | N W b W | - - | - - |
| " | 4 | .531 | .471 | .481 | .491 | 17.6 | 25.7 | 18.3 | 21.42 | .083 | .131 | .098 | .102 | 81 | 84 | 91 | 85 | N W b N. | S S W | Calm. | - - | Inap |
| c | 5 | .460 | .471 | .558 | .503 | 13.1 | 31.0 | 25.3 | 23.60 | .072 | .122 | .109 | .107 | 85 | 71 | 73 | 81 | Calm. | S W b W | S S W | - - | - - |
| b | 6 | .5·2 | .457 | | | 18.3 | 31.4 | | | .086 | .156 | | | 82 | 78 | | | W N W | S b E | | - - | Inap |
| e | 7 | .562 | .418 | .373 | .451 | 31.4 | 35.5 | 32.8 | 33.17 | .155 | .181 | .176 | .169 | 88 | 89 | 95 | 90 | S W | S S W | S b W | - - | 0.3 |
| e | 8 | .586 | .751 | .761 | .711 | 21.1 | 35.0 | 30.2 | 30.88 | .117 | .115 | .150 | .135 | 87 | 56 | 89 | 79 | W N W | N b W | N N E | - - | 4.5 |
| e | 9 | .456 | .688 | 30.022 | .752 | 25.9 | 28.0 | 17.0 | 23.45 | .137 | .119 | .077 | .091 | 93 | 77 | 79 | 84 | N E | N W b N | N W b N | - - | 0.3 |
| | 10 | 30.158 | 30.107 | 29.951 | 30.060 | 2.9 | 25.9 | 23.8 | 18.60 | .042 | .119 | .117 | .001 | 80 | 80 | 83 | 81 | N N W | E b N | N E | - - | - - |
| " | 11 | 29.825 | 29.738 | 29.740 | 29.763 | 23.3 | 37.3 | 33.7 | 31.65 | .111 | .193 | .166 | .155 | 86 | 87 | 86 | 86 | N E b N | N E b E | N E | - - | Inap |
| e | 12 | .712 | .558 | .566 | .610 | 33.1 | 31.4 | 33.1 | 31.05 | .170 | .179 | .178 | .180 | 90 | 91 | 94 | 92 | E N E | E b N | Calm. | Inap | Inap |
| c | 13 | .512 | .615 | | | 33.0 | 31.6 | | | .169 | .164 | | | 99 | 81 | | | W S W | W b N | | - - | 0.8 |
| b | 14 | .517 | .709 | .819 | .721 | 18.3 | 15.7 | 9.7 | 13.85 | .083 | .019 | .060 | .059 | 61 | 51 | 81 | 68 | N W | N W b W | W N W | - - | - - |
| c | 15 | .951 | .904 | .889 | .916 | −0.1 | 19.7 | 16.5 | 12.65 | .044 | .064 | .081 | .065 | 93 | 57 | 87 | 78 | N W | W | W S W | - - | - - |
| ab | 16 | .968 | .905 | .790 | .881 | 6.5 | 29.8 | 28.8 | 22.73 | .055 | .138 | .121 | .109 | 87 | 83 | 76 | 83 | W S W | S S W | S E b S | - - | - - |
| cd | 17 | .651 | .456 | .301 | .460 | 21.1 | 35.6 | 33.7 | 32.12 | .128 | .144 | .175 | .149 | 96 | 67 | 91 | 83 | N E | E | Calm. | 0.410 | - - |
| b | 18 | 28.901 | .116 | .512 | .293 | 35.9 | 40.2 | 33.0 | 35.55 | .202 | .192 | .137 | .170 | 96 | 78 | 73 | 81 | N N E | N W | W N W | .160 | - - |
| c | 19 | 29.810 | .829 | .736 | .792 | 21.4 | 36.2 | 32.5 | 31.07 | .125 | .152 | .162 | .140 | 93 | 72 | 88 | 80 | N W | S | S b W | - - | - - |
| b | 20 | .718 | .576 | | | 32.7 | 46.8 | | | .159 | .285 | | | 86 | 90 | | | Calm | S S W | | - - | - - |
| a | 21 | .359 | .280 | .306 | .311 | 40.8 | 46.9 | 39.3 | 42.88 | .208 | .252 | .193 | .213 | 83 | 83 | 81 | 77 | S W b W | S W b S | S W | - - | - - |
| a | 22 | .321 | .331 | .332 | .328 | 32.7 | 41.2 | 33.0 | 37.10 | .159 | .213 | .155 | .175 | 86 | 74 | 82 | 79 | W N W | W N W | N N E | - - | Inap |
| " | 23 | .289 | .290 | .378 | .320 | 39.2 | 37.8 | 33.3 | 33.93 | .159 | .199 | .127 | .159 | 89 | 88 | 66 | 81 | N W b W | S W b W | W | - - | Inap |
| b | 24 | .412 | .486 | .563 | .509 | 33.4 | 36.8 | 30.5 | 32.55 | .162 | .115 | .130 | .150 | 96 | 67 | 77 | 82 | W S W | N W | Calm. | - - | - - |
| " | 25 | .665 | .551 | .435 | .539 | 25.6 | 45.0 | 33.9 | 35.60 | .128 | .216 | .172 | .179 | 87 | 83 | 89 | 84 | Calm | S W b W | N b E | 0.110 | - - |
| | 26 | .177 | .052 | .149 | .125 | 31.0 | 33.5 | 35.9 | 36.18 | .181 | .216 | .191 | .195 | 94 | 89 | 91 | 92 | E b N | N E b E | Calm. | .050 | - - |
| | 27 | .399 | .469 | | | 29.1 | 36.9 | | | .121 | .171 | | | 77 | 79 | | | N N W | N W | | .070 | 0.8 |
| | 28 | .642 | .619 | .814 | .719 | 25.8 | 39.4 | 39.5 | 32.37 | .110 | .128 | .116 | .121 | 78 | 53 | 68 | 67 | N W | W b N | W b N | - - | - - |
| | 29 | .842 | .696 | .531 | .661 | 25.2 | 46.0 | 37.5 | 37.25 | .104 | .230 | .195 | .175 | 75 | 75 | 87 | 77 | Calm | S b W | Calm. | - - | - - |
| | 30 | .416 | .419 | .517 | .469 | 34.5 | 56.3 | 40.6 | 43.95 | .157 | .149 | .169 | .159 | 78 | 33 | 67 | 59 | W | W N W | N W | - - | - - |
| | 31 | .548 | .451 | .391 | .457 | 37.5 | 34.3 | 35.2 | 36.05 | .194 | .182 | .188 | .192 | 87 | 93 | 92 | 91 | N N E | N E | N E b N | .280 | - - |
| | M | 29.551 | 29.535 | 29.555 | 29.551 | 25.65 | 35.99 | 28.65 | 30.65 | 0.131 | 0.162 | 0.142 | 0.145 | 83 | 75 | 83 | 81 | M'Ps 4.69 | M'Ps 8.51 | M'Ps 4.06 | 1.080 | 7.1 |

