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The Canadian Journal.

TORONTO, DECEMBER, 1853.

Toronto Harbour—Its Formation and Preservation.

Read before the Canadian Institute, June 1st, 1850;

BY SANDFORD FLEMING, C. E.

The origin of the now wealthy and flourishing city of Toronto is, in common with that of many other cities and towns, clearly traceable to certain natural advantages possessed by their localities. A waterfall or rapid stream, the navigable termination of a river, or its junction with a lake, or other open navigation, will frequently account for the position of a town or village in an agricultural or manufacturing district; but a natural harbour of easy access, will generally if not universally point out the locality of a thriving commercial nucleus, in all countries open to settlement and civilization.

To none of these circumstances except the last can we attribute the origin of Toronto. We have no waterfall—no navigable river—even the soil itself is comparatively barren, and for several miles around, with a few isolated exceptions, unsuited for agricultural purposes. To the last, therefore, must we ascribe the beginning of Toronto, and to the unparalleled excellence of this harbour forming on the north shore of Lake Ontario, the most facile outlet for the productions of the back country, is principally due the rapid and uninterrupted progress in commerce and in wealth of the western capital. To maintain this harbour in its original state, or if practicable, to improve there on so as to ensure a continuance of prosperity, becomes, therefore, of the utmost importance.

The natural basin formed by a sandridge extending from the western boundary of the township of Scarborough, embracing in its arms a portion of the great lake, possesses many of the requisites for a good harbour; it encloses about 1200 acres of water, entirely free from rocks and shallows, and averaging from 15 to 35 feet in depth, on the wide expanse of which the whole shipping of *all* the Canadian lakes might safely ride at anchor. During the prevalence of certain winds, however, the basin is not of easy access to sailing craft; and not only is the channel scarcely sufficient to admit the entrance or departure of large vessels, but it is even fast closing up, and, astounding as the assertion may appear to some, will ere many years, unless efficient means of prevention be taken, put a complete stop to all navigation—a bold enough statement, but from ascertained facts a proper inference.

That the entrance to the harbour is fast closing up, I have been led to discover, by comparing a series of careful measurements recently made, with old charts of various dates. In the sequel, this important fact will be clearly shown, and an attempt made to account for it; in the meantime, it may be sufficient to state that a bar has encroached so much on the channel, as to make it not more than about half the width it was fifteen years ago. With the view of prescribing an efficient mode to prevent the further accumulation of shoal calculated to prove so detrimental to the future prosperity of the city, it is first requisite to ascertain the cause of the evil, from whence it arises, and investigate the manner of its action—hence the following enquiry into the formation of the Peninsula and Harbour.

Few persons visiting Toronto for the first time but are struck with the singular appearance of the neck of land or peninsula stretching out into the lake in front of the town, so low, that the few small trees growing at wide intervals appear almost springing from the water, and on a nearer approach, so long, so curiously shaped, and so different from the land on shore, that, many are doubtless led to theorize a little on its formation. Some, who have probably arrived in the province by way of Niagara, and crossed over with their minds filled with contemplations of the mighty cataract, at once and without much consideration attribute to the descending torrents of that river, the power of elevating from the depths of the lake, or of carrying across in suspension, the drift deposited here—a theory wild and incapable of defence, though some are bold enough to venture it.

Others again, who have probably arrived from the west, or whose business takes them frequently in that direction, and from the steamer generally calling at the mouths of the various small rivers emptying into the lake between this and Hamilton, may be induced to think that these streams have had the effect of drifting the debris of the uplands outward, which with the assistance of an imaginary eastward current of the lake, is carried until meeting a contrary current, supposed to be of the Don, then the matter held in suspension is supposed to have been deposited at their junction line, opposite Toronto. The advocates of this theory have yet to prove that such currents of the lake as these exist in reality: although it is true that currents outward and inward, over the bar, are found, occasionally resembling a slight half-hourly tide; yet if they have any effect on the bar at all, they must have a tendency rather to diminish than increase the deposit. All these streams with the exception of the Don, enter the lake nearly at right angles, and it is impossible that they can flow into a large and deep body of water such as exists between their mouths and the point in question, without being entirely diffused; nor could the drift brought down by them be carried wholly or chiefly in one particular direction without a most powerful current, but would, if ponderous, be deposited at their outlet, and if light, would be distributed far and wide. More especially is it reasonable to infer that the Peninsula is neither now effected in any way by these western streams and the imaginary currents in conjunction with them, nor *has* been formed by their drift, since the material composing it, sand and gravel could not in accordance with existing laws, be held in suspension and transported for miles over still water, 60 and 100 feet deep. Were the deposit or any part of it of an agillaceous nature, there would have been some slight reason to think that these streams might have been auxiliaries, but such is not the case.

Others again suppose that the Peninsula is merely a narrow ledge of rock slightly covered with the sand and gravel which we find on the surface, but this opinion is quite at variance with the general geological features of this part of the country, and to local investigations.

A little consideration of the subject will shew that these opinions can only be advanced by those persons who have merely been enabled to make cursory observations, and by those who, knowing the wonderful transporting power of running water when confined, as in a river, are inclined to attribute to its agency more than is justly due, and overlooking the change of circumstances, class effects universally which can only be produced by causes under particular conditions. They being anxious to account for certain results, are contented with a superficial and fallacious reasoning, and assign to the most conspicuous agents of nature, that, which after a more careful and deeper search would be ascribed to a power less easily observed, but not less active, or less potent.

Sir Richard Bonnycastle, in an elaborately drawn up Report

dated 1835, gives it as his opinion that the Peninsula "was one of the many ridges deposited at the bottom of a vast lake which existed before the present Ontario and Erie were formed out of its drainage," and "that it had not materially altered for a vast length of time, probably not since it emerged from the waters."

It may be thought presumptuous in me to present anything in opposition to the judgment of that respected and eminent gentleman; but from careful observations and measurements, and a comparison of these with surveys made at different times by others during the last half century, having found that the deposit both above and under water has received additions so extensive, and which so closely resemble in character its older portions, I may be permitted to suggest, instead of the Peninsula being a sedimentary deposition of the tertiary periods, as thought by Sir R. Bonnycastle, that the whole of it belongs to the present era, and that at least one of the agents of its formation, is at this day as actively engaged in changing and enlarging the outline of the deposit in question, as it has been hitherto in gathering together the materials, and modelling them into its present shape.

I shall first endeavour to show that the inferior portion or base of the Peninsula has been washed from the valley of the Don by that river at an early date; second, that the materials composing the superior and more recently formed portions have been gradually transported along the shore from the eastward, and that this westward progressive motion of the sand and gravel beach is now the sole cause of the extension and enlargement of the Peninsula, and of the danger at present threatening the entrance of the Harbour.

First—That the groundwork of the Peninsula enclosing the Harbour is, or has been, a delta of the River Don.

It is generally believed that at one time Lake Ontario stood at a higher level, and covered a far greater area than it at present occupies. A barrier may have then existed at its outlet, where probably the Thousand Islands are now seen, over the top of which the primeval St. Lawrence flowed: this great river, rushing over the barrier with tremendous velocity, would, through course of time, wash away its softer parts, and leave standing those numerous isolated rocks and picturesque islands which now covered with foliage, adorn so much the landscape of that section of the country. If this be not the approved way of accounting for the lowering of the level of the waters, a gradual upheaval of the land generally, or even a subsidence of the ocean may be brought forward; it is unnecessary for our present purpose however to enter into a geological disquisition on this point, if we allow that the whole of the country bordering on Lake Ontario was at one time submerged under the same extensive sheet of water; and that the level of this great lake, or it may be this arm of the ocean, was through course of time depressed, and its outline contracted until it was reduced to the present Ontario. A supposition so strongly supported by the discovery of several ancient beach lines, terraces and parallel ridges in the vicinity of Toronto and other parts of the country at various but corresponding levels, that it may without much difficulty be admitted.

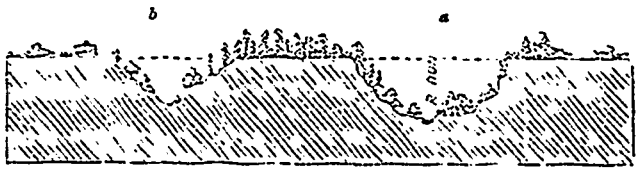
As the land gradually emerged its appearance would be bleak in the extreme; a flat or but slightly undulating surface unbroken by rivers or ravines, and uncovered for a length of time with vegetation; on the ancient shallows of the great lake various kinds of plants would, through course of time, take root, grow up, and wither; the continued reproduction and decay of which would gradually coat the surface with organic matter, and thus enriching the soil, enable it to produce more luxuriant vegetation. Now, (prior to the settlement of the country,) after a lapse of many centuries, we find the great hardwood forest growing over soils of an argillaceous character, and the ancient *sand shoals* of the great lake clothed with lofty pine.

We can easily imagine the general character of the present shores of Lake Ontario when they first became dry land—a vast undulating plane ascending as at present from the lake into the interior, but totally devoid of water channels for the surface drainage—here a bed of clay,—there a tract of sandy soil; and as it is only reasonable to suppose that rains fell in those days as at present, the water produced by them on the surface, in flowing from a higher to a lower level, would most easily wash out channels in the softest material; and these little streams, collecting together in their downward course towards the lake, would form the commencement of a river course.

The newly formed rivers, having the same fall towards the lake as the surface itself, their beds being but slightly under it, would be much more rapid than they are now, and rushing down with violence after thaws and heavy rains, would, proportionally with their greater rapidity, during the first years of their existence, be more effective in scooping out the sand drift, and transporting it to the Lake; from year to year the water channels would thus grow larger and larger, and although the rivers as they were depressed, lost much of their force and rapidity, yet continually undermining the banks and transporting the debris downwards, would, through course of ages, form those deep ravines in which many of them now flow.

That the rivers in this section of the country have originated in this manner, is inferred from the fact, that they are found almost universally to flow in flat-bottomed vallies or ravines, the banks of which are the abrupt terminations of the level country on each side; and that these ravines are generally found where the drift is of a light and sandy nature.

The accompanying section across the River Don, taken a little above the Cemetery, will show clearly the first proposition; the second also is established by the well-known character of the soil of which the banks are composed. The surface of the country extends for miles to the right and left of the river without any material change of level, except where broken by a secondary ravine of a tributary stream. Doubtless, then, the inference is correct as far as regards the Don, and that the dotted line stretching from bank to bank on the drawing, was the surface prior to the scooping out of its channel.



Section across the Don about ½ miles from its mouth.

a. The valley of the Don about ½ of a mile wide, and upwards of 100 feet deep—the river here is on a level with Lake Ontario.

b. A tributary of the Don, running through Yorkville, it is cut obliquely by the section and forms a junction with the Don about ½ a mile further down.

The dotted line is about 120 feet higher than the lake, and the surface maintains very nearly the same level for a long distance on either side in a direction parallel to the shore, with a gentle slope at right angles to it—on part of this slope the City of Toronto is built.

Nor is the Don singular in these respects, of all the streams I am acquainted with to the east and west of Toronto, the same scooping out of the ravines can be shown, and generally the same sandy character of the country immediately traversed, as indicated by the dark green belts of pine running into the interior of the country through the hardwood forest which flourishes better on

the heavier soils. And here, without digressing much from the subject, one can scarcely avoid observing very apparent marks of design—the adapting of the pine to grow on soils unfitted for cultivation, and the leading of rivers through pine-bearing soils, thus enabling the settler to take advantage of the various properties of running water in conveying and preparing the most useful of all timbers for his manifold purposes.

The valley of the Don is from a quarter to half a mile in width, with abruptly rising banks, from 100 to 200 feet and upwards in height, the scooping out of which implies the removal of many hundred millions of cubic yards, a quantity so immeasurably great when brought into comparison with the agent of removal—a stream (when not dammed up) only about 50 feet wide, that it appears altogether irreconcilable with the inference drawn; more especially is it so, when we know that the annual quantity of matter brought down by the Don is at present inconsiderable. If, however, we bear in mind that, without assuming a greater volume of water to have flowed in its channel than now, the transporting power of the Don must formerly been very much greater by reason of its greater descent and rapidity; and, if it can be shown that many ages have elapsed since it first came into existence, the conclusion come to may be taken as rational and correct.

It may seem difficult—nay, almost impossible—to estimate, however roughly, the time which has elapsed since the Don commenced to flow; but if we can arrive at the age of any other river emptying its water into Lake Ontario from a source equally high, the problem is solved. When the great Lake already mentioned, subsided from its high level, then, and not till then, did the Niagara, the Don, and other cotemporary rivers make their appearance. Since that epoch the Niagara has cut a deep channel for seven miles through the solid rock; its annual recession has been ascertained approximately, and from these data its age has been roughly determined. "We may turn to the deep ravine," says Lyell, "and behold therein a chronometer measuring rudely, yet emphatically, the vast magnitude of the interval of years which separate the present time from the epoch when the Niagara flowed at a higher level."

Thus, then, the Don, coeval with the Niagara, has flowed, according to this great Geologist, for a period far too great for the imagination to comprehend, and which one can scarcely venture to name by years; *even allowing that our historical knowledge of the past condition of the Falls is far too meagre to estimate with any degree of precision, the rate of their retrogression in former ages, yet we cannot but arrive at the conclusion that the chronological age of the Niagara and consequently of the Don, must be so enormously great, that one would think even its fractional part would suffice for the removal of the hundreds of millions of yards of matter by the latter river to the Lake, without calling to its aid any unusual phenomena.

Having thus shown that sufficient time may be granted, the Don therefore supplies an adequate cause for performing, and completing long since the work assigned to it; year after year during its early history, slowly but constantly hollowing out a channel and removing the former contents of its valley to the lake, the lighter and more soluble matter being held for some time by the water, to be distributed far and wide, the heavier particles on the other hand to be deposited near its mouth, in the form of an extensive shoal or delta—the base or ground-work of the Peninsula, on which again to be deposited a drift from other causes and from another source.

To be continued.

* "Mr. Bakewell calculated that, in the forty years preced ' 1830, the Niagara had been going back at the rate of about a yard annually, but I conceive that one foot per year would be a much more probable conjecture, in which case 35 000 years would have been required for the retreat of the Falls, from the escarpment of Queenston to their present site, if we could assume that the retrograde movement had been uniform throughout. This however, could not have been the case, as at every step in the process of excavation, the height of the precipice, the hardness of the materials at its base, and the quantity of fallen matter to be removed, must have varied. At some points it may have receded much faster than at present, at other much slower, and it would be scarcely possible to decide whether its average progress has been more or less rapid than now."—*Lyell.*

On the Preservation of Food.

BY J. T. BRONDGEEST, ESQ.

Read before the Canadian Institute. December 10, 1853.

Interesting in an economical point of view, this subject becomes much more so when we consider how large a portion of the exports of Canada consist of provisions, and the shipments from Toronto of little else.

This has been the subject of care in other countries, and in distant ages, when either from want of skill, or the accidents of war, famine was more prevalent than in modern times, and in those places with which we are the more familiar; the freedom of intercourse now renders the surplus of one country so accessible to supply the wants of another, that the deficiency of crops must be far more general than any that has occurred for years, before we require any particular arrangement, for preserving the products of the soil from one year to another.

But let not this fancied security prevent us from examining into the matter closely, for, apart from the possibility of the wheat-fly devastating other parts of the world in the way Lower Canada suffered for many years—let us not forget that constant waste is a constant loss, without any countervailing benefit, and that we agitated for years for a grant from the Mother Country for a protection on our breadstuffs, falling far short in amount of the loss occurring in our grain stores from destruction by rats and mice alone. And in forwarding grain to its destination, much as it has been improved upon of late years, there is still in every portion of the process loss and injury.

I propose, therefore, to give my views on the subject of the preservation of articles of food, premising that I offer nothing new, having often previously on other occasions urged the matter on the attention of my fellow-citizens, and also intimating my anxious desire that my remarks may call forth something much better than what I now offer to your notice.

Our warehouses for wheat are mostly constructed near the water, often so low as to be in danger from floods; they are built of wood, many of them in bad order, subject to destruction from fire, and infested with vermin.

Owing to the short time our grain remains in the warehouse, the weevil, so destructive in Europe is little known, were it necessary to store grain for any lengthened period, there is little doubt the destruction with us would be excessive, our granaries being so accessible to heat.

I would propose as a remedy for all these, the construction of "silos"—warehouses built of brick in the form of a hollow cone, like a tile-kiln, cemented outside to keep out the weather, having an iron cover on the top, and an opening at the lower portion to let out the grain—the grain is put in at the top, either by an Archimedian screw or by a crane, and taken out below as required; and as the grain is moved throughout the whole mass whenever any is removed from beneath, to air the grain nothing further is required than to take some out below, and put it back again at the top.

These buildings were used in ancient times, and are still used

in India; they would cost little to construct, and would be proof against vermin, fire and mildew, and last for an indefinite period.

The shipment of grain is also defective and wasteful. The putting the grain into a vessel in bulk, carrying it from the granary in bags, the transhipment by taking it out in bags and carting them some distance to the vessel intended to take the grain to its trans-Atlantic destination, again shipping in bulk, and on its arrival being taken out again with bags, with the rattage at every point of its progress, the spilling every time it is moved, and deterioration in quality from constant exposure, cause an amount of loss that, were it carefully estimated, would lead to an utter change in the methods employed in sending it forward.

Grain should always, on removal from granary, be put into barrels. These might be made of sawed wood, (seasoned or steamed of course,) which barrels would sell in Britain at a profit on cost for cooper's use. They should hold four bushels Imperial, or half a quarter, and in addition to shipping marks, have quantity and quality painted on them. As no vessel can take a bulk cargo of grain in greater quantity than in barrels, owing to the weight, the freight would not be augmented in consequence. Indeed, from the freight being what is technically called "rolling freight, it would most probably be somewhat less, and all loss from spilling, damp, heating on the voyage (the spaces between the barrels allowing of free circulation of air,) would be prevented, the damage from rattage much lessened, the shipment, transhipment and landing very much facilitated, the qualities of wheat and the properties of the various shippers kept quite distinct, and the sale, being in precise quantities, much facilitated.

Were our grain trade what it was ten years since, the present system might be tolerated some time longer, but in the view of the rapid increase of our grain trade, some means, whether they be such as I have pointed out, or better, should be employed to prevent the destruction of a large portion of our produce. I need not point out the superiority of barrels for the packing of grain, if to be transported by railway—a mode of conveyance we must very shortly accustom ourselves to consider.

The improvements made of late in the manufacture of flour, and the increased facilities for its transmission to the places of consumption, much to be improved by the formation of a regular line of iron steamers from Montreal to Britain, (steam ensuring rapidity, and the conducting powers of iron ensuring coolness,) would leave me little to say, were it not that the constant quotation of Canadian sour flour proves that it often spoils on the voyage, and that for the Californian and Australian markets, or indeed for those of the British West Indies, it is altogether out of the question, as Baltimore or Charleston American flour, or even that manufactured in Hamburg, in Europe, has to be taken in place of Canadian, at a higher price.

