

sity for a multiplicity of forces when one is sufficient for the purpose. We enter a machine shop, and amid the buzz of wheels and bands we see an engine in a corner running not only the small wheels, but turning the large fly-wheel as well; or we look on our harbour and see the same power moving not only the pleasure steam-yacht but the ponderous iron-clad as well. If then such is the manner in which man accomplishes his objects, if it is his endeavor in every force he controls to make it work not only small things but great, how much more should it be nature's mode to work in a similar way, for all man's highest efforts are but to imitate or to copy her, and it is not possible that the original should be less perfect than the copy.

Spontaneous Generation, therefore, or the cause of it, is only one quoin stone in the arch which girdles the universe, without which nature herself would be incomplete, and in a state of chaos.

ART. IV. — HALIFAX METEOROLOGY 1874. BY FREDERICK ALLISON, M. A., *Chief Meteorological Agent.*

(Read May 10, 1875.)

I HAVE confined myself this evening to brief remarks upon my meteorological observations at this station the past year; as, although statistics are now rapidly accumulating, it is well to defer extended deductions from comparisons of observed facts until a still larger mass of figures and notes be obtained, so as to ensure more accuracy in normals and limits, to work from in the future time.

Summarizing 1874 then, we find a cool moist year, varying in these principal characteristics very slightly from its two immediate predecessors. The actual tabulated results were as follows:—Mean temperature $42^{\circ}25$ — or .61 below the mean temperature of 12 consecutive years from 1863 inclusive. The maximum was 86° , $93^{\circ}1$, being the highest I have ever recorded here—that was in August 1872. The minimum was $15^{\circ}8$ —the lowest degree I

know of in Halifax; though approached within .8 on the evening of the 7th of January, 1866. These extremes gave a range of $101^{\circ}8$ —somewhat more extensive than usual. The mean daily range of temperature was $19^{\circ}26$, but on one day in January it ranged $40^{\circ}7$.

The mean pressure of the year, abnormally increased in some months by their want of heat, and lightened in others by excess of wet, came out only .065 over the 12 years normal. The barometer varied between 30.604 in January (a most extraordinary height in Nova Scotia), and 28.830 during a snow storm in February; giving a total range of 1.774.

The mean pressure of vapour was .252, and relative humidity 80.2. Mean amount of cloud 6.02, which shews a comparative deficiency in clear sky, readily accounted for if we examine below the small proportion of absolutely dry days.

45.24 inches of rain fell. This depth is above the normal of this climate by 1.8 inches; and it fell on 140 days, instead of only 124, the mean number classed as rainy. Though mentioned in former papers, I may repeat, chiefly for the information of members joined within the last few years, that I call a "rainy day" one on which appreciable rain falls during any part of the 24 hours, and as we measure to .01 of an inch, many days may appear "fine" to the public, which the meteorological record marks as "rainy." Time will not permit to give all the reasons for my introduction of this method into Nova Scotia, but I may say I follow the classification of the British Office, G. J. Symonds, and the most experienced rain observers. 89 inches of snow fell, 8.2 inches more than the 12 years normal; though less than in 1871, 1872 and 1873, all of which were exceptionally snowy years. And this snow fell on 60 days, a number 25 per cent. greater than the normal. Melting this snow, (and I may mention in passing, what is known to most of my hearers, that new fallen snow in this country gives an average equivalent in water of one-tenth), and adding its product to the rain, we have a total precipitation of 54.18 inches, being 1.95 inches greater than the normal depth. Our "dry days", (days be it remembered without even .01 of precipitation), numbered 188.

204 days is the average of a year since 1863. I have purposely avoided, for the present, comparisons with any other stations at home or abroad. This is not the object of this paper. But I may be allowed to remark that our 204 Halifax dry days exceed considerably the yearly Kew number.

Closing the year with the record of occasional and miscellaneous phenomena, I noted in 1874—

28 Auroras,	8 Lightnings,
18 Gales,	1 Hail,
48 Fogs,	3 Rainbows,
47 Dews,	8 Lunar Halos,
63 Hoar Frosts,	11 Lunar Coronæ,
7 Thunders,	8 Solar Halos.

On 64 days we had fair sleighing.

That we may have clearer insight into the details of the weather of the year under discussion, I now take up the months in order:—

January was mild, although shewing on the 27th, the extraordinary minimum above mentioned 15° 8 below zero. Its mean pressure reached 29.977 (.210 above the month's normal). It was a cloudy month: mean obscuration of sky reaching 6.97. Light S. W. winds prevailed with a mean velocity of 6.09 miles per hour. Rain was in excess—3.80 inches falling, and the depth of snow 15.7 inches, slightly deficient. We look for 17 dry days in January. We had but 12. There were 4 gales, none heavy. Frequent breaks occurred in the sleighing; leaving only 16 days for runners.

February was cold—nearly as much below the mean as January was above it. The barometer still stood high: mean 29.841. This month was much brighter than last, wind prevailing from N. W., but mean velocity yet only 6.66 miles. 2.28 inches of rain fell, or about 75 per cent. of the month's normal. Snow doubled itself, however, 29.9 inches coming down. This reduced the dry days to 15 instead of 16. 3 gales were recorded, and there was sleighing on every day.

March became again milder, rising to a mean of 30.78, or 2.10 above the 12 years normal of the month. As the winter declined

the pressure decreased, coming down now to a mean of 29.658. The mean amount of cloud was 5.35. N. W. winds still prevailing, but very moderate, only averaging 5.99 miles. We had rather more rain than the normal fall—3.63 inches; but the very slight depth of 3.7 inches of snow. (17.3 is the March average and in March, 1875, we had 14 inches.) There was but one gale, and that not strong; and sleighing on the first three days only.