*Sum of the Atmospheric Current, in miles, resolved into the four Cardinal directions.*

| North. | West. | South. | East. |
|---|---|---|---|
| 1756.22 | 2360.17 | 855.37 | 681.71 |

Mean velocity of the wind - - 5.87 miles per hour.
Maximum velocity - - - - - 25.0 mil's per h'r, from 1 to 2 p.m. on 14th.
Most windy day - - - - - 14th: Mean velocity, 15.16 miles per hour.
Least windy day - - - - - 1st: Mean velocity, 1.93 ditto.

The column headed "Magnet" is an attempt to distinguish the character of each day, as regards the frequency or extent of the fluctuations of the Magnetic declination, indicated by the self-registering instruments at Toronto. The classification is, to some extent, arbitrary, and may require future modification, but has been found tolerably definite as far as applied. It is as follows:—

(*a*) A marked absence of Magnetical disturbance.
(*b*) Unimportant movements, not to be called disturbance.
(*c*) Marked disturbance—whether shewn by frequency or amount of deviation from the normal curve—but of no great importance.
(*d*) A greater degree of disturbance—but not of long continuance.
(*e*) Considerable disturbance—lasting more or less the whole day.
(*f*) A Magnetical disturbance of the first class.

The day is reckoned from noon to noon. If two letters are placed, the first applies to the earlier, the latter to the later part of the trace. Although the Declination is particularly referred to, it rarely happens that the same terms are not applicable to the changes of the Horizontal Force also.

Highest Barometer - - 30.168, at 8 A.M., on 10th } Monthly range:
Lowest Barometer - - 28.892, at 8 A.M., on 18th } 1.276 inches.
Highest observed Temp. - 56.3, at 2 P.M., on 30th } Monthly range:
Lowest regist'd Temp. - —0.1, at 6 A.M., on 15th } 56.4
Mean Highest observed Temperature - - 36.76 } Mean daily range:
Mean Thermometer Minimum - - - - - 21.94 } 14.82

Greatest daily range - - - - - 26.0 from 2 P.M. on 9th, to 7 A.M. on 10th.
Warmest day - - 30th - - - Mean Temperature - 43.95 } Difference:
Coldest day - - - 15th - - - Mean Temperature - 12.65 } 31.30

The "Means" are derived from six observations daily, viz., at 6 and 8 A.M., and 2, 4, 10 and 12, P.M.

Aurora Observed on 6 nights. Possible to observe Aurora on 16 nights.

A distinct shock of an Earthquake was felt in Toronto on Sunday, the 13th, between 5 and 6, A.M. (*See Canadian Journal for March.*)

The Ice totally gone from Toronto Bay on the night of the 31st.

