

*Dependence of temperature on the direction of the wind.*

The following table shows the average difference between the temperatures that accompany each wind and the normal temperatures proper to the times of observation :—

Direction.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.
Deviation from Normal...	-2.9	-0.7	+1.3	+1.6	+2.2	+3.3	-1.0	-2.9

The change in the temperature that takes place in 24 hours depends on the resultant direction of the wind during the interval. Thus if the resultant wind be S. E., the temperature is raised 5°·5, while with a N. W. resultant it is depressed 4°·5. With other resultant directions of the wind the elevations (+) and depressions (-) are as follows :—

Resultant Direction.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.
Increase or decrease of temperature.....	-2.6	+2.0	+3.7	+5.5	+3.9	+2.5	-3.0	-4.5

**PRESSURES OF VAPOUR AND OF DRY AIR, AND TOTAL BAROMETRIC PRESSURE.**

The pressure of vapour in its annual march increases and diminishes with the temperature while the pressure of dry air follows an opposite course. Now since the numerical values of the variations of these two elements differ but little each from each, the annual variations of the barometer, which are the same as their algebraic sums, are very feebly marked. The same feebleness characterises the regular annual variations of the barometer in the middle latitudes of Europe and America; but in central Asia, where the variations in the pressure of air are large, and where, as the air is very dry, the variations of the vapour are insufficient to outweigh or balance those of the air, the barometric movements are very strongly developed.

**RAIN AND SNOW.**

It is seen by table V. that the mean annual rain-fall at Toronto is 29·47 inches nearly on the average of 29 years, and the fall of snow 65·3 inches.

*Secular change in the amount of rain and snow.*

The important question whether there be a progressive change from year to year in the amount of rain and snow, will be answered by referring to the following table, in which the annual rain-falls are grouped in averages of five years.

	YEARS.					
	1840(e) 45	1846 50	1851 55	1856 60	1861 65	1866 68
Depth of rain, in inches.....	36·6	29·4	28·2	27·9	27·0	26·6
Depth of Snow, in inches.....	65	54	67	59	72	80
Total Precipitation.....	43·1	34·8	34·9	33·8	34·2	34·6

(e) This group includes for rain four entire years, and parts of two broken years; the snow is the average for 1843, 1844, and 1845.

The table shows a very decided and uninterrupted diminution in the fall of rain, and on the whole a considerable increase in the snow; the joint effect being that there is no very decided progression in the total precipitation, excepting in the interval between the two earliest groups, of which the first is imperfect.

The question whether the rain-fall is decreasing in the country generally, is not to be decided by the evidence of our station. During rain there is often great inequality in the amount falling at places a few miles apart; and hence a knowledge of the average fall in different districts can only be acquired by measuring the monthly rain-fall at a very large number of points. The instrumental appliances are simple and inexpensive, and the attention required very trifling, and it is much to be desired that private persons would interest themselves in procuring data for elucidating this important subject.

If the rain-fall in each year at numerous points were collected into district averages, a comparison in the amount from year to year would settle the question of secular change, and if the tables of rain were accompanied by a statement of the per-centage of land cleared, the connection which subsists between the decrease in the rain and the removal of forests would be made apparent.

Again, if in every district the monthly differences of rain-fall in single years above or below the average of many years, could be tabulated in connection, with numbers expressing the yield per acre for different crops, or with some suitable measure of the prevalence and fatality of different diseases, or with the relative heights of the water in lakes and rivers, &c., &c.—important information ought be elicited with regard to agriculture, medical science and engineering.

*Relation between the depth of rain and the direction of the wind.*

The relation commonly given is expressed by the number of times that each wind blows during rain, the times recorded being limited to those when the other elements are observed, and the total number of observations being expressed by 100. In the following tables the total number of hours are taken into account during which the several winds blow in the course of rainy days.

The relative duration of the various winds is not the same for light as for heavy rain,