

“No. 5.—I think this is an *Eospongia*, but as it does not show any minute structure, will not say so positively.

“No. 2. Which is no doubt the “Chiaistolite” mentioned by Dr. Dawson, (Acadian Geology, 2nd Ed. p. 620,) appears to me to have been important, for the reason that it occurs in the gold-bearing leads of Australia.

“I showed your specimens to Mr. Selwyn, and he says the mineral has exactly the same form as that which occurs in the Australian rocks holding the Quebec graptolites. It is always found there in the vicinity of the granitic or gneissoid rocks. He does not think it to be Chiaistolite proper, but whatever it may be, it is, in his opinion, the same as that of Australia.

“*Eospongia* occurs in the same horizon in Canada, and thus we have a concurrence of two facts which seems to throw some light on the age of the rocks of your district.”

ART. IX. METEOROLOGICAL OBSERVATIONS AT HALIFAX, N. S., DURING THE YEAR 1868. BY FREDERICK ALLISON.

[Read May 10, 1869.]

January. In its clouding the first month of the year preserved its average mean. The whole quantity of precipitation was large, being chiefly in the form of snow which fell to the depth of 21 inches; though, besides the rain storm of the first night of the year we had two others. The range of temperature was not great, neither the maximum 38° nor the minimum— 5° being extreme figures. The whole month was, with very little exception, intensely cold; and the mean fell below the great cold of January 1867—that month was $19^{\circ}.10$, this $18^{\circ}.2$ —which is the coldest I have ever recorded in Halifax, and $3^{\circ}.43$ below the average of 6 years—4 times the thermometer marked below 0,—giving the same number as in January 1867. N. W. wind prevailed as customary and the mean estimated force was great, 2.8. Two gales were recorded; that on the night of the 1st, from S. E. being the heaviest. The other occurred on the 22nd morning and blew from N. E. to N. There was neither fog nor Aurora Borealis in January, and

hoar frost but thrice. Sleighing was enjoyed in the city on every day in the month; and almost always very good.

February. This month also gives a result in mean clouding close to the average. The rain fall was not great; but snow was fully up to the usual depth, and would appear to have been more abnormal than it in fact was, were we only to consider the two preceding years, which were themselves extremely deficient in February snow. The remarkable severity of the winter showed no signs of abatement as yet; the mean temperature of this month being $18^{\circ}.7$ —which is $6^{\circ}.41$ lower than in 1867, and $4^{\circ}.62$ colder than the average of 6 years. A wide range of temperature was attained, owing chiefly to the very low minimum,— 11° . The maximum was 47° ; and on eight days the thermometer marked below 0; five of these days, viz: from 22nd to 26th inclusive, being consecutive. Again was N. W., wind prevalent, and with the great mean force of 2.9. There was however but one gale, and that not of long duration. It blew principally from S. Neither fog, aurora, nor hoar frost was recorded. The sleighing was very good throughout February.

March. The estimated March clouding was near the ordinary amount. Though the precipitation was distributed over 18 days, the total was very small, both of rain and snow, of the latter but $4\frac{1}{2}$ inches (dry) fell. This is less than one sixth of the snow in March 1867, though that month was as remarkable for snow depth as this was for the want of it. A wide ranging thermometer is again to be noticed from 56° to 2° . This minimum was on the 2nd; after which date the thermometer fell no more below 0 during the year we are considering. The mean temperature of this month I found to be $29^{\circ}.3$, which is $.89$ above the 6 years mean, and $2^{\circ}.36$ warmer than in 1867. Still the wind from N. W. predominated, and with a strong mean force. A short gale from E. blew during the 21st afternoon: this was the only gale of the month. We had sleighing on the first nine days; 4 fogs, 2 hoar frosts, and 4 auroras were noted. The harbour was caught by frost on the morning of the 2nd to below George's Island, but not so as to prevent navigation, and the skim of ice broke up rapidly. There were also some parts skimmed across, above the Island, on the mornings of the 26th and 30th, but the rising sun soon remov-

ed all traces of these frosts. Robins were seen in the clearings near Windsor on the 23rd, which was also the day of their first appearance in that neighborhood in 1867; but this year, as in that, their general coming was not yet. Wild geese, bound N., passed over Halifax on the 24th, and next day a flock was seen flying nearly W. On this latter day I noticed them for the first time in 1868, and we find their arrival here not to vary much from this date in general.

