$$
\begin{aligned}
& Q C 985.5 \\
& 0664
\end{aligned}
$$

## TORONTO

General Meteorological Register

HOR THE YKAR 1896.


# REMARKS ON THE METEOROLOGICAL RESULTS AT TORONTO FOR THE YEAR 1896. 

## TEMPERATURE.

The mean temperature of the year 1896 was $45^{\circ} 36$, being $I^{\prime} 16$ warmer than the average of 56 years and $\mathrm{r} \circ 88$ warmer than 1895 .

The mean temperature of the several months was in eight instances above and in four below the average for their respective months, the average excess to the average defect being in the ratio of $2^{\circ}$ to $2^{\circ} \cdot 77$. On each of the 203 days the mean temperature was above the normal of that particular day and below on 163 days. The mean temperature of each month, with the difference from the normal, was: January, $22^{\circ} 18-0^{\circ} \cdot 24$; February, $22^{\circ} \cdot 62+0^{\circ} \cdot 13$; March, $23^{\circ} \cdot 57-5^{\circ} \cdot 18$; April, $45^{\circ} \cdot 77+4^{\circ} 80$; May, $59^{\circ} \cdot 79+$ $7^{\circ} 65$; June, $64^{\circ} 75+2^{\circ} 36$; july, $687_{2}+1^{\circ} \cdot 10 ;$ August, $67^{\circ} \cdot 49+1^{\circ} \cdot 28$; September, $57^{\circ} 41-\mathbf{I}^{\circ} \cdot 22$; October, $44^{\circ} \cdot 77-1^{\circ} 60$; November, $39^{\circ} 45+3^{\circ} \cdot 35$; December, $27^{\circ} 84+1^{\circ} .50$. Dividing the year into the ordinary seasons we have for Winter, $22^{\circ} 79$; Spring, $56^{\circ} 77$; Summer, $64^{\circ} 54$; Autumn, $37^{\circ} 35$. The thermic anomalies differ from the normal temperature proper to the latitude : Winter, $-13^{\circ} .8$; Spring, $-0^{\circ} 86$; Summer, $-1^{\circ} 69$; Autumn, $-6^{\circ} .98$. On three months during the year the observed :emperature exceeded the normal value for the latitude, viz.: May, $1^{\circ} 69$; June, $0^{\circ} 15$; July, $0^{\circ}$ or. The mean daily range for the year was $17^{\circ} 58$, the greatest monthly average occurring in August ( $22^{\circ} 56$ ) and the least in December ( $12^{\circ} .45$ ). The greatest daily range $\left(3^{\circ}{ }^{\circ} 9\right)$ occurred on the 8th May, and the least ( $2^{\circ} 8$ ) on the 29th December. The warmest month relatively was May, estimated by its excess $\left(7^{\circ} \cdot 65\right)$ above the normal, July, the warmest absolutely. The coldest absolutely was January ( $22^{\circ} 18$ ). March was the coldest relatively, its mean being $5^{\circ} 18$ below the normal.

The climatic difference was $46^{\circ} 54$, the warmest day was the 12 th of July, mean temperature, $78^{\circ} 32$, and the coldest the 16th of February, $5^{\circ} \cdot 55$ below zero; but the warmest day relatively was the 1oth of May, it being $27^{\circ} .80$ above its proper normal, and the coldest the 16 th of February, which was $29^{\circ} .13$ below the normal. The average temperature of the warmest and coldest days from former years was $77^{\circ} 95$ and $2^{\circ} 24$ below zero. The highest temperature of the year $\left(91^{\circ} 3\right)$ occurred on the 12 th of July, and the lowest ( $17^{\circ} 9$ below zero) on the 17 th of February. The annual range from these extremes was $109^{\circ} \cdot 2$, being $5^{\circ} \cdot 2$ less than 1895 and $6^{\circ} 2$ more than the average annual range. There were 39 instances on which the temperature at the hour of observation was $20^{\circ}$ above the normal and 29 when a defect of equal amount occurred. The most striking deviations from the daily normal curve of temperature have been as follows :-

## IN EXCESS.



## IN DEFECT.



## BAROMETRIC PRESSURE.

The mean height of the Barometer was 29.6382 inches, being o.o185 inches more than the average. The month which showed the greatest deviation from the normal was February, $0 \cdot 185$ in excess; May and August showing the least $0^{\circ} \circ 06$, also in excess. Average deviation without reference to sign was small, being only o*o56. The highest reading was $30^{\circ}+22$ inches at 4 p.m. of December 27 th, and the lowest $28 \cdot 734$ at $4 \mathrm{p} . \mathrm{m}$. of February 6th, giving a range of pressure of $1 \cdot 688$ inches.

The number of days of large abnormal variation in which the average pressure differed by two-tenths and upwards from the normal was 121, the greatest number (18) occurring in February, and least (3) in July and August.

## HUMIDITY.

The mean humidity of the year was 75 , being 2 per cent below the average, the greatest monthly humidity was 84 , in January, and the least, 66, in May. There were 17 cases of complete saturation at the hour of observation; 5 in January, 3 in February, I in May, 1 in July, 2 in October, 4 in November, and I in December. The least humidity of the year at the hour of observation was 20 on the i4th of August, at 4 p.m..

## CLOUDS.

The extent of the sky clouded was on the average of the year six-tenths of the whole. June was the clearest month and January the most cloudy. During the year there were 55 days completely clouded, being iI less than the average ( $1805-\% 9$ ), the greatest number (21) occurring in January, none being registered in the months of April, May, July and August.