**Comparative Table for March.**

| Ye'r | Temperature. Mean. | Max. | Min. | Range. | Rain. D'ys | Inches. | Snow. D'ys | Inch | Wind. Mean Velocity |
|---|---|---|---|---|---|---|---|---|---|
| | ° | ° | ° | ° | | | | | |
| 1840 | 33.29 | 56.9 | 8.7 | 48.2 | 8 | 1.640 | 8 | -- | Miles. |
| 1841 | 27.84 | 53.5 | — 6.9 | 60.4 | 5 | 1.170 | 7 | -- | -- |
| 1842 | 36.20 | 68.7 | 14.9 | 53.8 | 4 | 3.150 | 8 | -- | -- |
| 1843 | 21.70 | 38.6 | — 2.8 | 41.4 | 2 | 0.625 | 18 | 25.7 | -- |
| 1844 | 31.68 | 50.3 | 9.6 | 40.7 | 8 | 2.470 | 8 | 14.0 | -- |
| 1845 | 35.93 | 61.7 | 9.9 | 51.8 | 5 | imperfect | 8 | 2.8 | -- |
| 1846 | 33.73 | 49.3 | 7.6 | 41.7 | 9 | 1.965 | 5 | 2.3 | -- |
| 1847 | 26.68 | 44.3 | 4.8 | 39.5 | 5 | 0.850 | 6 | 4.2 | -- |
| 1848 | 29.12 | 58.9 | 0.9 | 58.0 | 5 | 1.220 | 6 | 9.7 | 5.80 |
| 1849 | 33.93 | 53.4 | 15.4 | 38.0 | 7 | 1.525 | 2 | 2.3 | 5.37 |
| 1850 | 29.73 | 46.0 | 6.0 | 40.0 | 2 | 0.745 | 7 | 11.2 | 7.62 |
| 1851 | 33.14 | 58.7 | 13.1 | 45.6 | 3 | 0.770 | 9 | 8.8 | 7.65 |
| 1852 | 27.79 | 44.8 | — 3.2 | 48.0 | 8 | 3.080 | 12 | 19.5 | 5.81 |
| 1853 | 30.65 | 56.3 | — 0.1 | 56.4 | 6 | 1.080 | 8 | 7.1 | 5.87 |
| M'n | 30.81 | 52.96 | 5.56 | 47.39 | 5 | 1.561 | 8 | 9.78 | 6.35 |

## Monthly Meteorological Register, St. Martin, at Isle Jesus, Canada East, March, 1853.

*Nine Miles West of Montreal.*

[BY CHARLES SMALLWOOD, M. D.]