April. In this month we shall see that its brightness, though greater than usual, does not imply either great freedom from precipitation, or much heat. Rain fell in fair quantity, and the fall of snow was excessive, measuring $14\frac{3}{4}$ inches, dry. April 1867 was somewhat cool, but this April was $2^{\circ}.33$ below the average mean, which is $37^{\circ}.76$. The range of temperature was not very extensive as the thermometer never registered above 58° which is a very small maximum. The minimum was 10° on the 6th day, an extraordinary degree of cold for the season; which may be inferred from the fact that in 1867 it was not marked later than the 16th of March, and in 1866 than the 9th of that month. W. winds slightly prevailed; and the coming spring was most plainly noted this year by the decline of the winter N. W. wind, over which W., S. W. and S. E. all triumphed. The mean force was again excessive; and we had the unusual number of 3 gales; all occurring, however, before the end of the 9th day. On the 5th and 6th there was tolerable sleighing in the city. I recorded 5 fogs, 3 hoar frosts, and 4 displays of aurora borealis. In the forenoon of the 10th a very plain Solar Halo was visible. Peach blossoms at Gorsebrook opened on the 2nd. On the 17th the Dent de Leon was abundant. Full bloom Mayflowers were picked near this on the 19th and at Windsor on 20th. Though this latter date agrees exactly with 1867, it was late in both instances. Smelt in the Avon were a week later than last year—in 1867 on the 15th, and in 1868 on the 22nd—and fully that time behind their ordinary date of arrival.

May. Both cloud and precipitation were again in excess this May, as they were in 1867. But 12 days were entirely dry, and 6.38 inches of rain fell. A few flakes of snow on the morning of the 6th were the last of the season. The range of temperature was

extremely wide: from 23° on the 4th up to $78^{\circ}.5$ on the 15th. This maximum was high, though it has been exceeded in May; but the minimum is unequalled, except in 1867, when precisely the same figure was marked on the fifth. The mean temperature— $48^{\circ}.69$ was nearly a degree warmer than in 1867, and $.95$ above the average. S. E. winds far surpassed those from any other direction, and were very nearly equal to the aggregate total of all others. May is a month of great variation in winds, but S. E. is a common direction. It may be remembered that the same wind prevailed in this month in the year immediately preceding that under consideration. The mean force was not great, and there were no gales: while many days were almost calm. An extraordinary quantity of fog visited us this May. We had frost on six mornings, which is considerably more than usual, but there was none between the 12th and end of the month. No hoar frost was deposited. But one aurora borealis was seen. No thunder nor lightning. One Lunar Halo was recorded, and a remarkable Solar Halo on the 3rd with the primary colours seen well. Hail fell on the 9th. All blossoms were late. Daffodils blossomed on the 18th. In 1867 these bloomed on the 3rd; and in 1866 on 22nd April. The wild cherry was in flower on the 25th; and the Narcissus not before 31st; having blossomed on the 28th in 1867. In Windsor also the May blossoms, such as violets, *Pyrus Japonica*, and Auriculas, were all more or less behind hand, A Humming Bird was noticed in that locality on the 28th.

June. This was a much more cloudy month than usual, and very wet for the season, 5.18 inches of rain falling. More than half of this quantity fell in the storm of 12th and 13th, which, for this month, was remarkably heavy. The mean temperature $59^{\circ}.2$ was $.49$ or nearly half a degree warmer than in 1867; but the average mean of June for 6 years is more than a degree above this, viz: $60^{\circ}.23$. This early summer time gives generally a wide-ranging thermometer, and this year rose from $35^{\circ}.2$ to $83^{\circ}.6$ at 5 feet from the ground. On the grass, hoar frost formed on the 3rd and 4th mornings—the mercury standing at exactly 32° . This was the last frost of the season. In 1867 it came as late as the 11th and in 1866 there was none in June; while in 1865 hoar frost was deposited as late as the 15th. The common sum-