Nor does the evil end here, for owing to the necessity of preparing flour to keep, the highly nutritive spring wheat has to be rejected, and the gluten of the winter wheat cannot be made use of to the fullest extent, this gluten being the most valuable portion of the grain.

On the other hand, if Canadian flour could be made to keep, and could, by regrinding the whole of the gluten be used, and a portion of spring wheat employed to give strength, Canadian flour, from its superior strength, would sell at a higher price than any other whatever.

The remedy, the sole remedy, is the employment of the kiln—not to the wheat, for that renders it too hard to grind, and too dark in colour, (some of the best spring grain, indeed, requiring to be wetted to grind well,)—but the *kiln* employed to dry the *flour*.

Now, steam heat offers the readiest mode of drying, either employed in a metallic chest, or enclosed in a tube round which a screw might be constructed, to convey the flour to the cooling rooms, and thus be submitted to the heat of the steam while on its passage, and every particle exposed to the heat in turn.

All the trouble and anxiety now felt by shippers, apart from the fluctuation of markets would thus be obviated, our spring wheat could be used freely, and a fair price paid for it, now almost rejected altogether, and the whole of the grain excepting the mere cuticle, or bran employed, increasing the price of our flour 15 per cent., and the quantity at least as much as would be lost by the shrinkage by drying, while the enterprising might seek other and more distant markets, probably also far more profitable ones, than those of the United States and Great Britain, to which we are now confined by the perishable character of our flour.

While on this subject, I may be excused adverting to the fact, that wheat alone is made into flour properly so called, barley being merely husked or ground into small balls, peas husked or as commonly called "split," rice simply pulled, while oats and corn are highly dried and then coarsely ground into meal. Now all these articles, with the addition to the list of rice and white beans, would make flour, useful to some extent for bread, serving as a variety and very important at sea, but also for soup and puddings, far more available than the preparations now employed. Indeed it would at first sight seem more rational to grind wheat into meal, and the coarser grains into flour, than the present practice—probably custom is the sole cause. For all these species of flour the kiln is even more requisite than for wheaten flour, the grain being ground undried.

And before dismissing the subject, I may also advert to the change of late in our acquaintance with the nutritive qualities of various kinds of Grain. At one time, because Wheat proved to be highly nutritive, and contained gluten as well as starch, and starch was clearly proved incapable of producing muscle, gluten was considered the nutritive principle; but as Maize supported life equally well and contained zein in place of gluten, zein although differing from gluten in many respects, had to be considered its equivalent as food, and so with hordein in Barley, vegetable casein in Beans and Pears; and lastly, Rice, which at one time was coolly put down as quite innutritious, although some three hundred millions live chiefly on it, is now looked upon as scarcely behind the rest, Oats having been all along thought to posses nutritive powers possessing gluten, or something not far from it.

The fact being that the life sustaining qualities are much alike, and although some possess sufficient compounds of nitrogen to form muscle, and enough compounds of carbon for fat and for warmth, some, it is true, contain more of the various phosphates than others, and differ in other ways,—that very difference proving their utility,—and that as a variety of animal and vegetable food conduces to health, we should be all the better if our bread was more diversified in character.

I disgress once more to speak of a subject having much relation to the preservation of flour, namely, its preparation from grain by grinding; for the purpose of making flour of a keeping quality, extra coolers have been employed for a long time, well seasoned barrels are deemed a most important item, if they cannot be obtained air seasoned, steam dried staves answer perfectly, even if made of wood cut the day previously; planes are manufactured in London of Beech wood cut a few days previously, but prepared by steaming.

Various patents have also been taken out—Bovills, employed by J. B. Ewart, Esq., Dundas, blows air through the eye of the stone, cooling of the flour, and helping the centrifugal force, to expel

the flour before being ground too low—Bonnell's patent—patented at Detroit, although Bonnell is a native of Toronto—being an improvement upon the celebrated French mode of grinding mouture economique, now so much admired in England, and consisting of grinding the wheat in the first place very coarse, or high, as it is called by the miller, and then regrinding the flour that will not pass the bolt by means of very small stones revolving at a high velocity—thus securing the whole nutritive qualities of the wheat in a condition highly favorable for making bread, but as I fear containing too much gluten to keep for any length of time without the kiln; and lastly a patent taken out in England for grinding with conical stones, fitting one over the other, grinding, at a high velocity, and discharging the flour before it can become injuriously heated, securing also, like Bonnell's, all the nutritive qualities of the grain,—this I think, will be found to answer partially without the kiln, much better with.

Strange that the mill remaining in the bakery still existing at Pompeii, should be a conical mill—how often our new inventions are but reproductions of forgotten arts.

The failure of the potatoe crop, or rather the failure of the means taken to preserve the potatoe from one season to another, has been the cause of much anxiety, and various means suggested and tried to remedy the evil with various success.

But it has generally been forgotten that at all periods, even when the potatoe was as a plant the most vigorous, and its culture the most certain, there was a portion of the year when the old potatoe lost much of nutritive powers, all its flavor, and even contained a positive poison, (solanine) while the new potatoe was equally valueless as food. And also that at sea in long voyages the supply of potatoes became so deteriorated as to be of little use.

When Napoleon the First sent his armies through Holland, potatoes were prepared for their use in a way it certainly would be easy to imitate. After being well washed, they were steamed for a moment or two, to loosen their skins, which were then rubbed off, when the potatoes were put into an Iron Cylinder with holes at the bottom, and forced through by a piston in a state resembling macaroni. These pieces were then dried at a heat sufficient to accomplish the object, but insufficient to cook them or alter the flavor, the potatoes could then be easily transported, and could at any time be made into mashed potatoe. It would keep any length of time, retaining all the original qualities of the recent tuber.

Some such process has been lately employed in Britain in preparing the root for use at sea, whether the same or not, I cannot say,—the one I propose could hardly be improved upon, and would enable us to enjoy an article of food as popular as the one in question, in full perfection all the year through, besides allowing us to draw our supplies from a distance, and giving us an additional article of export to the West Indies where in spite of the Yam, the Banana, the Casava, and the Sweet Potatoe, the ordinary potatoe is much valued.

In the same manner carrots, parsnips and turnips might be prepared, I have seen French preparations of these roots as fine as flour. Unripe peas can either be dried whole or in flour in either shape, agreeable at sea or in winter.

Onions can be preserved with little injury in brine, cabbages put up with insufficient salt to prevent fermentation, produce the German dish sour-krout, but salted enough, will keep for a considerable time, the salt can be readily removed by soaking, the same can be done with French Beans, and most pot herbs.

The preserving vegetables in vinegar so completely alters their flavor and all other qualities, that I shall make no remark on the subject, further than to shew the singular importance of them in preventing Sea Scurvy, and that pickled cabbage forms a part of the sea stock of vessels going on long voyages. The necessity of *raw* vegetable food in some shape every few months, and that nothing cooked will answer to prevent Sea Scurvy, makes the putting up of pickles of more interest than we might at first consider, even if with our long periods of forced abstinence from fresh green food in Canada, the use of pickles were not probably highly important to the animal economy, inst ad of being thought merely an unhealthy indulgence.

I shall make less remark on the preserving fruits with sugar, as the cooking of them not only nearly destroys their flavor, but their utility as a preventative of Scurvy is lost also.

Far different in the mode of preserving them by excluding the air, now so much resorted to in Britain, and beginning to be appreciated by the ladies of Toronto.

This process, invented I believe, by Mr. Appert, a native of France, and applied to the preparation of most articles required at sea, consists simply in procuring an air-tight vessel, say of glass, to be closed by a cork waxed over, or of metal, soldered down, in which the article to be preserved has been placed, and covered with water, a small aperture then being made to allow of the escape of air, the water is made to boil by means of a water bath in which the vessel is placed, as soon as the air enclosed in the vessel, in the food to be preserved and in the water itself, has been driven off, which takes place in a short period of time, the small hole is closed up also, the vessel being removed from the Bath. In this way all matters requiring to be preserved may be put up to keep any length of time, whether fruit, fish, vegetables or meat, whether raw or dressed; for the the preparation by no means cooks the article, although with delicate fruits, it injures somewhat its appearance. In this way also, can be preserved cooked meats in any form, milk and cream, as well as solids. It is to be wished that in this way the domestic preparation of fruits and summer vegetables, as fresh peas, french beans, and asparagus, will become general, and supersede altogether, the preparations with sugar, and that before long, that Toronto so advantageously situated for the procuring of animal food, and shortly, by means of railways, to become still more so, will be known for the cheapness and goodness of its preserved provisions, fish, flesh, fowl, fruit and vegetables, that the great demand now felt for them for sea use, will be supplied from a place where they are good and abundant, and not have to be put up as in London, where the cost is threefold what it is with us, or as at Trieste, where the British Government made with the very celebrated Mr Goldner, a contract for provisions, which proved to be merely the refuse of the slaughter house, not preserved at all.

Were the cans made larger and of a cheaper material than tin, say galvinized iron, and the process more economically attended to, it is more than probable that provisions thus put up would form a valuable export, not only the West Indies, where all such things are in demand, but also in Great Britain, not merely for sea use, but for home consumption; the package and preparation would be probably cheaper than barrels and salt, as used in putting up salt provisions, and decidedly more popular.

The salting and packing of Butter has been much better attended to in Canada West, of late years, than heretofore, when our grazing farms are larger we may look for a still greater improvement; that is, when the farmer himself puts down his own butter, and can fill the package in a few days. The Store packed butter will always prove inferior; if not repacked, will be of various flavors and colors, and if repacked greasy.

To make butter keep, the whey should be entirely removed by washing with clear water, and salted with highly dried Li-

verpool Salt, one ounce to the pound of butter—Saltpetre is injurious, Sugar useless—the reason for using Liverpool Salt is to avoid the chlorides of magnesium and calcium, (muriates of lime and magnesia) so common in American Salt, which are bitter and tend to the decomposition, and dried to make it absorb any whey remaining after packing, brine should be put in to fill, a cloth soaked in pickle having been previously inserted at each end to prevent the butter adhering to the wood when opened, and to prevent the access of air through the pores of the wood.

The packing of salt provisions has been much improved of late years in Canada, but although the right method is well known it is not sufficiently adhered to, to cause the demand for them in Britian which we would desire, and the West Indian demand is in much the same position.

The great object in salting provisions is, to make them keep in all climates, and for at least three years if required, and not to become so salt as to lose their flavor and nutritive qualities.

To accomplish these ends, it is essential that a chemical change be made in the muscular fibre, so as to render it less porous, this is done by pure dry salt which, absorbs part of the water of composition, leaving the muscle much closer, and which closeness it retains, absorbing afterwards much less salt, although at the same time keeping better.

The liquid resulting from this dry salting, should be either thrown away, or if any object, boiled and skimmed as brine.

The meat should then be packed with course salt between every layer, as well as at the top and bottom, and finally filled up with Brine.

The salt should be dry Liverpool for first salting, coarse grain Turks Inland or St. Ubes for packing, so that it may, by dissolving slowly, keep the brine at full strength at every part of the barrel, and American Salt avoided, for the reasons adverted to when speaking of packing butter—chlorides other than that of sodium being bitter, spoiling the color of the meat, and tending to decompose the meat rather than preserve it.

Beef requires in the first preparation a very small quantity of Saltpetre to give it a red color, for every other end it is worse than useless, but custom absolutely requires it, for this one ounce to the 100 lbs. beef is enough. And to preserve Beef from being so salt as to be useless, unless it be exceedingly fat, molasses or sugar are absolutely required, one gallon to 200 lb of Beef put in when packed, is not too much, and for sea use might be doubled.

The drying of meat is practised in many countries to a great extent, in some even without salt, being cut into strips and dried in the air, called Charque, or pounded and dried as pemmecan, or as recently prepared in Texas, pounded fine and made into Biscuits, with flour enough to keep them together, and then slowly dried. Some modification of this last mode is no doubt, desirable for sea use, as affording the basis for soups and stews, it might, indeed, be dried after being chopped fine, and would then on being wetted, serve a variety of purposes. Milk dried has been found to possess all the qualities of new milk, on being dissolved in water, and eggs can be prepared in the same way; of course all their preparations require to be kept in packages, proof against the air and vermin.

Drying after salting is a very desirable and agreeable mode of prepartion, and although mostly applied to Pork, could be also extended to Beef, beyond the common Beef-hams, and also even to Mutton.

Smoking—by means of which a small quantity of creosote adds its flavor and preservative qualities to that of the salt is much used with Pork—and with some kinds of fish—it might be extended to beef, and sea provisions might consist of a much greater variety of preparations than is now usual. The Beef smoked at Hamburg is remarkably fine in flavor, but there is nothing with superior beef and good salt to prevent the Toronto article being equally so.

To the list of salted and smoked articles, sausages may be added, and most of our lake fish, especially Lake Huron Trout, White Fish, Pickerel, and Herring, which last, if well and carefully smoked would surpass the celebrated Yarmouth Bloaters.

Meat can also be preserved fresh in fat, Pork has been sent from America to England packed in Lard, and Beef Steaks sent from Glascow to Jamaica in Suet; but I do not believe it was ever sent to any extent, or under any but very favorable circumstances.

When the Railways are all completed however, it is quite possible, by their means, and shipping by the New Iron Packets from Portland, that Toronto could supply the London market with fresh beef, mutton, and poultry—at all events it would not be more singular than the regular supply of the New York Restaurateurs with English Game, as at present so commonly practised—or Scottish Salmon at a Toronto Railway Dinner.

Other modes of preserving, not yet carried into effect, suggest themselves, one consists in the use of Acetate of Alumina, a salt possessing little taste, but of considerable preservative powers, but whether this salt would exercise an injurious effect on the health if employed in preserving food, and thus taken into the system remains to be seen. Chlorine and Sodium enter into combination in forming many of the fluids of the animal economy,—Aluminum might be inert, or might be injurious, but could not like common salt be of service.

But one mode of preserving remains, which, although not confirmed by experiment, deserves careful trial, and I trust, ere long, will receive the attention it deserves,—and that is the preservation of food by immersion in Carbonic Acid Gas. This will offer many advantages over simple expulsion of the air, as boiling will not be required, and consequently the article preserved will be perfectly unaltered, no collapse will take place in the package if metal, no pressure if of glass, and the interior and exterior gases being in equilibrium, much less probability of a leak in the cork; whether any particular apparatus however, would be required, such as the withdrawal of the atmosphere air prior to the introduction of the gas is to be seen. I think a jet of gas under pressure would fill the vessel, and sufficiently drive out the air, while the superior specific gravity of the carbonic acid gas would retain it long enough to allow of the insertion of the cork and sealing. This method of preserving should be tried with peaches and tomatoes, or other pulpy fruits, with which, if successful, there could be no difficulty with other articles.

I have thus, gone through the subject of the preservation of food, as far as I am acquainted with it, chiefly with the view of of calling attention to a matter of so great importance; if what I have said may lead to practical improvement, I shall be happy in having agitated the question, and much more shall I be contented, if I can lead others to suggest something better, as I believe that the interests of Canada, especially of Toronto, are so bound up with the trade in provisions, and that trade so identified with the ability to send them in proper condition to market, that a very slight improvement in the direction I have pointed out may be of incalculable advantage.

The Arctic Expeditions.*

We alluded last month to the publication in full of Capt. M'Clure's despatches:—and we return to them now in order to extract a few details of considerable importance, which are necessary to the elucidation of that officer's proceedings.

It will be remembered, that we expressed regret that the, so called, white man's grave, near Point Warren, was not examined. This omission is still to be deplored;—but it appears that Capt. M'Clure did delay his departure from the Point for several hours, for the purpose of examining a house which the Esquimaux told him had been built by the party of white men one of whom had been murdered. The result will be best related in Capt. M'Clure's own words:—"The interpreter, Dr. Armstrong, and myself went on shore in eager expectation of discovering some clue that would lead to a knowledge of the parties:—but in this we were miserably disappointed. Five huts, indeed, were there, to excite hopes; but upon approaching them we found the woodwork to be perfectly rotten and of a very old date, without any description of mark to yield the slightest information."—The interpreter, it seems, was of opinion that the transaction alluded to by the Esquimaux is traditionary,—and has in all probability reference to some affray between the natives and the early discoverers. The condition of the huts, as described by Capt. M'Clure, certainly helps to remove the story back from recent years to a distant period.

When abreast of the Horton river, between Cape Bathurst and Cape Parry, large volumes of smoke were observed,—and the look-out watch reported that he saw several persons moving about dressed in white shirts, and saw white tents in a hollow of the cliff. An examination of the locality confirmed the existence of the smoke,—which proceeded from fifteen small mounds, of volcanic appearance, occupying a space of about fifty yards. The entire ground was strongly impregnated with sulphur; and the land in the neighborhood was intersected by ravines and deep watercourses, varying in elevation from 300 to 500 feet. Marks of reindeer were seen in the vicinity,—and the temperature at the time (September the 6th) was warm. Several whales and seals played around the ship. The mystery of the white shirts and tents was thus satisfactorily explained:—and it is highly interesting in a physical-geography point of view to find these volcanic appearances at so high a latitude. The active volcano discoverd by Sir James Ross in a high latitude in the Antarctic regions will be in the remembrance of our readers.

Another discovery of great interest was made on the north of Banks Land by shooting parties who had proceeded a short way into the interior in search of game. This consisted of "a range of hills, composed of one entire mass of wood in every stage from petrification to a log fit for fire-wood. Many large trees were among it; but in endeavouring to exhume them, they were found too much decayed to stand removal." In the vicinity the heads of musk-oxen and the well-picked carcases of deer were frequently met with, and there was every appearance of the country being frequented by large herds of animals. Since the publication of Capt. M'Clure's despatches, an official return, of which the following is a copy, has issued from the Admiralty, showing the game killed by Capt. M'Clure's party, between the 1st of October 1850 and the 8th of April 1853. It is right, however, to state, that the principal part was killed during the spring of this year.—

	Number Killed.	Average Weight of each.	Total Weight.
Musk Oxen	7	378 lb.	1,945 lb.
Deer	110	70	7,716
Hares	169	6	1,014
Grouse	486	not weighed	
Ducks	198	"	
Geese	29	"	
Wolves	2	"	
Bears	4	"	
Total	1,005		

—It is supposed that this number would have been greatly augmented had the shooting parties gone into the interior of the country.