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

| Day. | Barom: corrected and reduced to 32° Fahr. 6 A. M. | 2 P. M. | 10 P. M. | Temp. of the Air. 6 A. M. | 2 P. M. | 10 P. M. | Tension of Vapour. 6 A. M. | 2 P. M. | 10 P. M. | Humi'y of the Air. 6 A. M. | 2 P. M. | 10 P. M. | Direction of Wind. 6 A. M. | 2 P. M. | 10 P. M. | Velocity in Miles per Hour. 6 A. M. | 2 P. M. | 10 P. M. | Rain in Inch. | Snow in Inch. | Weather, &c.—A cloudy sky is represented by 10; a cloudless sky by 0. 6 A. M. | 2 P. M. | 10 P. M. | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 29.438 | 29.424 | 29.384 | 20 | 30 | 24.5 | .129 | .168 | .153 | 1.00 | .90 | 1.00 | N E b E | N E b E | N L | 13.66 | 10.21 | 10.10 | | 5.22 | Snow. | Snow. | Str. 10. | |
| 2 | .419 | .485 | .565 | 25 | 46 | 28 | .141 | .28 | .154 | .90 | .86 | .85 | N | N E b E | N E b E | 6.25 | 0.68 | 0.03 | | 1.60 | Str. 10. | CumStr9 | Oercast. | |
| 3 | .669 | .509 | .528 | 20 | 31.5 | 25 | .129 | .156 | .141 | 1.00 | .80 | 1.00 | N E | N E | N E | 9.80 | 9.03 | 10.41 | | 1.00 | Str. 10. | Lgt. Cirr. | Str. 10. | |
| 4 | .579 | .569 | .670 | 19 | 49 | 14 | .125 | .320 | .104 | 1.00 | .90 | 1.00 | N E | E b S | S W | 16.54 | 1.05 | 0.03 | | | Str. 10. | C.C.Str.8. | F. Z. C. | Zod.Light, at 7, p.m. |
| 5 | .515 | .454 | .607 | 22 | 40 | 28 | .139 | .219 | .173 | 1.00 | .82 | 1.00 | N E b N | N E b N | NW b W | 6.39 | 10.25 | 1.91 | | | Overcast. | Str. 10. | Oercast. | |
| 6 | .611 | .539 | .576 | 21 | 55 | 26 | .118 | .331 | .161 | .88 | .74 | 1.00 | NW b W | S W b S | W S W | 2.94 | 1.64 | 0.80 | | | CumStr8 | Cir. C. 4. | Oercast. | |
| 7 | .626 | .532 | .486 | 20 | 45 | 30 | .129 | .260 | .180 | 1.00 | .83 | .97 | S W b W | SW b W | S b W | 4.47 | 4.19 | 8.18 | | | Clear. | CumStr.8 | Clear. | Crows first seen. |
| 8 | .496 | .679 | .836 | 32 | 45 | 23 | .199 | .235 | .127 | 1.00 | .74 | .88 | W | N W | N E | 4.25 | 13.80 | 3.17 | | 1.10 | Clear. | Cir. C. 2. | l'ght crrl | Aurora Borealis. |
| 9 | .779 | .550 | .827 | 22.5 | 30 | 20 | .126 | .145 | .114 | .89 | .78 | .87 | N E b E | N E b E | N N W | 6.35 | 8.62 | 15.16 | | 4.46 | Snow. | Snow. | Clear. | |
| 10 | 30.194 | 30.202 | 30.149 | 0 | 41 | 6 | .046 | .146 | .062 | .95 | .53 | 1.00 | W b S | W b S | S | 2.21 | 1.12 | 0.10 | | | Clear. | Clear. | Clear. | |
| 11 | 30.090 | 29.939 | 29.903 | 2 | 30 | 26 | .049 | .138 | .143 | .95 | .74 | .90 | N E b E | N E b E | N E b E | 3.69 | 5.25 | 0.37 | | | CumSt.8. | Str. 10. | Oercast. | |
| 12 | 29.823 | .701 | .592 | 15 | 44 | 33 | .108 | .223 | .197 | 1.00 | .73 | .95 | N E b E | N E b E | N E b E | 2.30 | 5.00 | 1.00 | | | Str. 10. | Str. 10. | Str. 10. | |
| 13 | .467 | .406 | .432 | 33 | 41 | 31 | .197 | .217 | .171 | .95 | .79 | .89 | W | W N W | W | 1.20 | 14.35 | 5.88 | | | Str 10. | CumStr.9 | C. Str. 8. | |
| 14 | .437 | .497 | .619 | 22 | 24 | 4 | .134 | .727 | .056 | .95 | .85 | .96 | W | W N W | W N W | 9.02 | 25.55 | 25.76 | | | Cir. C. 2. | C.C. St. 4 | C. Str. 10 | |
| 15 | .773 | .727 | .775 | — 3 | 20 | 1.5 | .040 | .083 | .051 | .95 | .57 | 1.00 | W N W | W N W | N W | 20.50 | 21.07 | 16.62 | | | C. Str. 10 | C.C. St. 2 | Clear. | |
| 16 | .945 | .899 | .907 | — 5 | 32 | 10 | .036 | .128 | .089 | .95 | .60 | 1.00 | W | W | W S W | 10.60 | 12.50 | 11.25 | | | Clear. | Clear. | Clear. | |
| 17 | .905 | .654 | .572 | 5 | 33 | 23 | .060 | .187 | .106 | .95 | .90 | .73 | S W | N E | N E | 3.12 | 3.18 | 3.10 | | | Cir. C. 4. | CumStr.4 | Oercast. | |
| 18 | .161 | 28.902 | .284 | 22 | 30 | 31 | .139 | .160 | .192 | 1.00 | .86 | 1.00 | N E b E | N E | W N W | 8. 8 | 17.94 | 10.42 | | 4.10 | Snow. | Snow. | Str. 10. | |
| 19 | .629 | 29.715 | .738 | 20 | 35 | 21 | .121 | .170 | .134 | .93 | .76 | 1.00 | W N W | W N W | W S W | 15.00 | 18.75 | 8.75 | | | Clear. | Cir. C. 4. | Clear. | |
| 20 | .895 | .649 | .489 | 17 | 50 | 35 | .109 | .246 | .213 | .94 | .65 | .95 | W S W | W S W | S b W | 7.33 | 3.75 | 0.69 | | | Clear. | C.C. Str.8 | Clear. | |
| 21 | .445 | .285 | .266 | 23 | 50 | 38 | .163 | .261 | .246 | .94 | .70 | 1.00 | S S E | W S W | W b S | 0.69 | 2.57 | 4.45 | Inap. | | Clear. | Cir. C. 2. | Cum. 4. | Slight Rain at 6, p.m |
| 22 | .235 | .284 | .311 | 35 | 54 | 36 | .213 | .216 | .210 | .95 | .76 | .91 | W S W | W S W | W | 0.90 | 11.24 | 7.11 | | | Clear. | CumStr5 | C. Str. 10 | |
| 23 | .301 | .263 | .299 | 35 | 53 | 33 | .186 | .274 | .187 | .83 | .66 | .90 | W S W | W S W | W S W | 4.24 | 2.14 | 6.75 | | | Str. 10. | CumStr9 | Cum. C. 6 | |
| 24 | .525 | .577 | .573 | 31 | 55 | 29 | .188 | .295 | .170 | .93 | .66 | 1.00 | W S W | W b N | W b N | 7.50 | 6.14 | 10.21 | | | Overcast. | CumStr4 | Cirr. C. 4 | |
| 25 | .608 | .489 | .493 | 31 | 49.5 | 32 | .185 | .186 | .189 | .96 | .51 | .93 | W | W S W | W S W | 8.16 | 8.19 | 6.87 | | | Overcast. | CumStr9 | Clear. | |
| 26 | .462 | .324 | .207 | 30 | 32 | 28 | .177 | .191 | .173 | .95 | .95 | 1.00 | E N E | N E b E | N E b E | 0.95 | 6.25 | 9.27 | | 2.00 | Str. 10 | Snow. | Snow. | |
| 27 | .314 | .379 | .187 | 29 | 40 | 31 | .152 | .194 | .187 | .85 | .73 | .97 | W N W | W N W | W | 10.41 | 10.54 | 21.91 | | | Clear. | C. Str. 10 | Oercast. | |
| 28 | .603 | .684 | .787 | 30 | 37 | 30 | .169 | .218 | .186 | .91 | .92 | 1.00 | NW b W | NW b W | NW b W | 16.93 | 14.27 | 8.33 | | | CumStr9 | CumStr9 | d. oercast | |
| 29 | .849 | .836 | .616 | 30 | 53 | 36 | .178 | .210 | .220 | .96 | .63 | .96 | W b N | W S W | W S W | 2.43 | 3.79 | 8.82 | | | CumStr9 | l'gt cirr 1 | Oercast. | Wild geese first seen |
| 30 | .387 | .421 | .469 | 36 | 57 | 36 | .219 | .422 | .230 | .95 | .89 | 1.10 | W S W | W S W | W N W | 6.13 | 4.11 | 6.22 | Inap. | | C. Str 10 | Str. 10. | Clear. | Slight Rain at 2,p.m. |
| 31 | .597 | .574 | .535 | 37 | 56 | 37 | .216 | .443 | .220 | .89 | .74 | .95 | W N W | W S W | W S W | 8.13 | 1.13 | 2.72 | | | Clear. | Clear. | Oercast. | |