mer wind of this neighborhood S. W. prevailed; with an estimated mean force of 1.9—much below last year. We had thunder on 2nd, and 8th, and lightning on 8th and 22nd, aurora on the 10th and 15th, and a solar halo on the 11th. Again no gales. Fog was present on 9 days. Though the blossoms on fruit trees, and of many other plants, were still late, those flowers which depend more upon a mild moisture than upon the sun's direct rays had fully recovered the days lost at the beginning of spring. For instance the lily of the valley, which loves the warm shade, flowered on the 1st June, where it delayed till the 5th last year. Ordinary pear trees and plums bloomed on the 1st and apples not till 13th June; while in 1867, which was a decidedly late year itself, the pear blossomed on the 30th May and the apple on the 9th June. The horse chesnut, lilac, and hawthorn, blossomed on 15th 18th and 22nd respectively, against the 12th 14th and 23rd in 1867. Ripe strawberries were plentiful here on 26th; last year not till 29th. Inland they came from 3 to 5 days earlier. Comparing Windsor with the above we find tulips 1 day earlier there. The hawthorn 13 days earlier. The horse chesnut 1 day earlier. Lilacs on the same day and honeysuckles 4 days earlier. Nearly all flowers were much later than usual there; and shad did not strike up the Avon till the 20th. I insert these details at the risk of being wearisome; but no meteorological record is complete without comparing effects with causes, as the seasons revolve.

July. The mean cloud of this month was close to the average, and its general features were fine and seasonable. Rain fell but on parts of 10 days, and measured only 1.02 inches; and nine-tenths of this quantity fell on two days. A striking variation from last season. The range of temperature was not very great. The maximum being $87^{\circ}.4$ and the minimum $45^{\circ}.9$. The former is about the average; but the latter low, though in this respect there has for three years been scarcely a change. No whole day, however, was very cool, and the month's mean temperature was high, being $56^{\circ}.53$, or $3^{\circ}.96$ above the average mean of six years. Still the S. W. wind prevailed and blew for nearly half the month. The mean force being very gentle, showing another great difference between this and July 1867. Twice we had thunder and lightning; and twice the aurora borealis. Once a lunar halo;

and on parts of 8 days fog, but never continuous for more than a few hours. On the 3rd the Scotch rose blossomed; green peas were in market on the 4th, being the very same day as last year: three days later than in 1866, and ten days later than in 1865, 7th the bush bean flowered. Cherries were ripe on the 11th, last year they were one day later. New potatoes were dug near this on 14th, same day in 1867. In several parts of the Western Counties they came from 6 to 11 days behind us. Wild raspberries ripened here on 22nd. In 1867 on 23rd. Blueberries were ripe in each year, on 31st. Comparing 1866 I find these fruits maturing about the same dates, but in 1865 they were from 10 to 14 days earlier.

August. The improvement which July 1868 presented over that month in the preceding year was continued in August though not to so great an extent. In itself, however, the month was remarkably pleasant. The estimated mean cloud was 5.7. A rain fall of 3.6 inches was precipitated on 14 days: or rather 12 of measurable depth. This is below the average fall. On two days the temperature rose to the very high mark of 89° , which was the maximum of the year, and 1° above that of 1867, which also occurred in August; the minimum was $40^{\circ}.8$, to near which degree it usually falls, though last year not reaching to within $6^{\circ}.4$ of this—we had in consequence an extensive range. The mean of the month 65° , was $1^{\circ}.55$ above the average, but $2^{\circ}.82$ less than August 1867 which was a very hot month. Still I record the S. W. wind as prevalent, though very closely followed by S. mean force same as usual. Distant thunder was heard twice—aurora borealis seen on three nights—lunar halo once—fog on 10 days, but never through the whole day. A remarkable shower of meteors fell on the night of the 10th, towards the south. Some very heavy dews occurred towards the end of the month. Currants ripened on the 1st, one week later than last season. Indian corn on the 17th, fully ten days earlier than usual. It may be noticed that the bright dry July, and warmth and moisture during the first part of August seemed favourable to maturing this useful plant. In Windsor the harvest apple was ripe on the 19th, and the Madeline pear on the 22nd. These dates were exactly reversed in 1867. Blackberries were fit to pick on the 23rd, 6 days behind

last year; and the musk melon was still later, not attaining a fair size till the 27th; while gooseberries were quite ripe in the same place on the same day as last year—the 9th. Nectarine plums were picked in Windsor on the 27th, against the 23rd in 1867, and the gladiolus blossomed on the same day.