Another interesting table has been published, showing the monthly mean height of the barometer and the temperature of the air on board the Investigator from August 1850 to March 1853:—from which the following yearly abstract is drawn.—

Barometer.	1850.	1851.	1852.	1853.
Maximum	30.650	30.750	31 000	30.726
Minimum	29.160	29.030	28.970	29 180
Mean	29.828	29 931	29.906	29.960
Air.				
Maximum	+5	+52	+52	+17
Minimum	—40	—51	—52	—65
Mean	4.66	+1.58	+0.05	—35.92

Those who have perused Capt. M'Clure's voluminous despatches will have observed how triumphantly the Investigator battled with the thick-ribbed ice, which, according to her Commander's account, was constantly on the point of destroying her. This fact is certainly strong inferential evidence in favour of the opinion entertained by high Arctic authorities, that the Erebus and Terror—which were quite as strong as the Investigator—have not been crushed by the ice; and when people find the latter ship making a voyage with perfect safety of above 1,000 miles in the Arctic seas, continually surrounded, and frequently nipped, by the ice—a voyage which Sir Edward Parry states to be "the most magnificent navigation ever performed in one season, and perfectly marvellous in its nature," adding, that he "believes no man can tell more of the difficulty than he can,—it is not unreasonable to hope that the Erebus and Terror may be still in existence as stout ships. On the occasion of a dinner given lately, at Lynn, to Lieut. Cresswell, Sir E. Parry observed, that "there is that stuff and stamina in 120 Englishmen, that somehow or another they would have maintained themselves as well as a parcel of Esquimaux would."

A non-official letter from Capt. Kellett to a friend in London, dated from Mellville Island in May last, states, that game was very abundant on the island during the past autumn. He says —"musk oxen remained with us all the winter; one was shot in March. You cannot fancy a man wishing for a good tough beefsteak: but after preserved meats there is a great pleasure in getting between your teeth something to bite. The venison eaters of England ought to come here for it; nothing can exceed a haunch of good reindeer buck, tender and highly flavoured. Hares were shot in winter, and ptarmigan with full crops and in good condition, a fine cock weighing two pounds-and-a-half."—This account is the more satisfactory when we are told that the winter was very cold,—the thermometer being down to–50 ° and –57 °,—and for a considerable time the mercury was frozen.

We see by Capt. Kellet's letter that the great exploring Expeditions from his ship started on the 4th of April, in two divisions. Commanders M'Clintock, Hamilton, and two officers proceeded north,—and Lieut. Mecham west. Capt. Kellet accompanied Commander M'Clintock for a short distance, and then returned to his ship. On the preceding Sunday he read prayers,—and addressed the men, hoping that they would have

*Athenæum.

little for any one to do after them. "We will do our best," was their response:—and Capt. Kellet adds,—"of this I am convinced."—Remembering the former extraordinary sledge explorations of the above officers,—and particularly those headed by Mecham and M'Clintock—there is little doubt that we shall hear of an immense tract of country and ice-covered sea having been explored this year:—and as Commander M'Clintock's route will lead him to the north-west of Victoria Channel, he may have the good fortune to find our missing countrymen.

Capt. Kellet states his intention of sending the Intrepid steamer to England with half the Investigator's crew. She must, he adds, be sent back to him again in 1854, with a transport of provisions. He represents Capt. M'Clure as being in excellent health,—and says that his officers are animated with the greatest zeal. "My only duty has been to restrain it within proper limits."

The following is interesting.—"I intended to have written to Col. Colquhoun, giving an account of our experiments with powder in blasting the ice. With light ice, three feet thick, I found small charges of 4 or 5 pounds most effective. The 20-pounds charge simply blows out a hole; but with the heavy polar ice of 72 feet thick, M'Clure used as much as 250 pounds in one charge, and with great success. He recollected when in great difficulty the Colonel telling him, 'use 100 pounds.' This saved his ship.—*Notanda*,—Gimcracks on board Resolute:—Mr. Somebody's machine for driving pure air into the ship. Mr.——'s galvanic batteries; balloons, kites. We have too large a proportion of sails,—not enough leather for soles. Sleeping bags should be made up in bags ready made. A large proportion of stearine should be supplied. Mr. Dale's cooking machines have been very carelessly made."—This latter information is distressing, when we remember the delicious venison, and read that the provisions supplied by the Admiralty are all of the best quality. It is certainly hard upon our gallant Arctic explorers that their dinners should be spoiled in the cooking.

News has been received from Valparaiso, dated September the 14th, to the effect that the Isabel steamer, which left England in the early part of the year for Behring's Strait, in search of Sir John Franklin, has been arrested in her voyage at the above port, in consequence of the desertion of the men. Of course under these circumstances, the Isabel will winter at Valparaiso; but we understand that Admiral Moresby will be prepared, if Lady Franklin desires, to furnish a fresh crew of able seamen to the Isabel next March, when she will resume her voyage to Behring's Strait.

An Epitome of a Lecture on Ottawa Productions, delivered before the Bytown Mechanics' Institute & Athenæum, on Tuesday, Nov. 15th, 1853; by Edward Van Cortlandt, Surgeon.

VARIOUS CONDITIONS UNDER WHICH IRON IS FOUND.

NATIVE IRON.

It is generally supposed that Iron never exists in the metallic state, but it is asserted that pure unadulterated Iron has been discovered at Canaan in the United States, Native Iron is likewise produced by the spontaneous ignition of Coal in the neighbourhood of iron deposits, and where it is known under the name of Native Steel. The greatest quantity if iron is found combined with Sulphur, Oxygen or Carbonic Acid, the first known as Iron Pyrites, is never worked as an Ore. The best Iron Ores are Oxides, but the greatest portion of British Iron Ore is a Carbonate.

METEORIC IRON.

The histories of all ages acquaint us of huge masses of Iron being found in various parts of the globe, and which are considered to be of meteoric origin, and in point of fact two masses of such were actually seen to fall at Hadrschina, near Agram, in Croatia, in 1751. Several masses have been found in Africa, and in South America, and in Siberia—the last mentioned was discovered by Professor Pallas, and weighed 1600 pounds. An enormous mass weighing 15 tons, was found in Peru, by Don Rubin de Colis. Captain Perry took some knives home which he obtained from the Esquimaux in one of his voyages, and which were made of meteoric iron. There is a mass of it which weighs three thousand pounds, deposited in the Natural History Lyceum at New York, and which was found at Red River, Louisiana; and a portion of a mass of meteoric iron, which fell at Santa Rosa, near Bagota was manufactured into a sword presented to Bolivar.

MAGNETIC OXIDE OF IRON.

Oxydulous Iron, Octahedral Iron.

It is this variety of Iron Ore which produces the Native Loadstone. It occurs in various parts of the world, especially in the North of Europe, and is that of which the best Swedish Iron is made, and it yields also the Wootz Steel of the East Indies. It is of an Iron black colour, darker than common Iron; its powder is pure black—it exerts a decided action on the magnetic needle, attracting and repelling, according as the positive or negative points are presented. This variety, which is found in several parts of this continent is called Native Loadstone. It is infusible before the blow-pipe, and soluble in Nitric Acid; it occurs in primitive rocks, chiefly of mica and gneiss; it is exceedingly rich in metal, yielding 80 per cent. It is very abundant in Sweden, and at Gallivara, beyond the Polar Circle, it constitutes an entire mountain. In the United States, it exists in the greatest abundance, and is worked in several places. On the western side of Lake Champlain, it is found in beds of 20 feet thick. Its ore produces the best steel and on this account it is that English weapons of superior description are always made of Swedish Iron.

This ore exists in inexhaustible quantities in various parts of the Valley of the Ottawa. The specimen before us was obtained from Lot No. 11, 7th Concession of Hull, and only four miles from the falls at the Chaudiere, where it constitutes a bed 20 feet in thickness, and there is a water power within 300 yards of it.

On the authority of Mr. Murray, the Assistant Provincial Geologist, we are enabled to state that a remarkable mass of magnetic Iron ore exists on the 24th Lot of the 6th concession of South Crosby, on an Island in Mud Lake, not far from Newborough, on the Rideau Canal; it has a breadth of ore of considerable purity of seventy yards. "The great supply of ore, says this gentleman, that might be here obtained, the proximity of wood in abundance for fuel, and the existence of water power at no great distance, combined with the advantage of a navigable canal, the water of which is in contact with the ore, render the locality well worthy of attention to such as are disposed to attempt the smelting of Iron in the Province."

The Geological formation yielding the magnetic oxides of Canada and those of the United States (where they prevail in equal abundance) are identical, says Mr. Logan, and it is probable they are both of the same formation as that of the Swedish mines. But the practical experiments on Canadian ores are still so few that nothing can yet be proved from them.—*Vide Report of Geological Survey, 1851-'52, page 46.*

SPECULAR IRON ORE, RED IRON ORE, IRON GLANCE.

The lustre of this ore of Iron is metallic, its color a dark steel gray, it is infusible before the blow-pipe, but melts with Borax. The great locality of this ore is the Island of Elba, which has been noted for producing it for sixteen centuries back, and its mines are considered inexhaustible; but it is also found in Saxony, Bohemia, Sweden, Siberia, Massachusetts in the United States, in England, and lastly, but not least, in the Township of McNab on the Ottawa River. Wherever it exists it is explored with profit. It is found at Ticonderago, where it is pulverized and used as a polishing powder. Most of the plate iron and iron wire of England are manufactured from this ore. It is extensively used in the button trade as a polisher, and the ore most in demand for this purpose comes from Spain. The best specimens for button polishing command a very high price, and are generally obtained from small pebbles;—it is worked at Utica in the United States with profit. This ore exists in enormous quantities at the mouth of the Madawaska in McNab Township; it is a very valuable species and is very easily smelted, and possesses every requisite for that purpose on the spot. A splendid specimen of this ore was presented to the Bytown Mechanics' Institute at the time of our Exhibition, and attracted the marked attention of the Governor General. The ore bed is twelve feet in thickness, and will yield 25 tons pure iron for every fathom in length and depth. The ore contains 55 per cent of pure metal.

BOG IRON ORE.

Hydrated Peroxide of Iron, or Brown Iron ore.

This Ore is generally found in detached portions at the bottom of shallow lakes and morasses, and hence its name—Bog Iron, and possesses several characters in common with Specular Iron Ore. It is made up of numerous aggregated fibres, and in colour it is invariably some shade of brown; it is very brittle, and possesses no magnetic power. On some occasions we meet with it in a more or less pulverized condition and assuming the appearance of an ochre, but it differs from all the other Ores of Iron, in containing water in large quantities, not simply absorbed, but constituting a characteristic part of the Ore, being chemically combined with it in the proportion of one-sixth.

Bog Iron Ore is only found in limited quantities in England, France, and Siberia. It is uncommon in the northern countries of Europe, but in Germany, France, and Austria it is extensively worked. At Salisbury in Connecticut, it exists to an unlimited extent, and has been worked for more than one hundred years, yielding from this locality alone the large quantity of two thousand tons of Iron annually.

The Iron obtained from Bog Ore is said to excel in toughness and hardness, and to be preferable to Red Iron Ore on that account, whilst the purer varieties, on being melted with charcoal, may be readily converted into steel of an excellent quality.

Bog Iron Ore is of more recent origin than any of the other Ores of Iron, and its deposition is going on continually, even at the present time in shallow lakes and swamps. In the south-western parts of New Jersey, where Bog Iron Ore occurs in great abundance, many spots previously exhausted are explored again successfully, after the lapse of about twenty years. And what is more curious than all we have yet said of it is, that it is brought to the state we find it in through the intervention of an infusorial animal called the *Gaillonella ferruginæ*.

At Sweden, Bog Ore has been fished up from the bottom of the sea, where, according to Hausmann, it is still produced. It is worked in every quarter of the globe, but its Ore is generally used for castings, which are said to take a sharper impression from the phosphoric acid, which Bog Iron Ore always contains.

The Iron produced at the St. Maurice forges at Three Rivers, is obtained entirely from Bog Iron Ore, and is, as is well known, of an excellent quality, and is just now largely worked by the Hon. Jas. Ferrier, of Montreal; and a new company has also started in opposition, headed by Mr. Hale. These forges were commenced by the French Government in 1737, and it is said most of the French cannon handed to the British at the capitulation were made there.

During the last American war these forges were of signal service to the British army, having manufactured a large number of cannon balls and shells, at a time they were much needed.

It exists on the Ottawa on an eight feet bed at Cote St. Charles, on Lots 16 and 17, the property of Mr. R. Lancaster, who kindly forwarded these specimens to the Exhibition. Bog Iron Ore is known to exist in the Township of McNab, and other localities in the Valley of the Ottawa, but which as yet have not been explored.

"To metallurgists the good quality of the wrought Iron of the St. Maurice forges (says Mr. Logan) appeared the more deserving of attention, as the ore from which it is derived, being the Hydrated Peroxide, is usually accompanied by a small amount of Phosphorus, in the form of Phosphate of Iron. It is difficult to remove the impurity which in too large a quantity renders the metal cold short. In cast Iron however its presence in small quantities cannot be called prejudicial, as it serves to render the metal very fluid when fused, and thus to give a fine surface to the castings, and bring out all the details of ornamental patterns in sharp relief, whilst it does not seem to render the casting brittle or to deteriorate its power of resisting the effect of sudden heating and cooling. "The Peroxide of McNab contributed to the Exhibition in London by Mr. Sheriff Dickson, of Pakenham, was regarded as a very beautiful ore, the uniform quality of which would render it one of much more easy fusion and management than the magnetic oxides, while it would probably produce an iron of excellent quality."

IRON PYRITES.

Bisulphuret of Iron.

Is found in small cubical chrystals, in veins amongst Slate and Coal Fields, where, by oxidation and its conversion into Sulphate of iron, it not unfrequently, by raising the heat to a great degree, causes the ignition of the Coal. It is also found accompanying the ores of many other metals, and often replaces the remains of animal and vegetable substances.

In Tierra del Fuego, at the extremity of South America, the natives procure fire by rubbing a piece of iron Pyrites very briskly against a flint, and catching the sparks upon dry moss, —a striking approximation to our flint and steel.

Iron Pyrites is never used for the purpose of obtaining metallic iron, but is employed in the manufacture of Alum, Copperas, and Sulphuric Acid, consequently is of little value to us in this part of the Globe.

Mr. Logan referring to the Iron Ores of Canada, as they appeared at the Great Exhibition, remarks "The vast supplies of Iron with which the collection gave evidence that the Colony is enriched, appeared to arrest the attention of all. The British Miner accustomed to follow into the bowels of the earth, beds of ore of six inches to one foot, containing between 30 and 40 per cent, of this important metal, naturally regarded with surprise huge blocks of it from beds of 100 and 200 feet in thickness, and yielding 60 to 70 per cent;" And again, "the Canadian Iron Ores were examined with great care and attention, by the agents of Russia; it seemed to strike them with wonder that such pro-

digious sources should be found in any country but their own, and the public in general, without taking into consideration the question of its present application to profitable uses, seemed to regard the great beds of Magnetic Oxide, as national Magazines, in which was stored up a vast amount of a material indispensable to the comfort and progress of mankind, which it is always satisfactory to the inhabitants of a country to know is within their reach and control, should circumstances arise to render its application expedient or necessary."—[Vide report for 1851 and 1852, pp 45 and 46.

PLUMBAGO.

Graphite, commonly called Black-lead.

Plumbago is found in various parts of the world, in detached rounded lumps, and in veins of mica slate, Gneiss, and in transition rocks, and although called black-lead, there is not one atom of lead in its composition, it being a carburet of iron. It is found of the best quality in a mountain called Borrowdale, in Cumberland. The mine has been worked since the days of Queen Elizabeth, and is now nearly exhausted, the consequence of which is that Cumberland black lead brings a very high price.

Plumbago also exists in many other parts of the world, where although not of a quality fit for lead pencils; it is profitably worked for other purposes, chiefly for converting into crucibles; it is used however, for polishing grates and stoves, to prevent the friction of machinery, and a preservative of iron from rust. On the Ottawa, it is known to exist of a very pure quality at the iron mine in Hull, but as yet in such small quantities, as not to warrant its being worked. It exists also tolerably pure at Devil's Lake, near Newborough, on the Rideau Canal. It is also found in large quantities, but of an inferior description, at Grenville, yet if properly cleared, would no doubt answer for crucibles.

The opinion of some of the great pencil-makers of the metropolis was obtained by Mr. Logan in regard to its applicability to the purpose of their trade, and "although it was found that the plumbago could, by washing, be freed from its impurities, and after the method of Mr. Brockedon, be converted into pencils, they would be considered of inferior quality.

LEAD ORE—GALENA.

Lead was well known to the ancients, and was used in Britain from very ancient times. Amongst the Romans it constituted a most important article of commerce, blocks and pigs of it having been frequently discovered, bearing Latin inscriptions, and the remains of Roman establishments are found in the neighbourhood. Several pigs of lead are deposited in the British Museum bearing Roman inscriptions.

After the departure of the Romans, the Saxons continued to work the lead mines, and are supposed to have been the first who buried their dead in leaden coffins, the remains of which are frequently met with in various parts of England. In the casting of lead, and where it is rapidly cooled, a cavity is produced, and which in rifle bullets is instrumental in causing them to swerve from a rectilinear course; on this account rifle and musket balls are frequently formed from rolled lead. If rain or river water is exposed for any length of time in open leaden vessels, the metal becomes oxidized and deleterious, and in cases where danger is to be apprehended in this way from cisterns, Doctor Christison advises their being filled with a very weak solution of phosphate of soda, by which they become covered with an insoluble coating.

Lead ore is found in several parts of Canada. It either is or has been worked near Kingston, with what results I do not know. It abounds on the Ottawa, and somewhere in our immediate vicinity, on the Gatineau, it is said to be so plentiful and so easy of access as if discovered to admit of being worked most profitably. But the secret of its locality is confined to the Indians, who look upon it with so much superstition that nothing can bribe them to divulge it; they are under the impression that when the white man discovers it, their race is to be swept away. I have in my private collection an Indian pipe made from an oaken knot, the bowl of which is most ingeniously lined with lead—it was found in an Indian grave at Rice Lake. It is found also in large quantities on the land of Mr. Marshall, at Fitzroy, and ere long, I have no doubt the Ottawa, amongst its existing and prospective manufactures will add lead to the number.

COPPER.

Native copper is as yet only known to exist in Canada in quantities worthy of attention at the Bruce and Wallace Mines, Lake Superior, where a company is just now working it very profitably—it is of a very pure description. We have a spear-head in the museum, evidently made of native copper, and shaped by hammering, which was picked up in Renfrew. It is probable that it was left there by some of the migratory tribes of Indians during their incursions across the country, on their way to the Ottawa, with a belligerent intention.

There is an engraving of a spear-head in the *Canadian Journal* for January, 1853, identical in every respect with our specimen, and which is described as a relic of the ancient miners of Lake Superior. It at all events shows us that the Aborigines were acquainted with the metal.