| | | |
|---|---|---|
| Barometer. | Highest, the 10th day | 30.202 |
| | Lowest, the 18th day | 28.902 |
| | Monthly Mean | 29.584 |
| | " Range | 1.300 |
| Thermometer | Highest, the 30th day | 57.° |
| | Lowest, the 16th day | — 6.0 |
| | Monthly Mean | 29.68 |
| | " Range | 63.° |

Mean of Humidity—.881.

Greatest Intensity of the Sun's Rays—79.°6.

Most Prevalent wind—W. S. W.

Least do. do. S.

Most Windy Day—the 14th day, mean—20.11 miles per hour

Least Windy Day—10th mean—1.14 miles per hour.

Snow fell on 7 days, amounting to 19.48 inches.

Rain fell on 2 days.—Inapp.

Aurora Borealis visible at observation hour, on 1 night.

Zodiacal Light visible on 1 night, at 7, p. m.

The Electrical state of the Atmosphere, has been marked during the month *generally* by Moderate Intensity, and the 9th and 26th days were remarkable for a very high Intensity of Positive Electricity; the 18th day indicated a high Intensity of Negative Electricity.

* NOTE.—Since the last Report, the Surveyors connected with the St. Lawrence and Ottawa Grand Junction Railway, have taken levels passing through this place, and have kindly furnished me with data, whereby I am able to state that this place is 118 feet above the level of the sea.

*Extract from the Report of the Sixth Exhibition and Fair of the Massachusetts Charitable Mechanics' Association.*

647. William Bond & Sons, Boston. One Astronomical Clock, and a Spring Governor. The object to be attained by this novel contrivance is that of regulating the movement of a rotating cylinder, so that its motion may not only be steady and uniform, but that its revolutions may be performed with accuracy in any given time desired.

There are, doubless, many situations connected with science and the arts, where rotary motions regulated with great accuracy, may be applied with great advantage. The experimenters upon Hydraulics, Hydrostatics, &c., we think will find it a useful appendage to their already very extensive apparatus.

Within the past few years there have been several astronomical observatories established in the United States, where observations are now being made, not only with great care and ability, but with becoming zeal and regularity. And connected with these Astronomical inquiries, are those of its kindred science Geodesia, which are now being, and have been for some time past, vigorously prosecuted or carried forward under the patronage of the General Government. To the combined observations and operations of these kindred sciences (if it be proper to consider them as separated) are we indebted for a knowledge of the figure and magnitude of not only our own planet, but of all the other planets belonging to our system. Our planet being a standard upon which a great portion of the astronomical calculations are based, the importance of ascertaining its magnitude with as great a degree of accuracy as we well can, must be apparent to every one who has given any thought to the subject. Besides, the accuracy of the charts of not only our own Coasts and the Oceans adjacent, but the Coasts and Oceans of the whole world are more or less dependent upon this element.