September, usually one of our clearest months, was distinguished in 1868 by cloud in great quantity. The rainfall, which has been large ever since 1865, was again considerable and measured 5.55 inches. This September was also exceptional in its mean heat, which ran up to $59^{\circ}.47$, being $1^{\circ}.73$ above the average mean, and warmer than any one of the six recorded. The range of temperature was rather more contracted than usual, extending from $80^{\circ}.4$ to $33^{\circ}.8$. This maximum is about the ordinary mark, but the minimum is frequently two or three degrees lower than this. On the grass 32° was first registered at 5 o'clock on the morning of the 18th; so that this summer the index remained above the freezing point for 106 consecutive days, viz., from June 4th to September 18th. In 1867 this period reached only from the 11th June to 12th September—93 days. The average will be found between these two. In winds also the usual September course was departed from, as those between S. W. and N. W. generally predominate; but this year, though N. W. were common, S. were still more so, and S. E. prevailed over all. The mean force was not remarkable in any way. Fog occurred on parts of 5 days—the aurora borealis on 2 nights only. Hoar frost twice. I may here state that near Windsor hoar frost was deposited as early as the 3rd. Four times was thunder heard, twice attended by visible lightning. Tomatos and blackberries ripened at Windsor on 3rd. Maria pear, green gage and Washington plum at Windsor on 10th; coming in 1867 on 9th 18th and 12th respectively. The bon cretien pear was ripe in Windsor on the 15th, instead of the 13th as last year. Damascenes were picked ripe on the same day, and the Gravenstein apple on the 24th—both at Windsor. At Gorsebrook the tomato ripened on the 10th: the Orleans plum on the 14th: and peaches on the 26th. All fully beyond their average season.

October. The large amount of clear sky in October, amply compensated for a cloudy September. The days marked by pre-

cipitation were not many—being 12 in all—but the total of rain and snow measured the considerable quantity of 5.89 inches, on account of several heavy falls of the former. 2.5 inches of frozen snow were deposited, giving when melted .26 inches or about the average proportion. This snow came in two falls on the night of 17th, and early morning of 22nd. The latter was quickly washed away by succeeding rain; but the former, which measured on the level 1.5 inches, and drifted in some places to 7 inches, will be readily remembered as a remarkable storm for such a date, and the first of the Autumn. In 1868 we were without any snow falling from 6th May to 17th October—164 days. In 1867 this period extended over but 156 days—from 28th April to 1st October. But one morning was foggy. The range of temperature was excessive; from $74^{\circ}.7$ to 19° . Both maximum and minimum beyond any previous one of my records for this month. On the whole October was cold. The mean $44^{\circ}.31$ was below the six years average, which is $45^{\circ}.98$; and was also below any one of the five years immediately preceding. Water was first frozen on night of 17th. This happened on the 4th last year. With the approaching winter N. W. wind again asserted itself, and prevailed. Currents from S. to W. were very common, however. The gale from N. N. E. to N. W. on night of 17—18, was the only one this October. Being generally a windy month, the mean force 2.3 cannot be considered great. On 5 nights the aurora borealis was visible. Thunder and lightning twice; and hoar frost on 5 mornings. Common meteors were observed falling on the 11th and 23rd, and a lunar halo on 24th. Capiaman pears were ripe in Windsor on the 3rd. The cycle, Marie Louise, and Flemish beauty all on the 5th. These were all somewhat late, and the first named pear particularly so; so that the fruit season of 1868 corresponded in tardiness with its time of bloom. Thus in 1865 the capiauman was ripe on September 16th; in 1866 on September 27th; in 1867 on 4th October, and this year on 3rd. And the other fruits bear much the same relations.

November. The cloud of this month in this latitude is generally abundant, but in 1868 did not reach the average, and was considerably short of 1867. The days of precipitation numbered 14, and the depth of rain and snow was excessive; being 6.45

inches, and the greatest of any month this year—.07 more than in May. By far the largest portion of this fell as rain. The snow, though not equal to last November's fall, was however found to contain .4 inch of water; dry, it measured 4 inches. This was an extremely cold month—the mean temperature, $34^{\circ}.77$, being $1^{\circ}.83$ below the cold November of 1867, and 3.87 colder than the average of six Novembers, the range was, however, wide, on account of the maximum marking up to $66^{\circ}.8$. The minimum, $15^{\circ}.5$, was rather low; but we have reached 13° in two former Novembers. N. W. wind prevailed as usual, though winds from almost every quarter are frequent in this month. The mean estimated force attained the high figure of 2.9. But one gale visited us, and that was a cyclone on the 27th; first striking us from the customary S. E. and swinging to N. W. in the afternoon. The other phenomena were two auroras, five hoar frosts, one lunar halo—rainbows on the 6th. There was neither thunder nor lightning. Four mornings were foggy and one afternoon. First skating on the 16th; and we had sleighing on one morning the 23rd: this occurred last year on the 20th evening, lasting 4 days.