Having now concluded our descriptions of the metals, we hasten to enumerate some of the refractory materials and minerals of the Ottawa, amongst which are included:—Marbles, white, mottled green, gray, brown—all of superior quality and easily worked; millstones; grindstones and whetstones; sandstones, white and yellow, for the manufacture of glass; phosphate of lime and shell marl, highly important as manures; hydraulic limestone, for making hydraulic cement. Dolomite, for the manufacture of Epsom salts, and containing 45 per cent. of carbonate of magnesia. Steatite or soap-stone, which is applicable to various purposes, since it is used in the manufacture of porcelain, and for polishing serpentine marble and mirror glasses. It constitutes the basis of cosmetic powders, and is a main ingredient in antiattrition pastes, and dusted on the inside of new boots, it causes them to slip on easily; lastly, it removes grease spots from silk and woollen cloths.

Amongst the minerals in the ladies' department and applicable to jewellery, we have Labradorite, which, when looked at in different lights, assumes the hues of changeable silk. Sunstone hyacynths and Oriental rubies and sapphires, together with amethyst, garnet, and peristerite, a new mineral discovered by my esteemed friend Dr. Wilson, of Perth, and deriving its name from the appearance it assumes of the beautiful colour of a dove's breast.

CLAY FOR BRICKS, TILES, &c.

Pottery clay of several varieties, also exists very generally throughout the Ottawa country.

Of the Woods of the Ottawa.

Amongst the ordinary wants and prerequisites of the human family, there is none involved in more doubt and darkness than the origin of Fire. And it is not known whether its first discovery was referable to the direct action of the Sun's rays, to spontaneous combustion, to percussion, to friction, or to an accidental mixture of different substances. The generally received opinion, however, is that the most primitive mode of producing it artificially was by rubbing two pieces of dry Wood together,

a means still resorted to by the Aborigines of many continents and Oceanic Isles. At all events, there is little doubt that the first Fuel consisted of Wood, however questionable the means by which fire was first obtained, and it is quite certain that it was used as such, even at the most remote periods.

EVERGREEN TREES.—PINES.

RED PINE.

Pinus Resinosa, Pin Rouge.

Is a large handsome Tree with scaly red bark. Its timber enters largely into commerce, and is fine grained, and of close texture; it is shipped in the form of squared logs, and as well undressed as Spars for Masts and Yards, for which purposes it is in great request; some deals are also manufactured from this wood; From its superior strength it is used for rafters in England, and is well adapted for supporting the slate and tile roofs of Britain, and owing to the great distance Lumberers have to go in search of it, it brings the highest price in the market. By far the largest quantity of Red Pine is derived from the Ottawa, and on the banks of some of its tributaries, large tracts of sandy land are entirely covered with it. It constitutes the only open Wooded Tree in Canada.

WHITE PINE.

Pinus Strobus, Pin Blanc.

This is the commonest and most majestic of all our Pines; it towers over all the other trees of the Forest, and attains a very great size. When growing in open situations, it is often feathered down to the ground, and when loaded with its large pendulous cones, assumes a very beautiful and picturesque appearance. White Pine is easily wrought, comparatively free from knots, and very durable. Its timber is most in demand for ordinary domestic purposes, a fact fully demonstrated by the tens of thousands of Logs, we see everywhere about our Saw Mills. From its superior size and lightness the lower masts of Ships are generally made of it, and its possessing the property of not splitting by the sun, fits it for their decks. This wood is our most extensive article of commerce, and is shipped in the shape of Masts, Planks, Boards, Shingles, Laths, and Squared Logs. This is one of the trees which furnish the Gum with which the Indians pay over the seams of their Canoes.

PITCH PINE.

Pinus Rigida.

Is the most symmetrical and beautiful of all the family of Pines, although it seldom attains a great size, and never thrives except on the most arid and sandy soils. As its name indicates, it is chiefly employed for making Pitch. It is an extremely rapid growing tree, and exists in large quantities at Sandy Point, Torbolton, and although every tree on this locality was destroyed by fire about ten years since, they have been reproduced in numbers and of sizes already, which, but for the indisputable evidence of the neighbouring Farmers, could scarcely be believed. Tar and Lampblack are largely manufactured from this tree, in Vermont, by a very simple process. The knots being incorruptible, are found abundantly in groves of this pine, which are collected and piled upon a stone hearth, covered with sods and earth, and set on fire, the heat soon expels the Tar, which runs down a groove cut in the stone for that purpose. The Lampblack is only the condensed smoke of the sam fire collected in large Wooden Troughs. The only purpose as wood is converted to when worked, is Pump-making.

SPRUCES.

Hemlock Spruce, Abies Canadensis, Pruche.

This tree is exceedingly abundant throughout Canada. It is a noble species rising to 80 or 100 feet, and measuring often from 2 to 3 feet in diameter. It is of slow growth, and is supposed to require 200 years to attain its full size. When from 25 to 30 years old, its appearance is exceedingly elegant, but when older its large broken limbs detract from its symmetry and beauty, and the naked stumps of the old limbs give the tree an appearance of decrepitude and decay. The wood is not of great value, and is chiefly employed for lathes and coarse indoor work. The bark is very valuable as a substitute for Oak Bark in Tanning, and is that almost exclusively employed in our Tanneries. A decoction of its bark is used as a sudorific, whilst a fomentation made by boiling its branches, is considered by Shantymen to be a Panacea for Rheumatism, and all sorts of swellings, and the "Sovereignest thing on earth for a green wound."

BLACK SPRUCE.

Abies Nigra, Epinette Noir.

Is a native of the most inclement portions of our continent, growing most densely, and presenting a very sombre appearance; and as large tracts of country are frequently covered exclusively with this tree, it has gained for them the appellation of Black Wood Lands. It is remarkable for the regularity and symmetry of its branches, which taper in the most beautiful pyramidal manner from the base to the summit. The timber is of great value, and is used from its straightness, lightness and elasticity, for the yards of Ships, and to "bend like a Black Spruce topmast" is a common saying amongst Sailors; it is also used for the knees of Ships and other craft. From it is extracted the Essence of Spruce, so well known for its Antiscorbutic properties, and so largely employed in the manufacture of Spruce Beer. Large quantities of this timber are annually shipped off from Quebec, chiefly for the Irish market.

BALSAM SPRUCE.

Silver Fir, Abies Balsimea, Sapin.

This is a beautiful ever-green tree, rising in a pyramidal shape, from 30 to 40 feet. In open and cultivated grounds it becomes feathered down to the bottom, it is consequently much in demand as an Ornamental Tree. It is this tree which furnishes the Gum de Sapin, or Canadian Balsam, sold largely as a substitute for and under the name of Balm of Gilead, an article of Eastern production, and which brings a high price in the market. It is also the chief ingredient in several descriptions of Varnish, and particularly valuable for preparing a transparent limpid varnish for water colour paintings.

It is the branches and leaves of this tree which furnish the Lumberer with a rude and primitive bed, when far removed from the abodes of man, hunting up Timber-groves in the forest.

RED CEDAR.

Juniper Virginiana, Cedar Rouge.

The Canadian Red Cedar is identical with the Bermuda Cedar, which is so largely employed by the pencil makers. It grows from Cedar Island, Lake Champlain, to as far south as the Gulf of Mexico. It attains a height of about 60 feet; grows on the most sterile regions, and may frequently be seen springing out of the crevices of rocks growing most luxuriantly without any apparent nourishment. In this section of the country it is not applied to any particular use, but in the western district is largely used for fence rails. There is a peculiarity connected with this tree, which, although very ornamental, never produces two specimens alike, that is two trees of the same shape. A resinous gum called Gum Sandarach is obtained from the Red Cedar, which when pulverized is known under the name of Pounce, and used as an absorbent of ink, and to prevent its spreading over the

newly erased surface of paper; it is also largely employed by Cabinet-makers for making a superior transparent varnish. The essential oil is very fragrant and imparts a most agreeable odour to leather, and to it books in Russia owe their inviting smell.

WHITE CEDAR.

Thuya Occidentalis, Cedre Blanc, Arbor Vita.

The White Cedar never attains any great height, and is so universally known as the occupant of Cedar Swamps, that any lengthened description is uncalled for. The wood is soft, smooth, extremely light, and possesses an aromatic smell. It retains a permanent shape, and is so extremely durable as to have led to the saying, "as sound as a Cedar post." It is chiefly used for fences and the sleepers of cellars, and from it the Indian shapes the ribs of his frail bark.

The North American Fisheries.*

English commerce is an affair of the last three centuries, and really began on an extensive scale in the prosecution of these very fisheries. An enterprising German, Dr. Pauli, who had before brought to light the Saxon treasures of the Bodleian, has lately discovered in the accumulated dust of the tower, which he had the bravery to penetrate, a quantity of curious and instructive correspondence, concerning the trade of the island with the continent prior to and at the time of the discovery of America, when the Low Countries and the free towns of Germany controlled the commerce of the world. The more shame to Englishmen that this work has been done by a foreigner. It is evident that at that time there was little foreign commerce of magnitude in English hands. Newfoundland was discovered by Cabot in 1497, but many years passed away before the English fishermen took advantage of the rights they had acquired thereby. Harry the Bluff was too much occupied with his wives and the Pope to pay that attention to the extension of the foreign power of the kingdom which had characterized the latter years of the reign of his more vigorous father. In 1517 there were only about fifty vessels at Newfoundland—English, French, Spanish, and Portuguese. The reign of Queen Elizabeth was distinguished by a more vigorous aid to this branch of national wealth. A succession of laws was passed for the encouragement of the fisheries, and the capital of the country was largely embarked in the business. In 1577, there were fifty English vessels on the Banks, and in 1603 two hundred, employing 10,000 men. Sir Humphrey Gilbert had taken possession of the island in 1583, in the name of Her Majesty, and planted a colony there. The sad fate of this heroic man is familiar to all through the touching poem of Longfellow. It was not thought beneath the dignity of the first men in the realm to enrich, or attempt to enrich themselves by these adventures. Raleigh took them under his protection, and Bacon was one of the patentees to plant a colony "in the southern and eastern parts of Newfoundland, whither the subjects of the realm have been used annually in no small numbers to resort to fish." The fisheries increased so rapidly, and became so prosperous, that large numbers made the island their permanent home, and began boat-fishing from the shore, which so seriously affected the sea fisheries that in 1670, instead of two hundred as in the beginning of the century, there were only eighty English vessels employed there. The alarm was sounded by the merchants interested in the trade, and the same year a Government force was sent out to drive away British fishermen and destroy British property in a British colony. The destructive measure had the desired effect; in four years after the annihilation of the rival boat fisheries the vessels employed had increased to two hundred and eighty, and the men to nearly 11,000. The destructive wars with France which marked the eighteenth century, seem to have sometimes repressed and sometimes advanced this interest in the Island of Newfoundland. They resulted at last in driving the French out of the continent, since which time the boat-fishing has gained upon that carried on in vessels, until there are at present but eighty of the latter. The boats now number ten thousand, and produce an annual yield of a million quintals, valued at £600,000. The total annual produce of the fishing interest of the colony is estimated at about £1,000,000.

The fish are caught near the land, with lines, and as often as the boat is filled, the catch is put ashore, where the "cut-throats," the "headers," the "splitters," the "dryers," and the "salters," pass them through from stage to stage till they are converted into the identical salted codfish which constitute the Saturday's dinner and the Sunday's breakfast from Hudson's Bay to the Potomac.

The fluctuations of the French fisheries in these waters have been very striking. In the early part of the sixteenth century, they had a dozen vessels there from the coasts of Normandy and Britany. In the beginning of the seventeenth century they employed 150 vessels in this branch of industry—how large a portion off Newfoundland, we are not able to state, but probably a large one. In the middle of the eighteenth century, after the last fearful struggle of the reign of the magnificent Louis, but before the contest under his successor which lost the Canadas to France, nearly six hundred French vessels, employing 30,000 men were engaged in codfishing. The magnificent fortress of Louisburg was erected, at an expense of fifty millions of livres, to protect their interest, and control the continent of America and the surrounding seas. It fell into British hands in 1763, and was entirely destroyed. The French have now the right to fish, off a certain portion of the coast of Newfoundland, and also within the Gulf of St. Lawrence, and occupy as a rendezvous for their vessels in these rough seas the two desolate islands of St. Pierre and Miguelon, only two leagues in extent, and without wood or fuel. By the help of a large bounty (fifty francs per man on the outfit, and from twelve to twenty francs per metric quintal on the produce,) they succeed in maintaining four hundred vessels and twelve thousand men in this business, and produce annually from three to five hundred thousand quintals of fish. From this source though not a commercial nation, they are assured of an unfailing supply of seamen for the national marine. There is no better school for sailors than those seas. We have crossed them often, and rarely seen them quiet. The mingling of the current of the Gulf stream, setting up from the Bay of Mexico, densely charged with caloric, which it retains even until it settles about the British shores, with the ice-charged stream from the north, produces a constant restlessness in the air above and the water below. Even if engaged in the boat-fishing off the Coast of Newfoundland, or about the Islands of St. Pierre and Miguelon, the French fishermen must pass through these seas; if engaged upon the Grand Bank, the most extensive submarine elevation in the world, and abounding in shoals of fish, he anchors with his little vessel of one or two hundred tons in deep water in the midst of them, and pursues his occupation in strong boats till the "fare" is secured, and then takes it to St. Pierre for curing. The interest could not be supported without a large bounty. It requires larger vessels and a greater outlay of money than the rival colonial boat fisheries, and is carried on with the disadvantages of a distant home and uncertain market. It is to be regarded rather as an element in French national strength than as an item in the national prosperity and wealth.

The Newfoundland and Labrador seal fisheries, one of the most valuable branches of this dangerous industry, were created by the French invasion of the British cod-fishing grounds, and

* From Fraser's Magazine for November.

have grown to their present magnitude within a very few years. The vessels employed for this purpose from Newfoundland now number three hundred and forty-one, and the men ten thousand. The annual yield of the seal-skin is 500,000, valued at £50,000, and of seal oil over six thousand tons, valued at £170,000. In the early spring when the ice begins to descend, they leave the island in vessels hardly large enough for a Thames yacht, and force themselves into the floating fields as far as they can. They gather in the "game" (rather than the "catch") from all sides, stripping off the flesh and the fat, and leaving the coarse meat behind. It is not difficult for one who is familiar with the sea to picture the peril of such an occupation—the floating masses of ice tossing about on the restless ocean, the little craft wedged in among it, and liable at any moment to be crushed—the fearful storms descending from the Arctic—the hurricane dashing the snow over the deck, and clothing the rigging with sleet—the tossing waters severing the loose ice and piling it in fragments—and above all, the prevailing northeast gales, driving the whole mass towards the mainland, and threatening instant destruction to all

The codfisheries also upon the Labrador coast have become very valuable, and are in the hands of the Newfoundland and United States fishermen. It is estimated "that about twenty thousand British subjects are at present required during the fishing season, in the catching, curing, and transporting the various products of these remote seas." The cod fishermen arrive on the coast in the latter part of May, and early in June, and anchoring in some quiet place, where they may ride in safety, they send out their boats, with a shipper and a man in each to look up the fish. If after search, none are found, or not enough to make it worth while to stay, they change their anchorage, until they find themselves in good waters. The fishing is carried on by boats, which return to the vessels with their catch, and the cleaning and curing is generally done by a portion of the crew who are taken for that purpose. Frequently British vessels take two "fares" in a season, in which case the second load is cured at home.

The other cod fisheries are at Cape Breton, Prince Edward's Island, Magdalen Islands, and the Bay of Chaleurs, in the Gulf of St. Lawrence, and in the Bay of Fundy, and about Nova Scotia and New Brunswick. The descendants of the French Acadians, whose memories are embalmed in Longfellow's *Evangeline*, still clad, according to Mr. Sabine, in the peculiar costume of Normandy, feebly prosecute the fisheries of the Magdalen Islands and of the Bay of Chaleurs in boats. The valuable waters which surround Cape Breton are turned to even less account.

The disputes between the United States and the British Government grow out of alleged aggressions on the Nova Scotia and New Brunswick fisheries. Nova Scotia, the Acadia of *Evangeline*, is perhaps the richest fishing ground in the world. It is surrounded with deep bays and harbours, swarmed with every species of the piscatory creation, that come to the very door of the fisherman's hut. He is thus enabled, at little expense, to take cod with boats and lines, and mackerel with sieves and nets, under the shore, safe from the reach of the storm and the swell of the Atlantic, and ought with an expenditure of the least possible energy, to drive out of the market the foreign competitor, who is obliged to fit out a large vessel, bring it a long distance, and is then not permitted to fish within three miles from the shore. But instead of entering into a manly competition, he enacts a stringent law against poaching, and calls upon the Home Government to enforce it, which is done in a very prudent manner, while he does little, according to Mr. Haliburton, but "eat, drink, smoke, sleep, ride about, and lounge at taverns." The Bank fisheries are nearer to this Province than to any other, the cod and mackerel lie on the shore for their exclusive catch, the shad, the salmon and the herring ascend their rivers, and yet they employ but ten thousand men in the business, and their exports of fish are less than £200,000 a year. They have most especially advantages for taking the mackerel, which come from the south in large shoals in the latter part of May and early in June, and make into the narrow inlets and the straits of Canso, on their way to the Bay of Chaleurs, to spawn. The Americans are obliged to catch this fish in the deeper waters with the hook; but the colonists have the advantage of taking them in the shallow waters off the shore with nets and sieves." To secure two, four, six, and even eight hundred barrels at a time, it is only necessary to set a sieve to tend it, and at the proper moment to draw it to the shore." They exported in 1851 a hundred thousand barrels of mackerel, or about one half of the whole catch of the same fish in Massachusetts the year before.

The American mode of catching this fish by line, is enthusiastically described by Mr. Sabine:—

"The master of the vessel after reaching some well-known resort of the fish, furls all his sails except the mainsail, brings his vessel low to the wind, ranges his crew at proper intervals along one of her sides, and, without a mackerel in sight, attempts to raise a *school*, *scool* or *shoal*, by throwing over bait. If he succeeds to his wishes, a scene ensues which can hardly be described, but which it were worth a trip to the fishing ground to witness. I have heard more than one fisherman say that he had caught more than sixty mackerel in a minute; and when he was told that at that rate he had taken thirty-six hundred in an hour and that with another person as expert, he would catch a whole fare in a single day, he would reject the figures as proving nothing but a wish to undervalue his skill. Certain it is that some active young men will haul in and jerk off a fish, and throw out the line for another with a single motion, and repeat the act in so rapid a succession that their arms seem continually on the swing. To be 'high-line' is an object of earnest desire amongst the ambitious; and the muscular ease, the precision, and adroitness of movement which such men exibit in the strife are admirable. . . . . Oftentimes the fishing ceases in a moment, and as if put an end to by magic: the fish, according to the fisherman's conceit, pane-stricken by the havoc among them, suddenly disappear from sight. . . . . The approach of night, or the disappearance of the mackerel, closing all labour with the hook and line, the fish, as they are dressed, are thrown into casks of water, to rid them of blood. The deck is then cleared and washed; the mainsail is hauled down, and the foresail is hoisted in its stead; a lantern is placed in the rigging; a watch is set to salt the fish, and keep a look out for the night: and the master and remainder of the crew at a late hour seek repose. The earliest gleams of light find the anxious master awake, hurrying forward preparations for the morning's meal, and making other arrangements for a renewal of the previous day's work. But the means which were so successful then failed now, and perhaps for days to come; for the capricious creatures will not take the hook, nor can all the art of the most sagacious and experienced induce them to bite."