The invention of the Magnetic Telegraph, and the construction of Telegraphic lines, as it were, from one end of our country to the other, which by being connected with the several observatories, afford a means of communicating the moment of time of any phenomena observed at one observatory to that of another and *vice versa*. By this means the difference of time between any two observatories, is determined with a greater facility and degree of accuracy than by any other method now practised; and then having extended the Geodetic surveys from one observatory to the other, we thereby obtain more accurate data for solving the Grand Problem, viz., the magnitude and figure of the earth, than we have been enabled to do by any other known means. The great desire of making these communications with as great a degree of accuracy as their nature will admit, was the exciting cause of this invention. But the invention is not confined to distant communications alone; it is equally valuable and useful in recording at the observatory where it is situated, the moment of time of any observed phenomenon.

This invention, properly considered, consists of what we shall term an Electro-Telegraphic Clock and the Spring Governor. The Clock which in its general construction does not materially differ from other Astronomical Clocks, was not exhibited at the Hall. It being somewhat difficult to give a complete description of this apparatus without drawings, and as the association cannot well insert in their publication of notices, cuts representing the articles exhibited, we shall only endeavor to give such a general description as will convey an idea of the invention and its application.

First, *The Clock*. As before stated the several parts of the Clock are not dissimilar in form to clocks heretofore in existence. The novelty of the Clock consists in insulating the axis or pivots of the escapement wheel from the plates which sustain the other portion of the clock-work by a ring of Shell Lac Gum, bushed with brass washers or discs;—and the axis of the steel pallets is in like manner insulated from the other parts of the clock-work. The pinion which connects the escapement with the train of the clock is insulated from its axis by Shell Lac Gum;—the Pendulum also is so contrived as to be insulated from the arm of the pallets with which it comes in contact, by an arrangement of Shell-Lac Gum. Electrical or circuit wires are secured to portions of these insulated parts which sustain the axis or arbors of the escapement and pallets, so that when either pallet comes in contact with an escapement tooth, the Galvanic circuit is closed, and when the contact is broken, (as it must be at every oscillation of the pendulum,) the Galvanic Circuit is opened, and thus pulsations of Electricity corresponding to the oscillations of the pendulum successively pass over the wires. Then, by the aid of the Spring Governor, an intelligent record of the electrical pulsations or beats of the clock is made.

Second, *The Spring Governor*. This part of the invention was on exhibition in the Exhibition Hall, and consists of a double train of Clock-work united into one upon an axis of a Fly-wheel. (We speak of this machine as consisting of a double train of clock-work because it receives motion from two weights.) The clock-work, consisting of small brass wheels and pinions, is arranged between two brass plates some four inches apart, and probably twelve or fourteen inches long. Near either end of these plates is a strong axis to which an apparatus is applied for receiving a cord, upon which weights are suspended to give motion to the trains;—these axes and pulleys we shall call prime movers. A few wheels of the train distant from one of these prime movers, is situated an escapement wheel, into the teeth of which pallets are operated by the oscillations of a pendulum, as in ordinary clocks, the escapement wheel is so connected with its axis by a spring, as to allow the axis to move while the wheel is detained by the pallets. From the pinion upon the arbor of the escapement wheel, the train is continued through several wheels and pinions, to a Fly wheel. From the prime mover at the other end of the plates a train of wheels and pinions extends also to, and connects with the Fly. Near this prime mover is situated a long shaft or arbor which extends through one of the plates some twelve or fourteen inches, its end being sustained by a proper support attached to the table upon which the whole apparatus rests. Upon this shaft a cylinder of some five or six inches in diameter and some ten inches in length, is firmly fixed, and of course revolves regularly with it. When the machine is in order to operate, this cylinder is covered with blank paper. A slide apparatus is attached to the table near to and parallel with the cylinder, upon which an Electro-magnet, in the U form, is fixed: and the slide is so connected with the clock-work, that it receives a regular motion therefrom, and is thereby moved from one end of the cylinder to the other. The magnet with its armature is so arranged that it gives a lateral or horizontal motion to a lever to which a pencil or pen is attached, which rests upon the paper with which the cylinder is covered. The instrument is also provided with a finger key, by which the circuit may be opened at the instant of any observed phenomenon, and thereby the regular flow of the electrical current will be broken;—at this instant the U magnet releases its hold upon its armature, and it moves laterally and thereby records the pulsation by a mark, in the form of a saw tooth upon the paper which covers the cylinder.

