

ART. IX.—METEOROLOGY 1873, HALIFAX, N. S. BY FRED.
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HAVING already in another paper this season, laid before the Institute the progress of Weather Telegraphy and Storm Warnings in Canada, in this communication I merely rehearse the results of observations at Halifax in 1873, taking them up where dropped in December 1872. The succeeding January opened with a high and ascending Barometer, which was generally maintained. After the snow fall of the last night of the past year, the Temperature fell considerably, giving a clear and cold New Year, with excellent sleighing. The month was not, however, very cold; its mean Temperature being $23.^{\circ}59$ or $.56$ above the corrected mean of January for eleven years. N. W. wind, as usual, preponderated, with but little velocity. The total precipitation, 7.83 inches, was very large. Rain and snow both exceeding, but especially the latter. We had 3 auroras, 2 fogs, and miscellaneous phenomena not numerous. But once the wind reached a gale on the morning of 28th, accompanied with six inches of snow. Heavy sleet and snow were falling the previous evening. At night the wind backed from S. E. to N. N. W., and snow increased in the morning till 8h. 15m. when it ceased. Thunder and lightning at 4 a. At 6h. 30m. a wind blowing 33 miles per hour, and then fell. The following day grew very cold, and at 7h. 30m. a. of 30th Temperature was $14.^{\circ}4$ below zero—the minimum since 7th January, 1866.

February showed a marked decrease of pressure, and somewhat below its own normal. It was steadily cold $2.^{\circ}80$ below the mean of February, and being nearly 3° colder than the preceding January—an unusual occurrence—there being in a long series but very little difference between these two months, and January on the whole the coldest. Prevalent wind N. W. A noticeable decrease in rain and snow took place—only 0.49 of an inch of the former being measured, and 10.7 inches of the latter; so that the month was a fine one, though very cold. Two gales took place; neither very heavy. The 8th began with sleet, then heavy rain, and S. E. gale in morning. A shower in the forenoon. Fog at

noon—and clearing with wind veering W. in afternoon. On the 22nd we had snow in the morning. At 8 a. fine rain and sleet till 10.30 a.; and occasional sleet showers and snow squalls p. m. A gale blew from S. E. early, and from S. W. to W. afternoon and evening. On 23rd it still blew very hard from W. S. W. and W. all day. Other phenomena were about their averages.

March still kept rather low in pressure. Its temperature was higher than usual, and presented a marked difference from the abnormal deficiency of heat in March 1872; being as $30.^{\circ}09$ to $22.^{\circ}91$; nor did the Thermometer touch 0—which it does in this month in two years out of three. The whole precipitation 4.09 inches was a very little below the average, but the deficiency happened both in rain and snow. Velocity of wind was much increased, with a general N. W. direction. The aurora was observed seven times and fogs three. Three times the wind reached a gale. On the 4th when, after nearly six inches of snow the preceding night with strong N. E. wind, it backed and blew from N. N. W. At 6h. 30m. of morning of 5th, the minimum thermometer registered $3.^{\circ}8$. On the 21st we had snow and sleet in the morning, and S. E. gale till 11 a., then heavy rain nearly all day. Height of gale was at 9 a., when it blew 32 miles per hour. Wind veered gently S. E. to S. W. between 6 and 7 p., but blew in S. W. gusts during night. Barometer was lowest at 6 p. Last sleighing on following day, on 22nd. On the 30th another gale was experienced, but not so strong. The wind was hardest from S. S. E. at 2 a. = 22.5 miles per hour. It gradually fell till 4 a. when it was quite moderate. The rain was heavy that morning from 1 to 5 a. Fog closed in from 9 to 10 a., and then the wind rose again from S. to S. W., blowing strongly all day with rain and snow squalls occasionally p. m. Cleared morning of 31st with W. breeze.

The mean pressure of April was as close as possible to the normal of eleven years, being 29.724, or but one-thousandth part of an inch below. The temperature also, $38.^{\circ}07$, was most regular; and only .05 below its normal. The N. W. wind still was in excess, and the velocity 7.99 but very little less than that of March—the most windy month of the year. But 1.93 inches of rain, which, with a snow fall of 6.5 inches, gave a total melted of 2.86 inches,

being not 75 per cent. of the average precipitation. Six auroras, and only four fogs, and one gale were recorded. This storm began 12th, 10 p.m. and lasted till 2 p.m. of 13th, from N. E., S. E. and E., with rain showers. First Robins were seen 3rd. Dent de Leon cut 10th. Camberwell Beauty Butterfly at 10 a.m. of 12th. The N. W. Arm was completely frozen over on 18th. Full blown Mayflowers were plucked on 23rd. Swallows were seen 25th.