A word about the Bay of Fundy, and we have made the tour of the fishing-grounds. The fisheries within this bay are carried on by boats from the shore, and are deemed to be less important than those on the sea side of the Peninsula. The men engaged in them are poor and thriftless, and are so scantily paid for their dangerous occupation, pursued on a stormy coast, with tides of fearful height and velocity, that they have little temptation or opportunity to become anything better. The shore fisheries of the States and the Colonies here touch each other; but there is, strange to say, little jealousy between the subjects of Her Majesty and the "free and enlightened citizens" of the Republic, and the

colonial laws against poaching are consequently administered in the most lenient manner.

The rights of the United States fishermen in these waters are regulated by the Convention of 1818. They received by that instrument the liberty to fish "on that part of the southern coast of Newfoundland which extends from Cape Ray to the Rameau Islands, on the Western and Northern Coast of Newfoundland; from the said Cape Ray to the Quirpon Islands, on the shores of the Magdalen Islands, and also on the coasts, bays, harbours and creeks from Mount Joly on the southern coast of Labrador, to and through the Straits of Belle Isle, and thence northwardly indefinitely along the coast;" and the liberty to dry and cure in the unsettled bays of the same Newfoundland and Labrador coasts; and they renounced the liberty "to take, dry or cure fish on or within three marine miles of any of the coasts, bays, creeks or harbours of His Britannic Majesty's dominions in America not included within the above-mentioned limits;" provided their fishermen should be "admitted to enter such bays or harbours, for the purpose of shelter, and of repairing damages therein, of purchasing wood and of obtaining water, and for no other purpose whatever." The disputes grow out of this last clause, which John Bull says excludes his dear cousin from all the Nova Scotia bays, according to established principles of public law; while the young gentleman, in return, claims the right to fish in all bays over six miles from headland to headland at the mouth, and to enter the other for the specific purposes named. But, as we said before, we do not purpose to take this question out of the hands of the negotiators and deprive them of the glory of settling it.

The inhabitants of New England have been fishermen from the outset. Gossnold went fishing off the Massachusetts coast in 1602, and in honour of his success, gave the name of Cape Cod to the sandy arm which reaches round into the sea, and takes up a part of Massachusetts Bay. The steeple-crowned saints who followed in his footsteps some eighteen years after, had an eye to the same good things in coming to this "stern and rock-bound coast." A ten-years' residence amongst the herring-catchers in Holland had taught them the value of such matters, and they showed a commendable determination in taking hold of them and and turning them to a good purpose, which their descendants have since been constantly striving to imitate.

In 1625, they had established a settlement at Gloucester, on the opposite promontory of the bay; and at the close of the seventeenth century, the products of the colony of Massachusetts Bay amounted to £80,000. They were undoubtedly injured by the witch mania, which ran through that part of New England, to the terror of old women, honest men, and people whose measure of sanctity and reverence for the ecclesiastical rulers was in doubt; but the exports had advanced by the middle of the eighteenth century to £150,000, notwithstanding the wars for the possession of Canada and the fishing grounds. So large had the interest become, that New England was able to furnish seven thousand sailors for the expedition against Louisburg. Since the peace of 1815, it has not advanced in proportion to the increase in the wealth and power of the country. American statesmen attribute the want of vitality to the superior advantages which the colonial fishermen enjoy in the exclusive use of their shore fisheries, to the stringent enforcement of the provincial laws, and to the want of sufficient protection to those interests in the United States. But we are inclined to think that the real cause of the decline is to be found in the impulse given to other and more lucrative branches of navigation and commerce in the United States, which draws away capital and men from the fisheries; and to the improved condition of the labouring classes, which allows them better food than cured fish.

It is impossible to conceive anything less inciting than the Massachusetts shore all the way round from Plymouth to Cape Cod. In some places, there is scarcely a blade of glass to relieve the desolate appearance of the sand, and where the soil is firm enough to give it life, it is not deep enough to give it much strength. We have been told that the gardens, such as they are, in the extreme towns, are supplied with earth from Boston, brought down as ballast in the little craft which ply across the bay, and in the fishing smacks which land their cargo there, and then come home to winter. The island of Nantucket has even less claim to be called land. Without rocks, or rivers, or trees, or hills, and scarcely with grass, it just lifts its sandy surface above the level of the ocean, protected by a belt of breakers from the swell of the Atlantic, but by nothing from the storms that lash it into fury. As on the Western Irish, and the Eastern coast, so on Nantucket and Cape Cod everybody lives by the sea; and of course sometimes an unexpected hurricane brings mourning and desolation into every house. They have not much of this world's wealth, (or rather the Cape Cod people have not, for the islanders are rich from the whale fisheries,) but on the other hand they are not poor. In the winter the young men and damsels go to the public schools, and the fathers look after their matters about home, get the vessel, lines and nets in trim for the next year's work, read the local newspapers, (and possibly a weekly journal from Boston,) to "post themselves up" as to what is going on in the outer world, of which this is the only time they get a glimpse. Some one, the staidest and most respectable, is selected for the "General Court," in Boston: that is, for the Legislature of the State. Care is taken, however, to pick out a person who has not too recently enjoyed the lucrative salary of two dollars a day belonging to the office. He goes to Boston, finds lodgings in some cheap part of the town, votes knowingly on all questions connected with the inspection of fish, and leaves the rest of the legislation to take care of itself. Meanwhile, his neighbours have been getting ready for taking the spring fares, and in May, or early in June they set sail for the Grand Bank or for Labrador, or the Bay of Fundy, or Nova Scotia. Their mode of fishing resembles substantially that of the French, which we have undertaken to describe; and if they are successful, they return home in the autumn, having suffered much and passed through many dangers, and with a reward quite inadequate to the difficulties and perils.

Notes on Tin.

Mr. Layard, in his work on Nineveh and Babylon, in reference to the article of bronze from Assyria, now in the British Museum, states that the *tin* used in the composition was probably obtained from Phœnicia; and, consequently, that *that* used in the Assyrian bronze may actually have been *exported* nearly *three thousand* years ago from the British Isles. The Assyrians appear to have made an extensive use of this metal; and the degree of perfection which the making of bronze had then reached, clearly shows that they must have been long experienced in the use of it. They appear to have received what they used from the Phœnicians. It is said that the Phœnicians were indebted to the Tyrian Hercules for their trade in tin; and that this island owed to them its name of *Baratanac*, or Britain, the land of tin.

The Great Polgooth Tin Mine, in Cornwall, has been worked for tin from a period far too remote for the earliest record, and the histories of Cornwall have severally given it that notice to which it was entitled from its magnitude and importance. At least, from the time of the requirement of tin by the Phœnicians to the present, it has been wrought more or less, with short intermissions, and has yielded a greater quantity of ore than any other tin mine in the country of the same depth. In a geologi-

cal point of view, it presents some of the most remarkable features known in the science of mining, and has not unfrequently baffled all the known theory and practice of the day; and from this reason mainly, whilst other mines have started into existence at a much more recent period, and have been profitably worked to a great depth, this mine has only yet reached to about 110 fathoms. The mine during the last sixty years has not been sunk one single fathom.

INCORPORATED BY ROYAL CHARTER.

First Ordinary Meeting, December 3rd, 1853.

The following gentlemen were proposed members of the Institute:—

Dr. W. Craigie,		Hamilton.
J. H. Hagarty, Q. C.,		Toronto.
C. J. Philbrick, M. R. C. S.,		"
C. E. Thomson, J. J. Bogert, S. E. Rykert,	Junior Members	Toronto.
R. Rothwell,		"
Professor W. Hincks,		"
" E. Chapman,		"
" D. Wilson,		"

E. G. O'Brien, Esq., and S. Spreule, were appointed to audit the accounts of the past year.

The Annual Report was read by the Secretary. The following certificate, having reference to the proposal of honorary members, was presented and read:—

To the Secretary of the Canadian Institute:—

We certify that the following persons—Capt. J. H. Lefroy, R.A., F.R.S.; W. Logan, F.R.S., and G.S., Provincial Geologist; Col. E. Sabine, R.A., F.R.S.; Robert Stephenson, M.P.—are eminent for their attainments in Science, and do recommend the same for election as Honorary Members of this Society.

J. B. Cherriman,
Henry Croft,
F. W. Cumberland.

The following gentlemen having been provisionally elected by the Council during the recess, they were duly balloted for and their election confirmed:—

The Hon. Francis Hincks, Life Member,		Quebec.
Rev. B. Cronyn,		London.
E. Thompson,		Toronto.
A. P. Salter, D.P.L.S., Chatham		Chatham.
E. R. Jones,		"
Hon. P. B. de Blaquiere,		"
T. G. Gregory,		Windsor.
Rev. R. Whitwell,		Philipsburg.
J. E. Pell,		Toronto.
W. McCleary,		London,
Rev. W. Bleasdale		Trenton.
Col. K. Cameron,		Beaverton.
J. R. Burke,		Stanfold, C.E.
Dr. Thomas Macklem,		Chippawa.
C. J. McGregor, E. M. Crombie, S. W. Hallam,	Junior Members,	Toronto.

Second Ordinary Meeting.—December 10th.

The following gentlemen were proposed members of the Institute:—

Thos. C. Street,		Niagara Falls.
Rev. Dr. Willis,		Toronto.
Robert Ferrie,		Doon.
James Stephenson, Jr.,		Hamilton.
Peter Cameron		Toronto.
William Henry Purdy,		"
Donald McDonald,		"
Sam'l Street Machlem, S. D. Mayer,	Jun. Members	Toronto.

The following volumes of Bohn's Illustrated, Scientific, Standard and Antiquarian Library, were then presented to the Institute on behalf of H. G. Bohn, Esq., London, by A. H. Armour, Esq., Toronto:—

The Politics and Economics of Aristotle, translated, with Notes, original and selected, and Analyses, by Edward Walford, M.A., with Introductory Essay and a Life of Aristotle, by Dr. Gillies.

The Organon; or, Logical Treatises of Aristotle, with the Introduction of Porphyry, literally translated, with Notes, Analysis, &c, by Octavius Freire Owen, M.A.; 2 vols.

The Comedies of Aristophanes; a new and literal translation from the revised text of Dindorf, with Notes and extracts from the best Metrical Versions, by William James Hickie, St. John's College, Cambridge, 2 vols.

The Lives and Opinions of Eminent Philosophers, by Diogenes Laërtius, literally translated by C. D. Yonge, B.A.

The Comedies of Terence, and Fables of Phædrus, literally translated into English Prose, with Notes, by Henry Thomas Riley, B.A.; to which is added a Metrical Translation of Phædrus, by Christopher Smart, A.M.

The Life of Alfred the Great, translated from the German of Dr. R. Paub; to which is appended Alfred's Anglo-Saxon Version of Crosius, with a literal English Translation, and an Anglo-Saxon Alphabet and Glossary, by B. Thorpe, Esq., M.R.A.S., Munich.

The Annals of Roger de Hoveden, comprising the History of England, and of other countries of Europe, from A.D. 732 to A.D. 1201, translated from the Latin with Notes and Illustrations, by H. T. Riley, B.A.

The Chronicle of Henry of Huntingdon, comprising the History of England, from the invasion of Julius Caesar to the accession of Henry II.; also, the Acts of Stephen, King of England and Duke of Normandy; translated by Thomas Forester, A.M.

The Flowers of History, especially such as relate to the affairs of Britain, from the beginning of the World to the year A.D. 1307, collected by Matthew of Westminster; translated from the original by C. D. Yonge, B.A.; 2 vols.

History of the House of Austria, from the Accession of Francis I. to the Revolution of 1848; to which is added Genesis, or the details of the late Austrian Revolution, by an Officer of State.

The Prose Works of John Milton, volume V, containing the Second Book of a Treatise on Christian Doctrine, translated from the original by Charles R. Sumner, D.D., Lord Bishop of Winchester; The History of Britain; The History of Moscovia; &c., &c.

Lectures delivered at Broadmead Chapel, Bristol, by the late John Foster, Third Edition, with Additions; 2 vols.

Fredrika Bremer's Works:—The Home; or, Life in Sweden; and Strife and Peace; translated by Mary Howitt; 1 vol.

——— ———: a Diary; Axel and Anna, and other tales, translated by Mary Howitt; 1 vol.

The Beauties of English Poetry, selected for the use of Youth, by E. Tomkins; Twenty-first Edition.

The Days of Battle: or, Quatre Bras and Waterloo, by an English woman resident at Brussels in June, 1815.

The Physiology of Temperance and Total Abstinence, being an examination of the effects of Alcoholic Liquors on the Healthy Human System, by William B. Carpenter, M D., F.R.S.

Letters from Egypt, Ethiopia, and the Peninsula of Sinai—by Dr Richard Lepsius; with extracts from his Chronology of the Egyptians with reference to the Exodus of the Israelites; Translated by Leonora and Joanna B. Horner.

Norway and its Scenery—Comprising the Journal of a Tour by Edward Price, Esq, and a Road-book for Tourists; with Hints to Anglers and Sportsmen.

Cage and Chamber Birds; their natural history, habits, food, diseases management and mode of capture—Translated from the German of J. M. Bechstein, M.D.: with considerable additions on structure, migration and economy, by H. G. Adams, incorporating the whole of Sweet's British Warblers—with numerous illustrations.

China, Pictorial, Descriptive, and Historical, with some account of Ava and the Burmese, Siam and Anam,—with nearly one hundred illustrations.

The Constitution of England; or, an account of the English Government—by J. G. de Lolme: A new edition, with Life and Notes, by John Macgregor, M. P.

The Coin Collector's Manual; or Guide to the Numismatic Student in the formation of a Cabinet of Coins—by H. Noel Humphreys, with above two hundred and fifty illustrations on wood and steel. Two volumes.

Personal Narrative of Travels to the Equatoral Regions of America, during the years 1799 to 1804—by Alexander von Humboldt and Aimé Bonpland. Volume III.

It was then resolved that the thanks of the Institute be transmitted to Mr. Bohn for his handsome donation.

The following gentlemen, who had been proposed at the last Meeting, were balloted for, and duly elected:—

Dr. William Craigie,.....Hamilton.
J. H. Hagarty, Q.C.,.....Toronto.
C. J. Philbrick, M.R.C.S,..... "
C. E. Thomson, J. J. Bogert, S. E. Rykert, R. Rothwell, } Junior Members.....Toronto.
Professor W. Hincks,..... "
" F. Chapman, ... "
" D. Wilson, ... "

The following gentlemen were nominated as Office-bearers for the year 1854:—

Hon. Chief Justice Robinson, for President.
Professor Croft, for First Vice-President.
Professor Hind, for Second Vice-President.
Professor A. Chapman, for Curator.
Mr. Fleming, for Librarian.
Mr. Crawford, for Treasurer.
Professor Irving and Professor Cherriman, for Corresponding Secretary.
Mr. G. W. Allan, for Secretary.
Mr. A. H. Armour, Mr. Harman, Mr. Henning, Professor Wilson, Professor Buckland, Mr. Brunel, Professor Bovell, Mr. Walter Shanly, Professor Hodder, Mr. Thos. Ridout, Rev. Dr. Scadding, Mr. Brondgeest, Professor Cherriman, and Mr. Francis Shanly—for Council.

Mr. J. T. Brondgeest read a paper "On the Preservation of Food."—(*See page* 107.)

On motion of Mr. Armour, it was made an instruction to the Council to have an alphabetical list of the names of the present members of the Institute placed on the table on next Saturday exening.

Annual General Meeting.

DECEMBER, 17.

The following gentlemen were proposed members of the Institute:—

G. B. Holland,.....Toronto.
C. Hampden Turner, ...Rook's Nest, Surrey, Eng.
Henry Bennett,.....Toronto.
Elkanah Billings,.....Bytown.

The annual report of the Council was read by the Secretary, and the account current of the Treasurer presented to the meeting.

The report was adopted.

ANNUAL REPORT.

The Council of the Canadian Institute, before retiring from office, have the honour to lay before the members the usual yearly report of the operations and progress of the Institute during the past Session, and the steps they have taken in carrying out the recommendations of the previous Council, and generally in furthering the objects of the Society.

During the Session of 1852-3, the following papers were read at the ordinary meetings:

1. On the Mineral Springs of Canada—By Prof. Croft.
2. On the Geology of Toronto.—By Prof. Hind.
3. On the Windrose at Toronto.—By Capt. Lefroy.
4. On the Provincial Currency.—By Prof. Cherriman.
5. On Oriental Literature.—By Jacob Hirschfelder, Esq.
6. On the Nottawasaga Valley.—By Sandford Fleming, Esq.
7. On the birds Wintering in the neighbourhood of Toronto —By G. W. Allan, Esq.
8. On the Genuineness of some of the Classical Authors.— By the Rev. Dr. McCaul.

9. On the Causes which influence the Circulation of the Blood.—By Dr. Bovell.

10. On Ornamental Planting.—By Professor Buckland.

At the Annual Conversazione, an Introductory Address was delivered by the Hon. Judge Draper, which was followed by addresses from the following gentlemen:

Rev. Prof Irving—On Binocular Vision.

Dr. Hodder, on the Poisonous Plants in the neighbourhood of Toronto.

Rev. Dr. Scadding—On Accidental Discoveries.

T. Henning, Esq.—On Late Arctic Expeditions.

Although many of these papers were not only excellent in a literary or scientific view, but also of peculiar interest in connection with this Province, the Council cannot refrain from expressing their regret and disappointment, at the total absence of any papers on the Science of Engineering,—a science for the promotion of whose interests the Society was originally established, and which, considering the magnitude and importance of the engineering operations now going on in this country, should naturally include a large portion of the intellect of the Society.

The number of Members of the Institute was, at the period of the last report 112; during the last session, 135 new Members have been added, and a list of 16 new names will be submitted this evening for the ballot, being those of gentlemen who applied after the close of the Session, and whom the Council, according to custom, admitted provisionally,—the total number of members will thus be raised to 263.