December. December was finer in every respect than the last month. Without the brightness of December 1867, it was still not very cloudy for the time of year, and in other characteristics was much more pleasant than that month. The total precipitation was small, though scattered over 14 days. The greatest deficiency was in rain, there being but 1.39 inch; while snow was above the average, falling to a depth of 20.5 inches, and when melted making 2.19 inches. Thus the whole amount of water measured 3.58 inches. There was some fog on two mornings. The month was rather mild, but the difference between its mean temperature and that of six years is very slight—the one being $24^{\circ}.98$ —the other $24^{\circ}.84$. This moderate weather was also very steady; the maximum being $43^{\circ}.8$, and the minimum being 1.7—so that the thermometer never registered below 0. This has not occurred since 1863. Again was N. W. wind prevalent; far surpassing any other. The mean force, 2.1, has not been so small for several Decembers. Two gales were recorded, the one on the 7th and 8th cyclonic in its character and very strong in its earlier hours—the other a straight blowing N. W. gale, with gusts of varying strength. But once was

the aurora borealis visible, five times was hoar frost deposited, one lunar halo was seen. Also one rainbow. Sleighs were used in the city on 16 days. There was good skating at Dartmouth on the 7th. Last year this happened on the 5th.

REVIEW OF THE YEAR 1868.

Though I fear my audience may already have had a surfeit of statistics, it may be useful to consider very briefly 1868 as a whole.

The mean estimated clouding, then, amounts to what may be usually expected in Halifax—6.57. In 1867 the corresponding figure was 6.38. (It will not be forgotten that in my form of observations 10 signifies complete cloud). The year, beginning much as usual in this respect, fell steadily towards greater clearness for the first four months. A great and sudden increase was then noted in May; and the next month still exhibited a high number, though falling gradually till September, when again the amount increases to exactly the May limit. But October shows another rapid change, and marks the brightest period of the year. Then rising once more in the scale, through November we close the year with the month of greatest clouding. In 1867 the least and greatest amounts of cloud were obtained respectively in June and November.

In precipitation we arrive at the following totals and means. The whole number of wet days, i. e., of days on which precipitated moisture was measurable, was 187. Though this is much less than in the extremely wet year of 1867, it is still rather above the average. In the guages the total rain measured 41.8 inches, and melted snow 8.17 inches; together 49.97 inches. An amount somewhat larger than usual, though still less than in the preceding year. The depth of frozen snow in 1868 was 81.4, which gave the water equivalent above mentioned. It is believed by some meteorologists that all phenomena in their department of science proceed in periods of increase and decrease—undulations, as it were, rising and falling during series of years of approximate duration. Be this as it may, we appear in 1867 to have reached the culminating point of a period of moisture which had been on the increase for at least five years. In 1868 we began to descend. The year

commenced with tolerable dryness, which was particularly noted in March; but through April's snow the precipitation increased, and in May the rain fall was very great. The amount declined gradually in the next month, and in July was marked the minimum. Again rising steadily, month by month, we reached in November a maximum of precipitation (but a trifle above May, however), and then dropped suddenly below the average in December.