Having thus briefly described the apparatus and its uses, let us now, for the purpose of illustration, consider the whole apparatus to have been properly adjusted and in a condition for operation, with the Battery connected with the insulated portions of the Clock-work. The clock being then put in motion, its beats may be distinguished at the distant station by the clicking noise of the armature upon its magnet, while the pencil attached to the lever which bears the armature, will, by its lateral motion occasioned by the opening of the circuit, record the beats or oscillations upon the cylinder,—and these phenomena will be repeated for every oscillation of the pendulum.

To render our description plainer, let us suppose one of the observatories to be situated at Cambridge and the other at Washington, and the Astronomers to have agreed to observe the transit of a particular star over their respective meridians. The star of course makes its transit across the Cambridge meridian first, and at the moment of its culmination the observer places his finger upon the finger key, and thereby causes an electrical pulsation, which is transmitted to Washington, and is there recorded upon the cylinder of the Spring Governor. After the lapse of the difference of time between the two observatories, the Astronomer at Washington observes the transit of the same star, and at the moment of its culmination he touches the finger key and thereby causes an electrical pulsation, which is transmitted to Cambridge, and is there recorded upon the cylinder of the Spring Governor. Then, by an examination of the records upon the cylinders, the difference in time can be readily ascertained, and by a mean of many operations of a like character, not only the difference in time between the places may be ascertained, but the actual time, which should be allowed for the transmission of the electrical pulsation in connection with the movement of the armature, may be determined.

This method of recording the instant of an observed phenomenon, whether to be transmitted to a distant observatory, or to be used at the observatory where the observation is made, possesses this peculiar advantage over any other with which we have any acquaintance, viz: the observer observes the phenomenon without being embarrassed with the trouble and anxiety of counting the beats of the clock or chronometer, or estimating the fractions of the interval between the beats at the instant of observation. In a practical sense his mind may be fully concentrated upon the phenomenon of observation.; the touch upon the finger key being mostly mechanical, requires no mental exertion; and further, the beats of the clock being recorded upon the paper attached to the cylinder by equi-distant marks upon a spiral line, furnishes a scale by which the fractional interval of the beat may be measured with great accuracy. Since the exhibition, the apparatus has been tested, and is found to more than equal the expectations of all who have seen it. The Committee, therefore, in consideration of the great aid which this invention promises to a great variety of scientific investigations, cheerfully recommend that there be presented to the inventor, by the Association, as a token of their approbation, a *Gold Medal*.

*On Chromatic Photo-printing, being a mode of printing textile fabrics by the chemical action of Light,* '*by* MR. R. SMITH.—The author proposes to employ the chemical agency of light in dyeing or staining textile fabrics; the cloth, whether of wool, silk, flax, or cotton, being first steeped in a suitable solution, then dried in the dark, and subsequently exposed to the action of light, those parts which are to form the pattern being protected by pieces of darkened paper, or some other suitable material, attached to a plate of glass. When the desired effect is produced, the time for which varies from two to twenty minutes, according to the nature of the process, the fabric has to be removed, in order to undergo a fixing operation, whilst a fresh portion of it is exposed to light. This may easily be effected by the use of very simple mechanical arrangements, so that a number of photographic printing engines may be placed side by side, and superintended by one person. From the trials which Mr. Smith has made, he believes that even the diffused light of a cloudy day will have power enough for the operation, though of course a longer time will be required for its perfection than on a bright and sunny day. In order to obtain a pale blue or white pattern upon a blue ground, Mr Smith uses solutions of citrate, or tartrate of iron, and ferrocyanide of potassium; steeping the cloth subsequently in a dilute solution of sulphuric acid. Browns and buffs are obtained by using a solution of bichromate of potash; the excess of salt in the parts not acted on by light being afterwards either washed out, leaving those portions white, or decomposed by a salt of lead which forms a yellow chromate of lead. By combining these two processes with the use of madder, log-wood, and other dye stuffs, a great variety of tints may be obtained.