The annexed Balance Sheet will show that the financial condition of the Society is flourishing, there being a balance in favour of the Institute of £145 16s. For this gratifying result, the Society is to a great extent indebted to the liberality of Government, who continue to aid them with the annual grant of £250, and the use of the rooms rent free. This grant it has been the aim of the Council to expend on objects of permanent value, such as the Library, the Museum, and the *Canadian Journal.*

The Council have much pleasure in announcing the success which has attended the publication of the *Canadian Journal* in the manner advised by their predecessors. While serving as the official medium for the publication of the Society's transactions, it has also made good its claims to public support on independent grounds as a Scientific Journal, and the Council have every reason to expect that under the able conduct of its present editor, it will well sustain the high character it has already earned.

The circulation of the Journal is now about 440 copies monthly, and of the first volume there only remain at this time twenty complete sets which have been reserved by the Council for the purposes of the Institute; in view of this fact it has been deemed advisable to increase the number of impressions from 500 to 750, believing that the supply will not be in excess of the demand that may be expected.

It may here be mentioned that application was made to the late Post Master General, to allow the *Journal* to be transmitted post free, in reply it was stated that the Post Master General could not accede to the request, but would put the Journal on the same footing as the Anglo American Magazine, and allow it to pass at half rates The Council regret that the Post Master General was unable to see the distinction between a purely scientific Journal, published at the cost of a learned society, and without expectation or intention of profit, and a literary magazine, which however excellent in its aim and execution, can only be considered as the enterprise of a private individual, and on which the reduction of postage would merely tend to increase his personal profit. The Council hope that on a renewed application by their successors to the Post Office authorities, this decision, in view of the privileges granted to the Journal of Education and the Agriculturist, and still later concessions to the Press, will be considered.

The Council would take this opportunity of calling the attention of the Publishing Committee of the Journal, to the fact that the history and details of the many great Public Works of Engineering in this Province, are at present either unpublished, or only in such a shape as to be all but inaccessible to the general reader. The Council are led to believe that a great collection of drawings, and much important information now lodged in Government Offices, would be willingly placed at the disposal of the Committee for publication in the Journal, and that the outlay would be trifling in comparison with the benefits derived therefrom: they would therefore recommend their successors to take steps by which such publication may be effected, believing that the results will be highly beneficial in every respect.

In regard to the formation of a Library and Museum, as advised by the last Report, the Council have expended a sum of £140 4s. 9d. in the purchase of books for the former, in addition to an unexpended appropriation of £110, for books not yet delivered; keeping strictly in view the character of the Library as defined in that Report "one of Scientific reference."

The following are the works alluded to:

	VOLS.
Naturalists' Library	40
Totten on Mortars	1
Loudon's Encyclopædia of Architecture	1
——— Trees	1
——— Gardening	1
——— Agriculture	1
Johnston's General Gazetteer	1
Gwilts Encyclopædia of Architecture	1
Cresy's " Civil Engineering	1
Cuvier's Animal Kingdom	1
Agassiz and Gould's Zoology	1
Dana's system of Mineralogy	1
Bourne on the Steam Engine	1
" on Surveying and Engineering	1
Sim's Principles and Practice of Levelling	1
" on Drawing Instruments	1
Transactions of the Institutes of Civil Engineers	
" " Vol. 1	1
" " Vol. 2	1
" " 5 parts, Vol. 3	5
Abstract of philosophical Transactions, 1800 to 1850	5
Transactions of the Institute of British Architects	2
Pambour's Theory of the Steam Engine	1
Taylor's Scientific Memoirs, in parts	6
The Builder	10
Railway Practice by S. C. Brees	2
Weale on Bridges	3
Journal of the Astronomical Society	11
Civil Engineer and Architect's Journal	12
British Association Reports	19
Flora of North America	2
Volumes	135

The following periodicals are regularly taken in, and will be bound for the Library:—

Illustrated News,
Athenæum,
Builder,
Expositor,

Mining Journal,
Appleton's Mechanic's Magazine,
The Citizen,
Engineer and Architect's Journal,
Anglo-American Magazine,
Journal of the Franklin Institute,
Art Journal,
Journal of Education,
Silliman's Journal,
London Quarterly.
Edinburgh Do.
North British Review.
Westminster Review.
Blackwood's Magazine.
The Sunday Times.

The Council have also much pleasure in recording the following liberal and valuable donations:—

	VOLS.
From Capt. Lefroy,—	
Magnetical and Meteorological Observations	2
Professional Papers of the Corps of Royal Engineers	8
Brande's Chemistry	2
Meteorological Report, by Espy	2
Athenæum, complete year, 1840-41, in Nos	2
From W. E. Logan, Esq.,—	
Official Illustrated Catalogue of the Great Exhibition	3
Hood's Handbook to the Great Exhibition	2
From A. H. Armour, Esq.,—	
Sylva Brittanica, by Strutt	1
The Tower Menagerie	1
Appleton's Library Manual	1
Five Maps.	
From H. G. Bohn, Esq., of London,—(through Mr. Armour),—	
Wisdom and Goodness of God in Creation—Chalmer	1
Soul in Nature—by Oersted	1
Earth, Plants and Man	1
Whewell's Astronomy	1
Kidd's Bridgewater Treatise	1
Bacon's Novum Organum	1
From F. Cumberland, Esq.,—	
Report of Select Committee of House of Commons on Atmospheric Railways	1
Report of R. Stephenson on Atmospheric Pressure	1
Annual Report of Railway Commissioners	8
Guage Commissioners Report	2
Report on Water supply of Metropolis	4
" on Soft Springs of the Surrey Sands	1
" on state of Large Towns, &c	3
" of Metropolitan Sanitary Commissioners	5
" of De la Beche and Cubitt, on the Oldham Mills	1
" of Surveyor of Prisons	2
" of Dover Harbor Commissioners	1
" of Col. Phillpotts on Canal Navigation of the Canadas	1
Jurors Report of Great Exhibition	1
From the East India Company,—	
Magnetical and Meteorological Observations	20
From A. H Armour, Esq.,—	
Owen's Geological Reports	1
Bache's Coast Survey of United States	1

The Museum has been enriched by the following liberal and valuable donations:—

From Capt. Lefroy,—
Skin of a White Caribou,

From Mr. Maurice Baldwin,—
2 pair of large Stags Horns.

From Professor Croft,—
Case of Squirrels and Ground Hog.
3 Cases of Birds, containing 165 specimens.
Collection of 120 Geological specimens from the Hartz Mountains.

From the Rev. A. Bell, of Simcoe,—
130 specimens of fossils of various kinds; and, a collection of Indian Axes, Arrow heads, and remnants of pottery.

From Dr. Wilson, of Perth,—
45 Mineralogical specimens.

Various Minerals from Mr. Thomas and Mr. Ridout.
Model of a Locomotive from Mr. V. Parkes.
" Steam Engine "
Specimens of ornamental tiles from Mr. Cumberland.
" of Plaster Casts from Mr. Thomas.
5 specimens of Lizards and a Fossil Echinus, from Mr. Wm. Couper.

A case for the mineralogical collection was provided by a private subscription of some members of the Institute.

The Council would recommend the application of a considerable part of the funds to the increase of the Library and Museum, and in particular, would urge their successors to form Collections of the Woods, Stones, and Vegetable products of Canada, with especial reference to their use in Arts, Manufactures and Agriculture.

In making application, as recommended by the late Council to the Imperial and Provincial Governments for copies of various documents printed by their order, some delay has occurred, but the Council have reason to believe that measures will be taken during the ensuing sessions of Parliament in favour of the application.

The negociation that was opened last Session, with the Toronto Athenæum, proposing an amalgamation of the two Societies, has not progressed satisfactorily, no answer whatever having been made by the Athenæum to the proposals of the Institute. It is matter of regret thet two Societies in the same city, pursuing the same objects, composed in great measure of the same persons, and both enjoying support from Government, should remain disunited and thus run the risk of counteracting each other's efforts. The Council would advise that attempts be made to re-open the negociation by their successors.

The Council have to deplore the departure from this country of our talented and energetic President, Captain J. H. Lefroy. Considering the many services rendered by him to this Institute, it was a very general opinion among the members that he should not be allowed to depart without some endeavour to express our grateful sense of his exertions, and a voluntary subscription was entered into to furnish a piece of plate of which we might request his acceptance, and also to provide a portrait of him for presentation to the Institute. Both these objects were accomplished by the subscription, with the exception of a small balance in excess of the estimate, which has been defrayed by the Institute. The portrait now hangs in the Society's room, and the piece of plate was presented at the Annual Conversazione.

The Council are of opinion, that to mark still more distinctly our recognition of Captain Lefroy's services, it is advisable to confer on him the title and privileges of an Honorary Member, and at the same time would also recommend that they be conferred on three other gentlemen,

W. Logan, Esq., Provincial Geologist,
Lt.-Col. Edward Sabine, R.A., and
Robert Stephenson, Esq., M.P.

That these gentlemen, the first on whom it has been proposed to confer this title, are "eminent in scientific pursuits," according to the terms of our Bye-laws, will be acknowledged by all, and the connection of the two former with this Province is too patent to require notice. Of Col. Sabine it may be remarked that to him was entrusted the reduction and analysis of the observations made at the Magnetic Observatories established by the Imperial Government, of which Toronto was one, and that it is from the Toronto observations that he has just derived his brilliant discovery of the Lunar magnetic variation.

In consideration of the great work on which Mr. Robert Stephenson is now engaged in this country, it was thought fit by the Council on his visit to Toronto to present a congratulatory address to him, describing also the nature of our Society, and requesting him to allow himself to be nominated an Honorary Member, to which he willingly acceded.

The formalities, prescribed by the regulations, have all been gone through in the cases of these gentlemen, and the names will be submitted to the Ballot in the proper form.

The Council have only to call attention to the alterations made in the regulations and Bye-laws at the last general meeting, and to report that they have worked well and do not seem to require further modification at present. A sufficient number of copies of the improved code has been printed and distributed among the members.

The Council would however suggest, with the view of extending still wider the usefulness of the Society, and bringing the country members into more active participation in its proceedings, the propriety of adding to the Council four Associates from among the country members.

In accordance with a recommendation passed at the last ordinary meeting, provision was made for opening the rooms of the Institute on each Saturday evening during the recess. Members, however, did not appear anxious to avail themselves of this privilege, and the Council would leave it for the Society to decide whether the practice shall be continued. The Council would also recommend the formation of committees of the members at the close of the Session, with the object of pursuing special branches of inquiry during the recess.

In conclusion, the Council would beg to draw the attention of the Society to the fact that their tenure of the present building is uncertain, and will probably terminate in a short time: it must be for the consideration of the Society whether it will be advisable to rent proper accommodation in other quarters, or whether the Society is now strong enough to attempt the erection of buildings of its own in a style worthy of itself, and the objects for which it has been instituted.

FINANCIAL STATEMENT FOR THE YEAR ENDING DECEMBER 3, 1853.

Dr.

To Cash paid on account for—	£	s	d.
Annual Conversazione	48	9	11
Publication of Journal	408	2	4
Balance, Lefroy Testimonial	6	0	0
Sundries on account of Institute	89	15	6
Library Expenses	140	4	9
Mineral Case	5	10	0
To Cash appropriated for Books not yet delivered	110	0	0
" Due on outstanding account	0	18	6
" To Reader for Journal	5	0	0
Balance	145	16	0
	£959	17	0

Cr.

			£	s.	d.
Balance from 1852			287	10	10
By cash received for sale of Journal	£76	10 2			
By cash from Members	266	17 6			
			343	13	8
By private donations			8	15	0
Government Grant, 1853			250	0	0
By cash due on account of Journal	£15	0 0			
" From Members	54	17 6			
			69	17	6
			£959	17	0

The gentlemen proposed members at the previous meeting were then ballotted for, and duly elected, viz:—

Thos. C. Street, M. P. P.	Niagara Falls.
Rev. Dr. Willis,	Toronto.
Robert Ferrie,	Doon.
James Stevenson, Jr.,	Hamilton.
Peter Cameron,	Toronto.
W. H. Pardey,	Toronto.
Donald McDonald, S. D. Mayer,	Jun., mem. Toronto.

Capt. E. A. Walker, of Barrie, presented some geological specimens from Lakes Huron and Simcoe. Professor Croft presented two additional numbers of the Provincial Geologists' Reports. The thanks of the Institute were voted to Capt. Walker and Professor Croft, for their respective donations to the Museum and Library.

The election of officers for the ensuing year was then proceeded with, which terminated as follows:—

President:

Hon. Chief Justice Robinson.

First Vice-President—Professor Croft,

Second Vice-President—Professor Hind.

Treasurer—Dalrymple Crawford.

Corresponding Secretary—Rev. Professor Irving.

Secretary—G. W. Allan.

Curator—Professor Chapman.

Librarian—Sandford Fleming.

Council:

Professor Cherriman,	Francis Shanley,
Alfred Brunel,	Professor Hodder,
Thomas Henning,	Professor Wilson.

It was then resolved, "That the thanks of this meeting be presented to Professor Cherriman, to whose untiring exertions, as first Vice President in the absence of Capt. Lefroy, may be largely attributed the continued success of the Institute during the year just closed."

It was also resolved, "That the thanks of the Institute be presented to the other Officers and Members of the Council for their exertions on behalf of the Institute during their term of office."

Notices of Books.

CAGE AND CHAMBER BIRDS, *their Natural History, Habits, Food, Diseases, Management, and Modes of Capture, from the German of* T. M. BECHSTEIN, M. D., *with Additions by* H. G. ADAMS, *incorporating the whole of* SWEET'S *British Warblers, with numerous Illustrations.* H. G Bohn, London.

This is one of the most attractive of Bohn's illustrated library. The descriptions are given in popular language, with only the occasional intermixture of technical or scientific terms. The book thus commends itself to the attention of the class who are most likely to be interested in the habits and peculiarities of forest warblers.

It is precise and full in its description of the details of the food, breeding, diseases, mode of catching and attractive qualities of the beautiful creatures to which its pages are devoted. It is embellished with numerous well executed woodcuts, and is really in all respects a charming book. We select, as an illustration of the general style of the work, the following description of that well known curious bird, the common crossbill. Page 172.

THE COMMON CROSSBILL. *Loxia curvirostra Lin. Bec croisé, Buf. Der, Fichten Kreutz schnabel, Ecch.*

Description.—This remarkable bird, which is about the size of a bullfinch, is six inches eight lines long, of which the tail measures two inches and a quarter. The beak is almost one inch long, with this peculiarity, that the upper mandible bending downwards, and the lower mandible upwards, cross each other: hence arises the name of the bird. The upper mandible sometimes crosses on the right, and sometimes on the left side, according to the direction given it when in youth; it is soft and yielding; the beak is brown, of a lighter hue underneath; the iris and the feet nut brown; the shin bones eight lines high. The changes of colour, which are falsely reported to take place three times a year, are briefly the following:—The young male, which is greenish brown, with a partial hue of yellow, is, after the first moulting, light red, with the exception of its black quill and tail feathers. This hue is darker on the upper than on the under part of the body.

The change generally takes place in April and May; it is not till the second moulting that these colours pass into the usual greenish yellow. The red crossbills are therefore the males of one year old; the greenish yellow the old birds.

The females are either grey all over, with a little green on the head, breast, and rump, or irregularly speckled with the same colours. An old male then, as may always be observed in the Thuringian Forest, answers to the following description. It is, however, necessary that the birds should be taken from the nest, and not at the season of departure when no two exactly resemble one another in colour. This arises from the different times at which they have moulted, which, as is well known, has a great influence on the colour of birds. The forehead, cheeks, and eyebrows are green or greenish yellow, spotted with white; the back siskin green; the vent white, spotted with grey; the shank feathers grey. All over the bird, however, the dark grey colour of the feathers shine through the green and yellow, and gives all the parts, especially the back, a spotty appearance, for in reality, all the feathers are grey, and only their points yellow or green. The wings are blackish; the small coverts green; the two larger rows, as well as the last quill feathers, bordered at the end with whitish yellow. All the quill feathers, however, as well as the black feathers of the tail, have a very narrow border of green. If the crossbills are grey or speckled, they are young; if red, they are one year old, and have just moulted; if carmine, they are just about to moult for the second time; if spotted with red and yellow, they are two years old, and in full feather. All these differences may be noticed except at the time of laying; for as they do not make their nest at any fixed season, so neither is their moulting regular, from which arises the great variety in their appearance. From all this it follows that the crossbill has much the same varieties of colour as the linnet; and that it is only the red garb, which they wear for a year, which so distinguishes them from other birds. It is curious that the young ones, which are bred in aviaries in Thuringia in great numbers, never acquire in confinement the red colour, but in the second year either remain grey, or immediately receive the greenish yellow colour of the males who have twice moulted.

Habitat.—In a wild state, the crossbill inhabits Europe, Northern Asia and America. It frequents fir and pine woods but only when there is abundance of the cones. In confinement it must have a bell-shaped wire cage, of the form and size adapted for a canary. It may also be allowed to run about, if a pine branch be provided on which it may perch and roost. It cannot, however, be kept in a wooden cage, as it destroy the woodworks with its bill.

Food.—Its food, when wild, chiefly consists of fir seeds, which it partly extracts from the scales of the cones with its bill, and partly from the ground. It also eats the seeds of the pine and alder, and the buds and flowers of the sumach. If kept in a cage, it may be fed on hemp, rape, and fir seeds, or juniper berries. If allowed to run about, it is content with the second universal paste.

Breeding.—Its time of incubation is the most remarkable of its peculiarities, for it breeds between December and April. It builds its nest in the upper branches of coniferous trees of thin pine or fir twigs, on which is placed a thick layer of earth moss, lined within with the finest coral moss. It is not pitched inside and out with resin, as some have reported. The female lays three to five greyish white eggs, having at the thick end a circle of reddish brown stripes and spots. The heating nature of their food preserves both old and young from the effects of the winter's cold. Like all grosbeaks, they feed their young with food disgorged from their own crops. They may be reared on bread soaked in milk, and mixed with poppy seed.

Diseases.—The exhalations of a room have a bad effect on these birds, so that they are subject, when in confinement, to sore eyes, and swollen or ulcerated feet. The country folk of the mountains are simple enough to believe that these birds have the power of attracting their diseases to themselves, and are therefore glad to keep them. A grosser superstition adds to this, that the bird, whose upper mandible crosses on the right of the lower, or, as they call it, a right crossbill attracts to itself the diseases of men; and that a left crossbill, or one whose upper mandible crosses on the other side, takes away the diseases of women. In some districts, the latter birds are preferred, as having most healing efficacy. Simple people daily drink the water left by these birds in their troughs, as a specific against epilepsy, to which, as well as apoplexy, the crossbills are subject.