Now let us for a few moments consider the mean temperature of last year, before noticing the details of heat for that period. That mean was decidedly a low one; being $42^{\circ}.12$ —or $1^{\circ}.02$ less than the average mean heat of 6 consecutive years in Halifax. The difference of 1° degree of temperature in a year's mean may strike the casual observer as trifling, but it is by no means so in reality; and all will recognize it as an important variation, when they remember the external tendency to equalization in all the phenomena of every climate. A tendency absolutely necessary to enable the same districts to produce the same vegetation in more or less perfection, and abundance, each season. The importance of an apparently slight difference will be also better understood, when the large number of observations from which a year's mean is deduced is borne in mind. In temperature this number is 4.380. Though as has been stated, 1868 was a cold year, it was .14 warmer than 1867; which latter was a turning point in temperature, as well as in precipitation. The monthly mean temperatures in 1868 rose above or fell below their averages as follows. The comparative terms I am now using of course apply to the relations between these individual months and their predecessors. The year began very cold, growing still more so till March, which was rather warm, but April again was cold, though in May we rose a little above the average. In June it fell cool again, but July was decidedly the warmest month, and August and September, though not so warm, kept well above the average. A sudden fall took place in October, and continued during November, which was the coldest according to season of any except February. December was warmer and the year finished within a very small fraction of the average heat. Regarding other features of temperature. The maximum was high, viz: 89° on 4th and 25th August. In 1867

it was 88° —on 10th August. I have not recorded as yet a greater degree of heat than this in Halifax; but our late worthy member and esteemed friend Col. Myers marked 92° on 15th June 1864; though I recollect that that gentleman himself did not place much reliance in the complete accuracy of his self-registering thermometers. -11° was the minimum of the year, obtained on 4th February. In 1867, $-9^{\circ}.3$ was the minimum; and $-15^{\circ}.7$ is the greatest cold recorded in Halifax during 6 years. We had thus in 1868 a range of exactly 100° ; a wide one for this station.

Besides adding to my stock of instruments, a very satisfactory form of rain guage during the past year, (which I should more properly have alluded to under the head of precipitation), I have paid more attention to the direction and estimated force of winds, though still without an anemometer. The results of these observations I now present in brief. Dividing the compass into the eight chief points, I find the N. W. wind by far the most common, prevailing on 83 days out of the 366. Between S. W. S. S. E. and W., there was not much difference—their scores being respectively 61, 55, 52, and 51 days. N. followed not far behind with 42 days; leaving but 13 days for the N. E. wind, and only 9 for the last of all, the E. Looking at the collected months, N. W. was emphatically the winter wind, prevailing during January February and March, October, November and December. S. W. occupied the summer months of June, July and August. S. E. while the heat was increasing, and declining, in May and September. And W. was the principal direction of April. In force, it is to be noticed that 1868 opened with a high figure; increasing, with the exception of a small drop in March, till May, when it lessened sensibly, holding its own through June, and again falling in July, when the least mean was recorded. Then a steady rise took place, till in November the force was unsurpassed, though equalled by February and April. In December we fell back to the September mean, closing with a figure below the average of the year, as a whole, the mean force was 2.31. Continuing the inquiry of 1867 to this year, and separating the winds into those between N. W. and S. W. on the one side, and N. E. and S. E. on the other, and excluding N. and S., I find 195 of the former, or westwardly, and 74 of the latter, or eastwardly winds. So that the first exceeded

the second by 164 per cent. In 1867 the ratio was very near this, being 155 per cent., though the numbers of each were considerably greater. In January I recorded 2 gales, February 1, March 1, April 3, then none till October when 1 was noted. In November 1, and in December 2, making 11 in all. It would require a paper in itself to enter further into this branch of meteorology. For, as heat is the active agent and the atmosphere the passive agent, the direction and strength of air currents are the most important effects to be studied in this science. I only mention now that of these gales at least 8 were cyclones, of which 4 struck us first from S. E., 2 from S., 1 from N. W., and one from W. Of the 3 of which I have no other proof, than that they were straight-blowing winds, 1 was from N., 1 from E., and 1 from N. N. E.

An unusual number of fogs visited us. In January 0, February 0, 4 in March, 5 in April, and the extraordinary quantity of 14 in May. In June 9, July 8, August 10, September 5, October 1, November 5, and December 2, making 63 in all, against 42 in 1867, and an average of 54 for the past 6 years.

On 27 mornings hoar frost was deposited, viz., 3 in January, 2 in March, 3 in April, 2 in June, 2 in September, and 5 mornings in each of the last three months of the year. In 1867 this phenomenon was noticed 32 times; and is generally more frequent than in 1868.

Thunder was heard without visible lightning 5 times; and but once was the reflection of the flash seen with no audible report. In all, thunder and lightning were observed 13 times, included between 2nd June and 17th October.

Distinct lunar halos were noticed 6 times, more frequent towards the close of the year, and solar halos on 10th April, 3rd May and 11th June. Hail fell twice, and twice were rainbows recorded.