In May the pressure rose considerably above the normal; and the temperature was slightly above the average. N. W. winds prevailed; with comparatively small force from any quarter. There was again much deficiency in precipitation. Only 1.58 inches raise, or about half the average. While the extraordinary amount of 7.4 inches of snow fell this May—6.8 inches coming in one heavy fall on the 3rd;—but still making, when melted but 2.34 inches, together with the rain, and resulting as I have remarked in a large deficiency for the month. Ten auroras, six fogs, and six hoar frosts were marked. No gale occurred in May—the wind never exceeding eighteen miles per hour. Latest snow fell on the 15th.

The June pressure was near the expectation of that month, being 29.795. The temperature was generally very low, and the mean but 55.°37 against 59.°27, the normal deduced from eleven years. Once more the N. W. was the prevalent wind, with a mean velocity from all directions of 5.98 miles per hour. The fall of rain 2.96 inches nearly touched the average of this usually dry month. We had four auroras, six fogs, no hoar frosts; but on the 3rd., the unusual event of a gale in June was noted; not strong, certainly, but still it blew hard from 6 a. to 6 p., and at 7.30 a. 21.6 per hour was read. There had been dashes of rain and hail the previous afternoon; and the pear tree had come into full blossom, among which much havoc was made. Apples blossomed on 8th. Horse chesnuts 13th. Lilacs 16th.

Again in July the pressure of the atmosphere deviated but little from the eleven years mean; being slightly in excess. The mean temperature was a good instance of how nearly correct the deduction of a normal from a long series becomes. 63.°48 being that result, and 63.°43 the mean of this July. The maximum of 87.°5 occur-

red on the last day, but the 22nd was the warmest throughout. Much more rain—3.90 inches—fell than in this usually dry month; and sixteen days were wet instead of the average eleven. The chief direction of wind at last changed to S. W., with a mean velocity nearly corresponding to that of June. No gale as usual; but seven auroras and seven fogs were recorded, with three thunder storms besides reflected lightning. Acacias blossomed on 22nd. New potatoes not in market till 30th.

In August high barometers for the season were noted. The mean rising .109 above the average. It was rather a cool month, though the maximum only fell short of that of July by .1, and the minimum of this month was 2° higher than that of its predecessor. The wind continued to prevail from S. W., with nearly the same mean velocity as during the whole summer. The 4.45 inches of rain were slightly in excess; but these twenty days of complete dryness, thus reaching the average of August in this particular. Auroral displays began to decrease, but four were observed. Twice was thunder heard and lightning seen. Six fogs occurred. We had one gale, which was much more violent in Cape Breton and the East, but here was strong through night of 24 / 25. At thirty-five minutes past midnight it was blowing 34.1 p. hour, and at 1 a. the corrected barometer stood at only 28.867. On 24th there was heavy rain early with thunder and lightning. Rain again heavy from 11.30 a. to 9.45 p., and light showers all night and during day of 25th. A N. gale began 24th, 6 p., veering N. N. E., very strong at midnight and continued 25th till 9 a. when declined; but the wind was very high all that day, backing to N. W. in evening.

September pressure was rather great, and the month was somewhat cool for the season; temperature rising however to 85° on the 28th, and never falling below 38.°5. Still S. W. winds predominated, with a mean velocity of but 5.52 p. hour—the least of any month in the year. The rain was almost identical with that of August, and again rather more than the average. Four auroras, six fogs, two thunders, two lightnings, and one gale were recorded. This latter was not remarkable and lasted but two hours from S. S. E., on the morning of the 5th. There were heavy showers

early and again in afternoon with thunder and lightning, and fog and drizzle in evening. Wind veered through S.W. to W. during day.

The mean pressure of atmosphere in October rose farther above the normal, and was 29.965. The month was mild—more mild than May, to which its normal temperature closely approximates. On the morning of the 3rd, the first hoar frost of this autumn appeared, and on the 18th the temperature of air first fell to 32°. The prevalent wind returned to N. W., but with little velocity. Though quiet, the month was very wet; and the great rain fall of 8.63 inches was measured, being 3.20 inches above the mean fall, and 3.75 inches over the preceding October. Not a flake of snow fell this month. We had not one gale, which is unusual, though the same was remarked in 1872. Auroras, four. Fogs, four. Hoar frosts, six. And once lightning was seen, with the heavy rain of the 5th night.