Mode of Taking:—In either autumn or spring, they are easy to catch by means of a decoy. A stake, to which strong limed twigs have been attached, is fixed, with the decoy bird at its side, in some forest glade to which the birds are observed to resort. They will certainly be lured to the twigs by the "gip, gip, gip," of the decoy. In some parts of Thuringia, the country people place spring traps in the tops of the pines, a favourite haunt of the bird, and hang a good decoy in a cage on the highest branches. As soon as one bird perches, the others follow; and as many are often caught as there are traps, if the sticks on which the birds are to perch are alone allowed to project.

Attractive Qualities.—The crossbill is rather a silly bird in a cage, and uses its bill and feet for the purposes of locomotion, like the parrot. If in health, it swings its body up and down like a siskin, and utters its harsh and unmelodious song. The males, however, are not all alike in this respect, for the amateur prefers those which often utter the ringing note like "Reitz." or "Kreitz," called the crossbill's crow. It becomes so tame, that it may be carried in the open air on the finger, and accustomed to fly in and out of the house.

Naturalist's Calendar, for November and December, Toronto, 1853. By William Couper.

The Great White Owl, (*Strix Nyctea,*) November 4th.—This bird in habits the northern parts of America, Asia, and Europe. Its body is whitish, with lunated fuscous spots. In the Lapland Alps it is quite white, and hardly distinguishable from the snow. Mr. Bullock (*Linnean Transactions, Vol. XI, Part I,*) thinks it breeds in Shetland. It arrives on the peninsula opposite Toronto early in November, where (if not disturbed) it remains nearly three months. Some of them measure five feet in expanse of wing. Its food consists chiefly of musk rat, mice, and other small quadrupeds: it also chases the feathered tribe by day.

Dragon-flies, last seen, November 5th.

The Carab *Agonum Cupripenne*, taken on the banks of the river Don, November 15th. From the above locality, and on the same day, I took 8 species of *Carabidæ*. They were found in the drift-wood washed on the banks by the river, and under stones and logs.

On the 1st December, I took from a decayed stump of a beech tree two large beetles of the Elater family, (*Alaus Ocillatus.*) No trace of the larvæ could be discovered. The two taken are males, and from the position in which they were found in the timber, I am satisfied they were hybernating. As soon as they received the warmth from my hand, a general movement of their limbs took place; in turning one of them on its back, it possessed the usual power of springing. Mr. T. W. Harris, of Massachusetts, in his treatise on Insects injurious

to vegetation, says:—"I found many of them in old apple trees, together with their larvæ which eat the wood, and from which I subsequently obtained the insect in the beetle state."

I found in an oak tree, on December 1st, an Ichneumon-fly, having a red body; antennæ black, with ten of their middle rings white; legs black, with white bands; wings bluish. This insect is the third of the genus having red bodies, with part of their antennæ white, which I have noticed to hybernate. One species has been found for three successive winters, between the earth and the roots of White Ash in one locality, and what is more astonishing, under the same trees. Trees growing in the clearing are in many instances better protected throughout winter than many of the forest monarchs. If the field has been at any time cultivated, the earth generally becomes conically packed around the lower section of the trunk, which, if not disturbed for a year or two, will give place to a quantity of fibrous roots adhering closely to the bark. Insects has instinct to select this as a place to take their winter's rest. The small steel-blue *Halticadæ* can be here found in societies of from fifteen to thirty, together with two or three species of *Coccinellidæ*, which also hybernate in society. Countless numbers of *Podurœ* hop about whenever their abode is disturbed. Cold appear to take very little effect on these minute insects—they display the same power of locomotion in the month of December as they would in the warmth of summer.

December 10th.—In removing the earth from an oak tree at Castle Frank, I discovered a large lepidopterous insect of the genus *Bomby*. Anterior wings reddish brown, and angulated, having two weaved streaks across each, and in their centre an oblong black dot; posterior wings of a brown satin colour, with white margin; antennæ filiform; tongue spiral, but short; body quite flat, with the tail indented. By these marks the moth can be easily distinguished from others of the same family. Lepidoptera are so rarely found torpid in this country, that I consider this instance well worthy of notice. The same species was taken by me during summer.

December 12th.—I visited Mr. Baldwin's bush, west of Yonge-street, for the purpose of obtaining Coleoptera. Those taken are principally bark-miners. Three species of *Cucuji* were found under the rind of Oak, Choke Cherry, and Maple, together with three other species of bark-miners—all appeared in perfect vigour when removed from the crevices they occupied. During my walk in this locality, I noticed that nearly all the standing timber is more or less attacked by beetles—trees in their second growth, even the giants of the forest, are fast decaying away. This cannot be attributed to bark-mining beetles alone, but to the powerful larvæ of the extensive family of *Cerambycidæ* and *Buprestidæ*. So long as fallen trees are allowed to remain on the ground, not a healthy piece of timber can come from that locality, for such decayed trees are the resort of the above beetles, and they tend to their increase.

The Polar Regions.

ON THE POPULAR NOTION OF A NAVIGABLE SEA AT, OR PROXIMATE TO, THE NORTH POLE.

Of the different communications made by me at the late meeting of the British Association, at Hull, that 'On the Popular Notion of an Open Polar Sea' has been most unfortunate in regard to the inaccuracy of the notices of it in the papers of the day. These notices having been subsequently repeated in journals of more permanency, and also referred to as my statements on certain popular and interesting questions concerning Arctic geography—as, for instance, in an article by Mr. Petermann in the *Athenæum* of October 22,—I feel it due to myself and to the public, to seek the opportunity, which I trust you will afford me through the medium or your journal, of correcting the most important of these errors,

Mr. Petermann says,—"In a paper read by the Rev. Dr. Scoresby before the British Association, at Hull, the learned author states, that by having reached the latitude of 80½° he believed he had penetrated further into the Arctic Regions than any other living man:"—a position which he then proceeds to question, and, according to the authorities adduced, to disprove. In other publications referring to the same communication of mine, a singularly mistaken statement, ascribed to me, to the following effect, is added:—That, "though his observations had left no doubt in his own mind that the country about the North Pole was one mass of stupendous blocks of ice,—he firmly believed, however, that the North Pole might be reached *by land*."

Now, what I actually stated on the first of these points—that quoted by Mr. Petermann—was to this effect:—that "no instance could, I believe, be produced in which the adventurous navigator had ever been able to push his way northward (except in one case, where I was personally engaged) beyond the eighty-first parallel,—the latitude, in such adventure, being determined by celestial observation, and the case verified by the production of the ship's journal kept at the time; but that, in the exceptional and remarkable case referred to, we had advanced to the latitude of 81° 30′ north (verified by two observations beyond 81° and by my personal journal kept at the time),—which, I apprehend, was the furthest point reached *by sailing*, within the experience of any living person of which we had reliable record."

And that statement, even if put in more general terms, so as to embrace the enterprises of times past, might, I believe, be fairly maintained. No doubt numerous cases may be found recorded in the collections of the Hon. Daines Barrington and others, in which far higher latitudes are stated to have been reached. But still, in support of my own statement at Hull, I may be permitted to say, that little or no value, obviously, can be attached to mere memorial authorities for remarkable attainments of this kind, where so many influences tend to produce exaggeration or delusion of memory. Yet of this memorial class, incapable of decided evidence, are almost all those of Mr. Barrington, as well as those of subsequent collectors of similar incidents, as far as I have seen, which have been adduced to show a navigable Polar Sea in the far North: The subject, indeed, was particularly discussed by me in the 'Account of the Arctic Regions,' Vol. I. pp. 40—49; and the conclusions as above have not yet, I believe, been contravened. Of the more recent cases adduced by Mr. Petermann in the *Athenæum* (see *ante*, p. 1258,) I am not authorised to speak; perhaps, further than to say, that unless the attainment of the high positions specified—latitudes 82° and 82° 60′—be grounded on observations of the sun, and taken from journals kept at the time, they cannot be relied on as evidence even of the navigableness of the ice-encumbered seas to these extents—much less for supporting the theory of an open Polar Sea.

Few of the cases adduced in support of the theory of an open Polar Sea admit of positive verification or disproval; but it is remarkable that of such cases as admit of being tested, all that I have met with may be refuted, Two of these occur in the instances recorded by Mr. Barrington, which may suffice for illustration,—the cases of Captain Clarke and Capt. Bateson, in 1773, where the former stated his having sailed to the latitude of 81½°, and the latter to 82° 15′. Now those cases belong to the year of Capt. Phipp's expedition towards the North Pole—they refer to advances in the same sea and at the same season, and, as will be obvious to the reader of 'Phipps's Journal,' must have been impossible: for that able officer, we find, was unable to advance beyond 80° 48′; where he was not only arrested by impermeable ice, but so dangerously involved therein as to have seriously contemplated the idea of being obliged to abandon his ships.

All the other cases that I know of, admitting of a satisfactory testing, equally fail; whilst there are the important facts, that of all the public expeditions undertaken by this country with the object of approaching or crossing the Pole, not one ever reached *by sailing* the latitude of 81° north, and that a personal experience of twenty-one voyages to the Greenland Sea—in which I was from seven to nine times at the furthest navigable point and nearest the Pole, for the time, of any other adventurers in the world—gave but once an advance beyond 80° 34′, when we reached, under my father's unexceeded enterprise, the latitude of 81° 30′. In no other regions or meridian, I may add, has anything like such advances been made; nor can any of the cases of "open sea" quoted from the despatches of Sir E. Belcher and Capt. Inglefield show it to be actually navigable to so great an extent, nor, indeed, within 150 miles of it.

In my communication to the British Association on the popular notion of an open Polar Sea the several arguments usually adduced in favour of the theory were separately examined; but no reply attempting to controvert any of the facts or to shake the conclusions from them was elicited. Nor do the views recently set forth by Mr. Petermann, enlightened and comprehensive as in many respects they are, at all meet the facts and analogies—as far as I am able to judge—which I suggested in contravention of the popular theory. It had long been my wish, indeed, to have a subject of so much ge graphical interest duly examined,—and not carried, as it has prevalently been of late, by a sort of popular acclamation. With a view to this I made application to the President of the Geographical Society in the month of May last for my bringing a paper before that Society on the specific question, in order to its being fairly discussed; but the opportunity, within the fortnight which I had then at command, was unfortunately not afforded.

No inconsiderable ambiguity, it should be noted, has been thrown around the topic by the mixing up of two very different forms of the theory of the existence of "a Polar Sea,"—viz., the theory of the existence of a polar ocean, and that of a *navigable* ocean up to or immediately around the northern pole.

As to the theory, in the first of these forms, there is no difference,

that I am aware of, in the opinions of arctic geographers. So far as inference from our present knowledge may guide us, the probability is that the great waters of the Atlantic and Pacific extend to the poles. The occupation by sea of the wide expanse round or beyond the scattered islands of Nova Zembla, Spitzbergen, Greenland, and the regions westward of Greenland, has been determined. And of the theory so reasonably adduced, the Greenland Sea, embracing a width of 300 to 400 miles, extending continuously from the North Sea southward, and expanding without any known limitation by land northward of Spitzbergen, affords the most conclusive example. The inference, therefore, that the straits entered by Penny and Inglefield are respectively inlets of the Polar Ocean, and that the recent discoveries of Belcher extend actually within that ocean—is a position hardly to be questioned. But this conclusion is totally different from that of popular reception—that the ocean thus approached or entered is so free from ice at certain seasons as to afford a navigable passage northward to the pole. Neither the researches of Captain Inglefield in Smith's Sound, nor as far as the particulars have reached us, the discoveries of Sir Edward Belcher to the northward of Wellington Channel, can be fairly adduced as evidences either of a "mild climate" in the far north, or of the existence of navigable waters immediately around the Pole. As to either of these popular inferences, it is easy to show that the facts referred to *prove nothing*. The *open water* and apparently *mild climate* spoken of, as in my replies to the questions of the Arctic Committee was shown, are the ordinary results of like hydrographical and geographical configurations. Of this, amongst a great variety of examples which might be appealed to in respect to the indications from an apparent open sea, a single illustration may suffice. Let any one sail to Hackluyt's Headland, Spitzbergen, which in June or July will be found attainable in almost any summer, and there, greatly beyond the furthest of the advances by our nort-westward navigators, he will ordinarily find a clear or navigable sea. Let him then ascend the lofty summit—1588 feet high—of the hill rising from this celebrated headland and (beyond any immediately attached ices of the coast) he may probably perceive an open sea, sometimes quite free from ice, from the N.E. north about to the N.W. extending to the utmost limit of vision, or to a distance of more than forty miles. If the "open seas," of Inglefield, Belcher and Penny, therefore, might be appealed to as evidence of the navigableness of the Great Polar Ocean to the far north, surely much more so the existence of a like open sea in a position from 170 to 180 miles nearer to the pole. But if the open water within the most northern ice, which we have often explored, be found to be merely local, occasioned by the proximity of Spitzbergen, under the action of favouring currents or winds, and succeeded by impermeable ice—how utterly gratuitous must be the inference that other open seas, as yet unexplored, and lying much further southward, should be appealed to as proofs of the existence of a navigable passage, up to, or near to, the Pole?

On the question whether the region immediately around the North Pole be one of a *mild climate*, as popularly assumed,—that is, in comparison with that within the seventieth and eightieth parallels,—I may safely venture the expression of the decided conviction that such an assumption is equally adverse to the analogies of science and the facts of experience. To these facts, in relation to the highest latitudes yet navigated, I appeal. In the narrow channels or bays, and in places contiguous to land, or on occasions of bright calm weather in summer among ice, the weather is often comparatively warm, and in sheltered situations within or near land, it may, to the feelings, seem hot. But this is the case in *any* of the Arctic regions yet reached. It is found to be the case in any of the sheltered bays of Spitzbergen, from Hakluyt's Headland to Point Look-out, within the parallels of 70 and 80; and equally so, or probably in a greater degree, in Scoreby's Sound, Greenland, in latitude 70°. Facts of this kind, therefore, like the "mild climate" asserted in Penny's researches, prove just as little as the statement of Greenland captains quoted by Mr. Petermann, of their finding "in all these instances (where they attained very high latitudes) an unexpected high temperature." For mere assertion, grounded on personal feelings of warmth, may not reasonably be adduced as proof of such a fact, when very extensive thermometric observation, in the same or proximate regions, and made at the same seasons, decidedly contradict it. Near to the land, and particularly within bays and sounds, as I have said, the temperature may be actually warm; but clear of the land, in the highest attainable latitudes, I never experienced *out of the sunshine* a really warm, much less high, temperature. Thermometric registers, kept and collated for seventeen years (spring and summer), within my own experience, prove the very reverse of what has been assumed to be the real condition of these high northern latitudes, and these, as to ten of my voyages in which the 80th parallel was reached or passed, show a maximum temperature for June and July of only 48°,—such temperature occurring only with a southerly wind, whilst with a steady northerly wind it never reached according to my observation so high as 40°. Capts. Phipps and Parry, indeed, when navigating nearer the shore, experienced higher temperatures, the former registering a maximum of 58°,—but the general facts stand abundantly supported, that in the months of June and July, as well as in those of the spring, the climate far from shore is not warm, that the temperature in spring and summer is almost always lowest with *northerly* winds, and that the average summer temperature of latitude 80° can be shown to be *lower* than that of the parallels below it. The occurrence of a rise of temperature in hard northerly gales in winter I have elsewhere shown to be perfectly consistent with these general conclusions.

The second error in the notices of my paper referred to at the commencement of this article, needs but few words of correction, nor should I have deemed such a statement as that I had proposed, "a journey *overland* to the Pole," necessary to be alluded to, had not that absurd error or mistake been very extensively repeated. The project of reaching the Pole by a *transglacial* journey was originally communicated by me to a learned Society in Edinburgh in the year 1815, and published the same year; not subsequent to Col. Beaufoy's paper or papers on a question of like nature, as stated by Mr. Simmons, but two years before these papers, or any other publication on such project (as far as I ever could learn) appeared. The scheme, as is well known, was tried and failed in the year 1827; but the gallant officer who commanded the expedition now yields his acquiescence in the conviction that such a project is not only not impracticable, but would probably be found "of no difficult attainment it set about in a different manner." The expression of this opinion, as given in the "Arctic Voyages" of Sir John Barrow, at p. 313, is connected with the proposal of a plan for the transglacial journey to the Pole, which, I may be permitted to add, is substantially the same as (I might almost say all but identical with) that originally proposed by me, whilst yet but a youth, in the year 1815. WILLIAM SCORESBY.

Torquay, Nov. 9.

REMARKS ON THE SEPARATION OF SOME METALLIC OXIDES.—It is not possible to separate zinc and nickel from copper by means of sulphuretted hydrogen, the sulphuret of copper always carrying down a perceptible quantity of the other substances, even in acid solutions.

The two following methods, according to Flajolet, permit us to isolate this metal:—

First Method.—A solution of hyposulphite of soda is added to the boiling metallic solution, which is acidulated with sulphuric acid; sulphuret of copper is formed, which is treated in the usual manner. By this process the precipitation of metals of the three first classes is avoided.

Second Method.—An excess of sulphurous acid is added to the metallic solution; hydriodic acid is then added; iodide of copper is formed, which may be either weighed directly, or converted into oxide. In this manner copper is separated from manganese, iron, zinc, nickel, cobalt, arsenic, and antimony.

Separation of Copper and Mercury.—The liquid is neutralised with carbonate of soda, and an excess of cyanide of potassium added. From this solution hydrosulphate of ammonia precipitates mercury alone.

Separation of Manganese and Cobalt from Nickel and Zinc.—The excess of acid in the solution is neutralised by means of carbonate of soda; an excess of cyanide of potassium is then added, and afterwards carbonate of soda. At the temperature of ebullition the manganese is precipitated alone. It is sufficient then to destroy the cyanide by an excess of acid to enable the cobalt to be precipitated by carbonate of soda. When copper is determined by means of hydriodic acid, bismuth, if present, is precipitated with it. These two metals are separated in the same manner as manganese and cobalt. S.