April made small progress towards spring. Its mean temperature was $33^{\circ}39$ —only surpassing that of March by $2^{\circ}61$, and falling short of its 12 years normal by $4^{\circ}34$. On the 1st the thermometer was down to $7^{\circ}2$. The mean barometer rose to 29.792. Mean amount of cloud was 6.08. The prevailing wind fell back to S. W., with a mean velocity still light—6.37 miles per hour. Only 1.90 inches of rain fell, or about 66 per cent. of the normal; but the extraordinary quantity of 26.5 inches of snow was measured, being 17.3 inches above the fall we expect in April. There were 4 gales, and 10 days sleighing, the latest on the 14th of the month.

May, with a mean temperature of $49^{\circ}19$, ($1^{\circ}60$ above the normal) offered a great contrast to the preceding month. The mean pressure was 29.785. The clouding but 6.0. Wind remaining S. W. fell to a mean of 5.38 per hour. The rain fall was abundant, measuring 4.76 inches, though not on many days. 0.1 of an inch of snow fell on the 2nd. We average about three quarters of an inch of snow early in May. The wind blew a gale on the 26th.

In June we retrograded sadly in mean temperature. It was scarcely warmer than May; $53^{\circ}66$ in place of a normal of $58^{\circ}80$. With considerable vacillation the barometer resulted in 29.767. It was the most cloudy month of the year; and the prevalent wind was S. E., though remaining with the small mean of 5.37 miles. The normal June rain fall is 3.44 inches. Last June 7.92 inches fell, making 20 wet days. Twice we had thunder and lightning.

July was more moderate in every respect. $62^{\circ}45$ was the mean temperature—close to its normal. The barometer was high, mean 29.895. The maximum heat of the year, $86^{\circ}0$, was reached

on the 10th; while the 15th, mean $69^{\circ}23$, proved the hottest day. Mean cloud decreased to 5.66, and the wind to 3.85 miles per hour, returning to a S. W. prevalent direction. 2.29 inches was the rain depth, almost the same as the average for July; falling on an ordinary number of days, 12.

August again became colder, both absolutely and as compared with former Augusts. Mean temperature $61^{\circ}33$. Mean pressure of atmosphere, 29.854. This month was not so pleasant as July. We had more cloud, mean 6.47; winds were light, giving a mean of but 4.25 miles; and S. was the prevalent direction. The rain fall was still not large, being .29 below the normal, or 3.37 inches. 19 dry days were recorded.

September scarcely varied at all from its mean temperature since 1863. This month gave $57^{\circ}42$, while $57^{\circ}38$ is my calculation for the 12 Septembers. The temperature never fell below 40° , and that not till the 24th. Pressure was rather great; mean 29.936. The brightness sensibly increased: mean cloud being only 5.51. The returning N. W. wind gave evidence of the decay of summer. The mean velocity of 4.97 miles per hour was very small. A large quantity of rain fell on 12 days: 5.04 inches, or 1.17 inches above the normal. The first autumnal gale was felt on the 30th; very heavy.

October, as last month, resulted in temperature nearly the normal. $48^{\circ}74$ was the mean; and the pressure also continued steady—29.862. The month was very clear; only 4.88 being the mean clouding. We had a quiet month, the wind only giving a mean of 4.48 miles, and the prevalent direction fell back to S. W. The rain fall was very small, not half the normal which is 5.20 inches, while this October measured but 2.46 inches. This rain was scattered over 13 days. No snow fell, generally we have about half an inch in this month. A moderate gale blew from the S. W. on the 30th—morning. The first hoar frost formed on the 7th, and the atmosphere first fell below 32° on the 23rd.

November, though slightly colder than the average (which is $37^{\circ}35$, while this November's mean temperature was $36^{\circ}77$) was a pleasant month. The mean pressure was very great: 29.900.

The mean amount of cloud showed a deficiency of .67, being 5.85. Wind force was increasing, giving a mean velocity 8.40 miles, though still 1.63 behind its normal; and prevalent direction was from due W. Rain fell only to the depth of 3.37 inches; whereas the 12 years shew an average of 4.80 inches. 2.1 inches of snow, dispersed over 4 days, fell; being exactly one-half of the normal fall. 18 days were completely dry. 2 gales visited us, but neither were violent.

In temperature, December presented nothing extraordinary: its mean $26^{\circ}21$ was a very small fraction over the normal. For the first time that winter the thermometer marked down to 0 on the 30th, and registered -4° on the morning of the 31st. The mean pressure, though much diminished from last month, kept up to 29.791. The mean amount of cloud was nearly as is common, 6.60. Winds still prevailed from W. and increased much; at last passing the normal speed, and resulting in a mean of 10.92 miles per hour. The rain depth, 4.42 inches, was just 1 inch above the 12 years average; but the 11 inches of snow fell short by over one-third, or 5.7 inches. The total precipitation, 5.49 inches, slightly exceeded the normal fall. But one gale was felt in Halifax, but it was long and fierce. It began from N. E. on the evening of the 14th. At 1 a. m. of 15th it blew from N. 45.6 miles per hour. Veered N. W. that day, and above 24 miles all day. On 16th, still from N. W., it blew over 30 miles till noon, when it gradually fell. The first sleighing was on the 18th, and we had 7 days of it in all December.

ART. V.—NOVA SCOTIAN GEOLOGY — ANTIGONISHE COUNTY.
BY THE REV. DR. HONEYMAN, D. C. L., F. G. S., &c.
Director of the Provincial Museum, Halifax, N. S.

(Read May 10, 1875.)

INTRODUCTION.

IN the session of 1865-6 I read a paper on the subject of my present memoir, which was illustrated by a map. (*Transactions.*)