In November the mean pressure declined greatly, falling to 29.718; which is, however, very nearly the average. Temperature also decreased to a remarkable extent, resulting in a very cold month. The mean was 33.°32, 4°08 below the average. N. W. winds, as usual, prevailed; but not with a great velocity generally. Rain continued to fall in large quantities with 5.8 inches of snow; giving a total precipitation nearly equal to last month, and almost 50 per cent above the normal fall of November. One aurora, and seven hoar frosts, but no fog was recorded. Four times the wind rose to a gale, viz: 8/9, when heavy rain fell nearly all the former day and in showers in evening. Snow and rain and a S. gale at midnight, which veered S. S. W. and was at its height at 1 a. of 9th, and then fell early. On 13th when it blew from S. W. to W. S. W. in the morning, after snow, followed by heavy rain the previous day, with wind from S. E. to S. W. On 18th gale began from E. N. E. at 3 a., and continued through E. to S. E. till noon of 19th. On first day rain fell from 2 a. to noon, and on second snow began at 4 p., quickly turning to rain, which continued till midnight, when wind was very light from S. W. The fourth gale blew from 10 p. of 24th till 5 a. of 25th from E. S. E. to S. S. E. Snow beginning on afternoon, turning to rain at night, and ceasing at 6 a.

During the closing month, December, the barometer was frequently high, once even reaching 30.647; and resulting much above the normal. The temperature was slightly deficient in heat for this season. The thermometer marked below 0 as early as midnight of 15th, and at 1 a. next day the minimum of the month was touched— $2^{\circ}.9$. The predominating wind remained N. W., and still the velocity was low. Rain was far below its average, and snow slightly in excess, the total precipitation not attaining the normal. We saw no aurora in December; four times fog, and ten times hoar frost were present. We had three gales. On the 4th, after a foggy noon and showery evening, a S. W. gale began at 8 p. The gale and rain ceased 5th 3 a., wind veered to W. S. W. On the 20th a snow storm began about 4 a. Rain and snow mixed fell during the forenoon, with E. S. E. gale from 9 to 11 a. On the 28th we had heavy rain and a S. gale in morning, and then wind veered through S. W. till the gale again sprang up from W. at 5 p. and blew till midnight.

The mean of the whole year 1873, was somewhat in excess in pressure of the atmosphere. The normal temperature of air in Halifax is $42^{\circ}.92$, derived from eleven years' observations. Last year gave $42^{\circ}.24$; being therefore rather a cool year. The mean pressure of vapour was .272, and relative humidity 79.0. The mean amount of cloud was 5.78, or .20 below the normal. N.W. winds greatly outnumbered any other, being the prevalent direction in nine months, (S.W. excelled in July, August and September) and observed 461 times out of 2920 observations. The mean yearly total of precipitation at this station, deduced from the same eleven years above alluded to, viz: 1863 to 1873 both included, is found to be 52.05 inches. Of this 43.28 inches fall as rain, and 8.77 are obtained from melting the snow, which normally falls dry to the depth of 80.1 inches. 1873 was a wet year in every respect, but not excessively so. 45.27 inches of rain fell on 130 days; and 91.4 inches snow on 51 days. 199 days were quite dry, or afforded no appreciable precipitation—205 being the mean number. Miscellaneous phenomena were observed as follows:—

Auroras	55	Gales	17
Fogs	50	Dews	81

Hoar Frosts	67	Thunders	10
Lightnings	13	Hails	2
Rainbows	5	Lunar Halos	14
Lunar Coronæ	28	Solar Halos	9
Days Sleighing	89		

The maximum temperature I know to be recorded here was $93^{\circ}.1$ on 9th August, 1872; and the minimum $-15^{\circ}.8$ on 27th January of this year. In 1873 the highest was $87^{\circ}.5$ on 31st July, and the lowest $-14^{\circ}.4$ on 30th January; giving an extreme range of $101^{\circ}.9$. The warmest day was the 3rd of August—mean $69^{\circ}.54$. The coldest the 30th of January—mean $-2^{\circ}.18$.

ART. X.—OBSERVATIONS ON SOME FOSSIL BONES FOUND IN
NEW BRUNSWICK, DOMINION OF CANADA. BY J. BERNARD
GILPIN, B. A., M. D., M. R. C. S.

THESE bones were taken from one of the cuttings of the Inter-colonial Railway on the Jacquet River, Bay de Chaleurs, New Brunswick. After cutting through sand and gravel for about twelve feet, a bed of clay was reached. In this the bones were bedded. Abundance of the following fossil shells were found with them :

- Balanus hameri*. Ascanius.
- Fusus tornatus*. Gould.
- Buccinum undatum*. Linn.
- Natica groenlandica*. Perry.
- Leda truncata*. Gould.
- Mya arenaria*. Linn.
- Mya truncata*. Linn.
- Tellina groenlandica*. Beck.
- Tellina proxima*. Brown.
- Saxicava rugosa*. Linn.

The cutting is forty feet above the level of the sea, and one-fourth of a mile from it, and on the north side of the river. The