APPARATUS FOR STOPPING A RAILWAY TRAIN.—A very ingenious contrivance, consisting of the introduction of a series of transverse rollers under the engine and carriages of railway trains, has been invented by Mr. E. Palmer, of Woodford-green, Essex. The circumference of the rollers is placed at a short distance above the rail, and while the train proceeds in the ordinary manner they remain stationary; but in the event of the wheels leaving the path, the rollers come into instant operation, sustain the load, and, having a flange on the inner end, act as a second series of wheels, which, supposing them to be applied to an engine, keep the propelling wheels from the ground; and, therefore, however quickly they may be revolving, their power ceases on the rollers touching the rails. The same gentleman has also invented a powerful drag carriage, formed by two strong frames, reaching from the rails to a little above the wheels in height, with projecting ends at the base—each having four slanting beams to strengthen the frame, one on each side of each wheel. The lower part of the frame has cuttings, through which the wheels work on the rails, a forked cutting from end to end to tighten on the rail when required, and attached parallel to each other by cross beams, well screwed in place; each frame has four iron plates reaching from the base to the top part (one on each side of the axletrees), and allows the carriage to move up and

down. There is also a strong sliding frame, with four inclined planes attached thereto, which works inside the wheels, and above the axle-trees and bearings, and upon which are the usual springs and scroll iron, supporting the carriage, which are attached to four cross-beams. This invention has the combined advantage over the brakes now in use in being more powerful and applicable at the proper place or part of the train, and in being self-acting—the sliding frame having a raised part at one end, which comes in contact with the buffers of an engine coming up against it, and projecting a sufficient distance beyond the carriage, that the inclines may be pushed forward, and the carriage lowered just previously to the rollers or wheels of the engine coming on the lower projecting parts of the frames for that purpose, which circumstance immediately adds half its weight to the drag carriage, which stands firm, receiving the shock on powerful buffers, transferring it to the rails by means of the forked cutting above alluded to. Models of both these inventions may be seen at the Society of Arts.

Test for Copper.—The *Technologiste* gives a method for detecting the presence of copper in spirits, and freeing them from it. Olive oil, it says, is not only well known as an excellent test for indicating the presence of a salt of copper in any liquid, but it is also a means of clearing spirits from any traces of copper which may have proceeded from the vessels in which they are distilled. If, for this purpose, a few drops of olive oil are introduced into the spirits and shaken, in a few minutes, as soon as it begins to separate, it will be seen to take a green hue, and absorb all the copper which may happen to be present so that the most delicate tests cannot fail to detect any trace of the metal.

Monthly Meteorological Register, at the Provincial Magnetical Observatory, Toronto, Canada West.—November, 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.	M'N V	Rain in Inch.	S'nw in Inch.
																					Miles		
b	1	29.522	29 455	29.517	29.502	42.8	51.7	48.8	48.23	0.229	0.252	0 271	0.263	84	67	80	80	S b W	S b W	Calm	5 01	- -	- -
b	2	.578	.586	.683	.623	43.6	39 9	38.4	40.37	.205	.212	201	.204	73	87	88	82	N	N	N	6 37	0.035	- -
b	3	.824	.872	.926	.889	32.7	44.6	32.1	35 92	.161	.191	.148	.169	87	68	81	81	Calm.	S b W	S S W	4.32	- -	- -
c	4	30.044	30 058	30 074	30.071	33.7	40.5	31 5	33.07	.111	.158	.153	.136	70	63	87	72	W b S	W b S	S W b S	5.54	- -	- -
b	5	30.105	29 936	29.850	29.957	29.1	35.3	32 0	30.93	.146	.164	.171	.156	91	80	95	90	S S W	S	S b W	2.17	- -	1.0
c	6	29.921	29.943			20.8	36.0			.105	.165			90	78			E N E	W		5 69	- -	- -
b	7	30.190	30.216	30 095	30.166	24.8	34 5	34.1	30.95	.108	.143	.158	.137	79	72	79	79	N E	S E b S	E b S	5.71	0.240	1.5
e	8	29.846	29.513	29.344	29.525	33.2	40.9	45.2	40 18	.180	.239	.287	.235	95	94	96	93	S E	S E b S	S b E	5.77	0.335	- -
b	9	.159	.351	.572	.387	46.1	37.7	33 3	38.27	.260	.131	.163	.179	84	60	86	76	W N W	W N W	W	11.78	Inap	0 2
e	10	.884	.969	.935	.935	25.0	35.3	35.0	31.72	.104	.143	.150	.132	76	70	74	72	Calm	S b W	S S E	5.26	- -	- -
a	11	.866	.793	.816	.838	37.5	47.5	43.1	42 25	.184	.226	.201	.201	82	70	73	75	S E b S	S E b S	S E	6.68	- -	- -
a	12	.841	.683	.521	.663	46.3	53.6	50.3	50.27	.263	.295	.329	.299	86	73	92	84	E S E	S E b S	S	4.75	0.580	- -
a	13	.303	.392			51.1	45.7			351	.237			96	73			E	N W		12 03	Inap	- -
a	14	.534	.485	.343	.442	40.6	45.5	37.6	40.93	.209	.192	.201	.199	80	63	90	79	N W b W	W S W	S S W	4.32	- -	- -
ab	15	.420	.660	.840	.655	44.2	47.8	34.5	40 93	.257	.166	.128	.175	90	50	64	68	W N W	N W	N W b N	5.88	- -	- -
b	16	.950	.966	.944	.956	35.9	37.6	38.1	37.17	.187	.161	.164	.168	89	78	72	77	N E	E N E	E b N	9 70	- -	- -
b	17	.891	.873	.937	.903	42.7	43.1	41.3	42.28	.214	.264	.237	.237	79	97	92	89	E N E	N E b E	N E b N	3.37	0.070	- -
b	18	.915	.809	.800	.850	41 6	46.0	43.4	43.45	.232	.288	.266	.260	89	93	95	93	N E b N	E	Calm	2.13	0.070	- -
a	19	.843	.778	.719	.778	52.4	51.1	51.4	52.20	.337	.360	.318	.311	87	87	93	90	Calm	E	Calm	1.59	0 325	- -
a	20	.688	.707			51.0	45.4			.352	.287			96	95			W N W	E b N		2.45	0.575	- -
b	21	.731	.728	.772	.751	43.8	44 5	42 6	43 45	.260	.255	.258	.256	92	88	95	92	Calm	Calm	Calm	0 95	- -	- -
c	22	.726	.651	.685	.682	41.7	50 1	46 3	47 09	.250	.292	.293	.279	85	81	94	88	S b E	S S W	Calm	4.14	Inap	- -
b	23	.646	.522	.479	.551	44.5	46.3	48.6	44.68	.252	.293	.315	.266	87	91	93	90	Calm	E S E	W S W	5.88	0 030	Inap
b	24	.852	30.132	30.252	30.102	23.7	23.7	14.8	20.25	.081	.080	.075	.077	65	62	83	69	N N W	N W b N	N b W	9.73	- -	Inap
b	25	30 239	30.120	30 034	30.118	15.1	26.7	25.9	22 77	.073	.125	.117	.102	80	84	77	79	N	E N E	Calm	3.50	- -	- -
a	26	29.960	29.952	30.060	29.991	24.4	35.2	31.8	39.35	.100	.102	.115	.112	74	50	64	66	N E b N	S E b S	N E b N	3.70	Inap	- -
b	27	30.168	30 147			31.6	28.7			.152	.141			86	89			N E b E	N E b E		10.84	Inap	- -
b	28	30.039	29.961	29.903	.959	33.4	44.5	41.3	39 87	.173	.221	.220	.210	91	76	85	86	N E	E N E	E N E	3.38	- -	- -
a	29	29.775	.495	.458	.583	40 7	49 2	43.8	44.02	.231	.308	.269	.252	92	89	95	91	E S E	E N E	S W b W	8.07	1.165	- -
a	30	.662	.691	.772	.716	35.2	35.7	32.3	31.28	.156	.155	1.62	.159	76	75	89	81	S W b W	W S W	W N W	4.90	- -	Inap
	M	29.811	29 779	29.783	29 792	36.64	41 98	38.40	38 6	0 191	0.209	0.203	0 201	83	76	85	81	M'n 5.55	M'n 6 67	M'n 4 38	5.52	2.425	2.7

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

North, 1495.7; West, 1209 6; South 1090.1; East, 1219 3;
Mean direction of the wind, North.
Mean velocity of the wind - - 5.52 miles per hour.
Maximum velocity- - - - - 20 8 miles per hour, from 3 to 4 p.m. on 13th
Most windy day - - - - - 13th: Mean velocity, 12.05 miles per hour.
Least windy day - - - - - 21st Mean velocity, 0.95 ditto.
Raining 74.1 hours on 15 days.
No Thunder or Lightning during the month.
Snowing on 5 days. Snowing 17.1 hours.
First frost of the season, 12th Sept. First snow of the season, 25th Oct.
Indian Summer from 12th to 20th October.
Highest Barometer - - 30.270, at 11, a. m., on 7th. } Monthly range:
Lowest Barometer - - 29.159, at 6, a m. on 9th. } 1 111 inches.
Highest regist'd Temp. - 55.6, at P.M., on 19th } Monthly range.
Lowest regist'd Temp. - 12 8, at — A.M., on 25th } 42.8
Mean Maximum Thermometer - - - - 44.06 } Mean daily range:
Mean Minimum Thermometer - - - - 31.05 } 13.01
Greatest daily range - - - - - 27.6 from P. M. 23rd to A. M. of 24th.
Warmest day - - 19th - - - Mean Temperature - 52.20 } Difference
Coldest day - - - 24th - - - Mean Temperature - 20.25 } 31.95

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 2 nights. Possible to see Aurora on 7 nights. Impossible to see Aurora on 21 nights.

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 shown 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.

Comparative Table for November.

Year.	Temperature. Mean.	Max. obs'rvd	Min. obs'rvd	Range.	Rain. D'ys	Inches.	Snow. Dy's	Inch.	Wind Force. Velocity
								not	Miles.
1840	35.9	54.4	29.5	33 9	5	1.220	8	reg'd	-
1841	35 0	63 2	7 6	55 6	8	2.450	5	"	--
1842	33.3	50 6	7 6	43 0	9	5 310	10	"	—
1843	33.5	51.2	14.4	36.8	10	4.765	7	1.2	0.59lb.
1844	34 9	49.8	12.0	37.8	8	inapp.	4	8.0	0.48lb.
1845	36.8	58.8	7.6	51 2	7	1.105	4	5·0	0.53lb.
1846	41.3	55.5	18 2	37.3	12	5 805	2	0.4	0.64lb.
1847	38.6	58.2	7.8	50.4	14	3.155	3	Inap.	4.77m.
1848	34 5	49.3	16.5	32 8	9	2 020	3	1.4	4.81m.
1849	42 0	56.7	28.4	28 3	10	2 815	2	1.0	4 78m.
1850	38.8	62 3	18 1	44 2	7	2 955	1	Inap.	5.27m.
1851	32.9	50.1	16.5	33 6	5	3 885	6	6 7	4.70m.
1852	36.0	50.4	18.7	31.7	7	1.775	3	2.0	6 50m.
1853	38.7	54.1	14.4	39.7	15	2.425	6	2 7	5 52m.
Mean	36.63	54.61	14.88	39.74	9.0	3.053	4 6	2.58	0.56 lb 5.19 M'l

Monthly Meteorological Register, St. Martin, at Isle Jesus, Canada East November, 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.			Temp. of the Air.			Tension of Vapour.			Humi'ty of the Air.			Direction of Wind.			Velocity in Miles per Hour.			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.	6 A. M.	2 P. M.	10 P. M.	6 A. M.	2 P. M.	10 P. M.	6 A. M.	2 P. M.	10 P. M.	6 A. M.	2 P. M.	10 P. M.	6 A. M.	2 P. M.	10 P. M.			6 A. M.	2 P. M.	10 P. M.
1	29.392	29.339	29.372	37.5	60.7	47.6	.199	.371	.291	.83	.71	.86	S	W S W	S b W	5.80	6.27	1.18	Inap.		Clear.	Clear.	Overcast.
2	.437	.464	.463	41.0	57.5	40.2	.221	.422	.245	.82	.81	.92	S b W	W S W	N E	0.62	0.72	4.51	Inap.		Hazy.	Zenith cl'r hazy.	Str. 10.
3	.545	.617	.668	38.1	40.0	33.2	.207	.210	.178	.81	.79	.86	W	W N W	W S W	3.33	2.77	1.97	0.146		Str. 10.	Cum Str. 5.	Clear.
4	.710	.723	.779	31.5	39.0	31.2	.171	.196	.161	.89	.76	.85	W N W	W N W	W N W	1.32	10.15	7.50			Cum. Str. 4.	Cum. 2.	Clear.
5	.872	.800	.744	23.0	35.6	28.0	.093	.186	.119	.61	.83	.68	W N W	S W b S	S W b W	8.86	3.89	0.39			Clear.	Clear.	Slight Snow.
6	.662	.662	.719	25.2	31.2	27.0	.123	.178	.112	.79	.83	.67	N b E	W b N	W S W	1.40	4.12	6.41		0.98	Str. 8.	Cum. Str. 4.	Str. 8.
7	.984	30.074	30.109	17.5	26.4	17.0	.084	.129	.074	.73	.80	.64	W N W	N W b N	E	5.00	8.76	2.50			Clear.	Clear.	Cum. Str. 8.
8	.996	29.760	29.399	18.3	26.9	32.3	.077	.112	.153	.64	.67	.76	N E b E	E	S S E	3.84	7.27	2.91		3.30	Str. 10.	Snow.at9.10am	S. 10. S'w c. 9 p.m
9	29.950	29.930	.952	31.0	40.6	25.0	.201	.215	.123	.95	.92	.79	E S E	W S W	N W bW	2.22	10.16	9.12	2.514		Rain [& bl't	Cum. Str. 9.	Cum. Str. 8. A. Bo
10	29.604	27.725	.809	24.0	27.8	19.0	.121	.146	.113	.80	.88	.90	NW b W	W N W	W	23.60	0.25	2.50			Cl'r zodi'l h'g.	Cum. Str. 3	Clear.
11	.890	.774	.790	30.0	41.8	37.9	.160	.235	.218	.86	.85	.91	S b E	S b E	S b E	1.75	6.82	8.75			Clear.	Clear.	Cum. Str. 10.
12	.779	.614	.591	40.0	52.2	48.0	.251	.373	.324	.95	.93	.93	S S E	S b E	S	2.28	4.98	3.31			Overcast.	Cir. Cum. Str. 9.	Overcast.
13	.306	.179	.013	51.1	53.5	48.0	.361	.428	.310	.93	.93	.98	S	S E b S	S E b E	3.37	5.00	0.41	0.129		C'm St. 9. R'n	Rain at 11.10a.m	Rain.
14	.154	.217	.223	35.0	38.2	31.0	.213	.207	.164	.95	.84	.85	W b N	W b N	W b N	14.50	21.25	6.36	0.260		Cum. Str. 8.	Cum. Str. 4.	Clear.
15	.166	.371	.405	31.6	45.5	31.0	.195	.235	.156	.91	.74	.80	W b S	N W bW	N W bW	2.62	13.86	8.25			Overcast.	Clear.	Clear.
16	.363	.880	.922	24.5	37.6	21.0	.091	.139	.108	.63	.58	.72	N W bW	E b N	E N E	Calm.	Calm.	0.13			Clear.	Clear.	Clear.
17	.935	.846	.797	25.0	31.3	33.1	.102	.178	.187	.65	.92	.90	N E b E	E N E	E b S	6.75	6.35	2.25		2.90	Overcast.	Snow at 10.25. a	C. S. 10. S'w c. 10
18	.318	.760	.592	31.6	35.0	33.2	.158	.186	.187	.81	.83	.90	E N E	E N E	N E b E	2.52	4.98	4.18	0.240		Do. [St.10	Hazy.	Rain at 5.10 p.m.
19	.643	.613	.622	35.8	42.0	36.0	.203	.213	.202	.91	.85	.89	W N W	N W b N	N E b E	0.79	0.51	0.11	0.223		Rain 3 p.m.	Str. 10.	Rain at 5.45 p.m.
20	.615	.578	.618	34.0	36.2	34.0	.206	.200	.201	.99	.87	.95	N E b E	N E b N	N E b N	8.02	6.03	8.12	0.373		Rain in n't	Rain.	Str. 10.
21	.614	.565	.556	31.5	34.2	33.0	.158	.186	.161	.81	.87	.78	N E b N	N E b N	E b N	11.00	9.16	1.72			Over't. [St.10	Cloudy 10.	Str. 10.
22	.510	.413	.435	36.2	46.0	44.0	.198	.252	.278	.89	.86	.88	S S W	W b S	W S W	0.12	3.67	3.39	0.103		Rain in night.	Str. 10.	Str. 10
23	.388	.541	.469	23.5	25.7	29.0	.144	.112	.083	.83	.61	.63	N E b E	N E b E	N E b E	9.03	8.03	11.69			Str. 8. [St.10	Str. 10.	Snow com. at 6pm
24	.570	.745	.956	13.6	20.0	3 0	.068	.078	.044	.67	.60	.77	N b E	N N W	N W	17.63	11.36	7.23		0.85	Ceased in nt.	Cum. 2.	Clear.
25	.989	.913	.871	4.0	13.3	13.5	.038	.053	.061	.61	.51	.63	W N W	W N W	S W b W	1.01	6 66	2.50			Clear. [St.10	Cear.	Clear.
26	.805	.830	.858	19.0	22.6	21.5	.080	.079	.081	.61	.56	.60	S W	N W	N W	9.62	1.03	3.78			Str. 4.	Str. 5.	Clear.
27	30.127	30.127	30.147	4.0	8.0	4.0	.017	.019	.038	.78	.61	.61	N E	N E	N E	7.50	6.29	6.25			Clear.	Clear.	Clear, A. Borealis.
28	29.904	29.917	29.843	5.5	14.0	21.9	.012	.066	.111	.62	.61	.83	N E	N E	N E	8.73	5 50	5.75			Cir. Str. 10.	Sleet.	Str. 10.
29	.737	.609	.431	26.0	41.0	40.0	.112	.287	.210	.70	.79	.79	N E b E	W	S S E	0.72	0.10	3.51			Clear.	Light Cir. 2.	Clear.
30	.400	.413	.470	39.5	38.7	35.0	.231	.207	.212	.91	.84	.95	S W bW	W S W	N W bW	16.25	6.12	6.25	0.180		Rain.	Str. 9.	Str. 10.

Barometer. { Highest, the 27th day - - - - - 30.147
Lowest, the 9th day - - - - - 28.930
Monthly Mean, - - - - - 29.637
" Range - - - - - 1.217

Thermometer { Highest, the 1st day - - - - 61.°0
Lowest, the 25th day - - - - 00.°0
Monthly Mean - - - - - 31.°0
" Range - - - - - 61.°0

Greatest Intensity of the Sun's Rays—130.°0
Lowest point of Terrestial Radiation 6.°0
Mean of Humidity, 792.
Rain fell in 10 days amounting to 4.163 inches.

Snow fell in 4 days amounting to 7.93 inches on the surface.
Aurora Borealis visible on 2 nights, and might have been seen on 9 nights.
Zodiacal Light very bright.
Most Prevalent wind—W. N. W.
Least do. do. N.
Most Windy Day—the 14th day, mean—14.03 miles per hour
Least Windy Day—16th day, mean—0.01 miles per hour.
The electrical state of the atmosphere *generally* has been marked by Feeble Intensity of a Positive character, and on the 17th day indicated for several hours High Tension of Negative Electricity.
River Jesus frozen over 26th November.