*On 'Fire-arms, by* MR. WILKINSON.—In order to form some conception of the improvements lately proposed, and wholly or partially adopted, Mr. Wilkinson briefly alluded to the earliest fire-arms, which are still in use in India and various parts of the world. Commencing with the different modes of ignition, Mr. Wilkinson then proceeded to give a rapid sketch of the progressive steps by which fire-arms have arrived at their present state of comparative perfection. He described and exhibited, first, the matchlock, invented about the beginning of the sixteenth century: previous to which hand-guns were fired by a lighted match applied to the touch-hole in the same manner as to cannon. Second, the pyrites wheel-lock, introduced into this country about the time of Henry the Eighth, and continued to Charles the Second; in which ignition was obtained by the rapid revolution of a steel wheel against a pair of iron pyrites. Third, the flint lock, introduced about 1692, and generally used up to the close of the last war. Fourth, the percussion lock, invented by the Rev. Mr. Forsyth, and patented by him, April 11th, 1807, was generally introduced into our army in 1840. He then proceeded to explain the nature of the rifle, and the theory of projectiles, which was illustrated by diagrams. Mr. Wilkinson stated, that it has been calculated by French writers that with the old flint musket and spherical bullet during the last war, the maximum effect was only one in 3,000, either to kill or wound; and one in 10,000 was the minimum. So that, in some engagements 10,000 ball cartridges were expended to kill or wound *one man*; and a writer in the *Times* stated, a short time since, that 60,000 cartridges had been fired at the Cape, and only twenty-five Kaffirs killed. He observed, however, that this would not be the case in any future warfare; it will be much more destructive for the time, but of shorter duration. The percussion musket effected very little improvement in the accuracy or range of the bullet, but it produced much greater certainty of fire. It is wholly to the introduction of rifles and elongated projectiles that the recent improvements are due. We are told by Robins a century ago that this would be the case, but it generally requires a hundred years to convince any government. Mr. Wilkinson then gave a brief history of the changes in the form of the bullet introduced more than twenty years ago, by M. Delvigne, though suggested nearly a century since by Robins, who pointed out that the spherical form was not that best suited for projectiles. Lately the cylindrical-shaped bullet has attracted great attention from the ingenious modification of it invented by Capt. Minie, who added a small iron capsule to the lower end of the bullet. Lastly, Mr. Wilkinson described his own improved bullet, the form of which is *cylindro-ogivale* having two deep grooves round the base; and the novelty of which consists in the bullet being expanded in the act of discharging the rifle, although the bullet is perfectly solid. At the close of his paper, the author explained the electro magnetic chronoscope a mode of measuring the flight of projectiles invented by Prof. Wheatstone. The principle on which was effected, consisted in the interruption of an electric current, by the breaking of a fine wire, when the gun was fired, the circuit being again completed by another arrangement when the target was struck; whilst a clock, with suitable stop-hands, was employed to indicate the interval of time between the discharge and the blow on the target.—Mr. Varley, jun. inquired if Mr. Wilkinson's bullets were intended to be fired with any covering. He had found the Minie bullet more effectual with a covering than without. Mr. Wilkinson said, he preferred to use nothing but the naked powder and ball: the latter being rubbed with Russia tallow, or other grease, to fill the grooves. The pressure on the grooves squeezed out the grease, which lubricated the whole extent of the bore, and dimished friction: so that 100 rounds could be fired as easily as one. In reply to an objection to the use of grease in hot countries, Mr. W. stated that, with the thermometer at 130°, 100 rounds had been fired in thirty-six minutes; the barrel and other iron work being so hot that it could not be handled. The grease in that case was still used, but with the addition of about one-eighth of bees'-wax, which overcame the difficulty.

*Improvement in Boring Operations.*—From the *Miners' Journal*, published at Pottsville, Pennsylvania, we learn that an improved boring apparatus, patented by Mr. Knight, has been severely tested, by boring into the face of a granite rock 18 feet depth, and 21 feet in diameter, at the rate of 18 in. per hour. The framework of the machinery could not be properly fixed at first commencing the cutting, but when the excavating has entered about 50 feet, it will be connected by sleepers and braces, as firm as the rock which it is cutting out. The patented apparatus has been adopted by the North American Coal Company who are now employing it to be bore to a seam of bituminous coal, called the "Big White Ash Vein," which they expect to win at a, depth of about 50½ fms. The hole is 4½ in. diameter, which is drilled at the rate of 11 feet in five hours. The machine is so arranged that 10 drills can be worked in a certain space at one time by any motive power, and the *debris* is washed up by a curent of water from a pump worked by the same engine. Mr. T. S. Ridgway, mining engineer, of Minersville, states that during the winter of 1848 and spring of 1849 he had employed this machine in boring the Artesian well at East Boston for the Land Company, which worked well to a depth of 325 feet, but where not sufficient water was found, the stratum being a hard clay-slate, overlaying the primitive rock. The patentee is prepared, we understand to sink shafts to any depth, and in any strata, in half the usual time of those performed by hand labor, and at about one-third the expense. The operation of drilling through hard rock is one of considerable importance, and if this apparatus effects all the advantages which are claimed for it, the invention will prove of considerable value to the mining world.

*History and Astronomy*—In a paper read before the Royal Institution, by G. B AIRY, ESQ., Royal Astronomer, 'on the results of recent calculations on the Eclipse of Thales and Eclipses connected with it.' The Lecturer stated, that the conclusion as to the general fitness of the eclipse of B. C. 585 for representing the circumstances of the eclipse of Thales, by inference from modern elements of calculation, was first published by Mr. Hind in the *Athenæum*; and he said, that he had examined in greater or less detail every eclipse from B. C. 630 to B. C. 580, and that no other eclipse could pass over Asia Minor,—and gave it as his opinion that the date B. C 585 was now established for the eclipse of Thales beyond the possibility of a doubt.