We had frosts on 179 nights in 1868, and on 183 in 1867. The greater number being entirely due to the colder March of the last mentioned year.

In my paper read before the members of this Institute in May last, when speaking of the aurora borealis, I alluded to the probability of wet weather following close on these displays according to season; showing, from 11 years of records, that this probability in winter was as 3 to 1. In spring and in autumn, that dry weather

was as likely to occur within the 24 hours as wet: and that in summer the probability was against wet weather as more than 2 to 1. In this place, I do not follow the rule for seasons, which we have adopted from England; and which for convenience sake is followed throughout the temperate zone of the northern hemisphere. But I divide the year more properly according to real characteristics of our Nova Scotian climate; calling spring the period from 15th April to 15th June, summer from 15th June to 15th September, autumn from 15th September to 15th November, and winter from the latter date to 15th April; though, of course, I keep to the old periods in my records, that they may fit harmoniously with the rest of the continent, and with Europe, when this station is connected, (as I hope it soon may be) with the outside world. Noticing that these relations of the aurora with precipitation were closely preserved in 1868, but that the wet weather would predominate over the dry considerably were the time extended to 36 hours; I now propose to shortly consider this phenomenon in connection with gales. I find that out of 95 exhibitions of the aurora borealis extending over every season, 61 were followed by no gale or very high wind—when on 34 occasions these were followed by winds of great strength, the first directions of these winds were very variable, viz., from N. 9, E. 1, S. 5, W. 1, N. E. 2, S. E. 5, S. W. 7, and N. W. 4, so that the theory that the aurora is invariably, or generally, followed by a southwardly storm has no foundation in fact. That these displays do indicate some great atmospheric disturbance is undoubted, as they are never seen when the weather is settled, and the temperature is equable; and it is after all in this great root of meteorology, viz., heat, that we must seek a solution of all atmospheric phenomena.

I think that the wonderful aurora of the 15th of last month (which by the way was not followed by either high wind or appreciable precipitation within 50 hours) gives evidence that this is not a purely magnetic phenomenon; as while the whole heavens were more or less illuminated, the brightest and highest coloured rays shot nearly at right angles to the poles. While from personal observation I cannot find the deductions contained in the following letter to be correct, I still feel bound to produce this evidence; which at least deserves respect on account of its age. (Read extract.)

I cannot close this paper without acknowledging the obligations under which I have been placed by several friends, and by some who were otherwise complete strangers to myself, in aiding the development of Nova Scotian meteorology, by valuable hint derived from their own experience in other countries, and by giving me access to useful instruments and books. Among the strangers to whom the Province is really thus indebted are our own corresponding members J. S. Hurdis, Esq., of Southampton, G. Murdoch, Esq., of St. John N. B., and Dr. Chas. Smallwood of Montreal. I have also to thank the proprietors of the *Express* newspaper who have for the past year most courteously thrown open their columns to my meteorological reports each month, actuated by their ever present desire to advance our native Nova Scotia. I have now only to hope that the efforts of this Institute to secure a meteorological observatory at this point may be crowned with success.

ART. X. THE WALRUS.* BY J. BERNARD GILPIN, A. B.,
M. D., M. R. C. S.

(Read May 10, 1869.)

Trichecus, rosmarus, (Gmel.)

I beg to lay before the Institute, a description of a Walrus, that was brought to Halifax in April of the present year. It was shot in March at the Straits of Belleisle, Labrador—dragged on the ice for five miles, and then taken by ship to St. John's, Newfoundland, and from thence fetched to Halifax.

Extreme length, 12 ft. 3 inches.

Length of head, muzzle to hind part, 1 ft. 5 inches.

Muzzle in breadth, 1 ft.

External tusk, length, 1 ft.

Tusks, inside mouth apart, 4 inches.

Outside mouth, apart at lips, 11 inches.

Eye from nose, 8 inches.

From eye to eye, 9½ inches.

* In the plate accompanying this paper I have drawn the Walrus to a scale of half inch to a foot, I have also shown the peculiar crescentic nostril with its inner fold and the fore flipper with its five scalloped edge and rudimentary nails far above this edge. To Mr. Roue I am indebted for the many opportunities of sketching the Walrus he gave me, and to Mr. Clark for the lithographic plate, the first connected with Nat. History ever issued I believe in the Province.