## WIND.

The resultant direction of the wind was $\mathrm{N} .88^{\circ} \mathrm{W}$., showing 14 more northing than 1895 , and $11^{\circ}$ more southing than the ten years to 1890 . The mean velocity of the win 1 without reference to direction was 8.44 miles. The most windy month was March, with an average of 10 'oo miles per hour, and the least windy was August, with an average of 6.69 miles. The windiest day was February Igth, average velocity $38 \cdot 53$ miles per hour, and the day of least velocity September 18 th, average velocity $1^{\circ} 92$ per hour. The highest velocity in one hour was $50^{\circ} \mathrm{o}$ miles, 4 to $5 \mathrm{p} . \mathrm{m}$. of the 19 th of September.

## RAIN AND SNOW.

The total depth of rain that fell during the year was $21 \cdot 77$ o inches, being 5.552 inches less than the average, and 0776 I less than the rainfall of 1895. The depth of snow, $73^{\circ} 3$ inches, was 5 inches more than the average, and $18^{\circ} 5$ inches more than the snowfall of 1895 . September was the most rainy month as to quantity ( $5 \circ 08$ ), and also with reference to the number of rainy days. December was the least rainy month, only o 345 inches having fallen.

The day of greatest rainfall was the 23 rd of January, when $18+5$ inches fell. There was only one other day during the year on which over one inch

The heaviest fall of snow in one day was 74 inches on the 19th of March. Rain fell on 104 days, being io less than the average number, and 3 more than 1895. Snow fell on 43 days, being 23 less than the average and 5 less than 1895 . There were 174 days on which neither rain nor snow fell; 335 hours in its fall, giving a total rain occupied 426 hours, and the snow, rain or snow was actually falling. 756 hours, or 3 I days and 12 hours when

## THUNDER-STORMS.

Of the 25 thunder-storms occurring during the year, the first was on the 2cth of March, and the latest on September 27th, I in March, I in April, 8 in May, 6 in June, 4 in July, 4 in August, I in September. The most severe 27th of September.

## AURORA.

Auroral displays were more numerous than in the previous year. Of third class and, none were of the first class, 2 of the second class, I of the for observation. The most brill class. There were 172 nights favourable 17th of May and 6th of August.

## SUNSHINE.

The total duration of bright sunshine during the year was $2146^{\circ} 7$ hours number of hours the sun was above the horizon, $4474 \%$; ratio of registered
to possib e, $\mathrm{o}^{\prime} \ddagger 8$.

GENERAL METEOROLOGICAL
MAGNETICAL OBSERVATORY,
Latitude $43^{\circ} 394 \mathrm{~N}$. Longitude, $5 \mathrm{~h} .17 \mathrm{~m} .34^{*} 65$. Elevation


REGISTER FOR THE YEAR 1896,
TORONTO, ONTARIO.
above Lake Ontario, 108 feet. Elevation above the Sea, 350 feet.


TEMPERATURE.

|  | 1896. | Average of 56 years | Extr | Emas. |
| :---: | :---: | :---: | :---: | :---: |
|  | $\begin{gathered} \circ \\ 45 \cdot 36 \\ \text { July } \\ 68 \cdot 72 \\ \text { January } \\ 22 \cdot 18 \end{gathered}$ | $\stackrel{\circ}{44 \cdot 20}$ | 4700 | - |
|  |  | $44.20$ | 47.09 in 1878 | 40.77 in 1873 |
|  |  | July | July, 1868 | Aug, 1860 |
|  |  | January | Feb., 1875 | Feb., 1848 |
| Difference between the temperature of the ${ }_{\text {warmest }}$ | 22.18 46.54 | 22.42 $45 \cdot 20$ | $10 \cdot 16$ | 20, 00 |
| Average of deviations of monthly means from their respective averages of 56 of deviations being disregarded..... | 2.53 | 45 276 | 3.58 | $\ldots$ |
| $\left.\begin{array}{l}\text { Month of greatest deviation without regard } \\ \text { to sign............................ . }\end{array}\right\}$ | May | January | Feb., 1875 |  |
| Corresponding magnitude of deviation........... | $7 \cdot 65$ | 412 | Neb.,187 12.33 |  |
| Average temperature of the warmest day ...... | $12 \mathrm{Ju} \cdot 32$ | $77 \%$ | July 14, '68 | July 3i, ' 44 |
| Coldest day.......... . . . . . . . . . . . . . . . . . . . . | 16 Feb. | 7795 | Feb, 6, 1855 |  |
| Average temperature of the coldest day ........ Date of the highest temperature............. | 12 July | $-2 \cdot 2$ | Jan. 22,159 | $\} \text { Dec.22,'42 }$ |
| Highest temperature............. . . . . . . . . . . . . |  | 90.87 | Aug. 24, '54 | Aug. 19, '40 |
| Lowest temperature. | 17 Feb . | 12 |  |  |
| Range of the year... | -179 109 | $-12.12$ | $\begin{array}{r} 10, \\ -265 \\ 118 \cdot 2 \end{array}$ | $\begin{gathered} { }^{2} \cdot \\ 1 \cdot 9 \\ 87.0 \end{gathered}$ |

BAROMETER.

|  | 1896. | Average of 55 years. | Extr | EMRS. |
| :---: | :---: | :---: | :---: | :---: |
| Average pressure of the year................... |  | 29'6196 |  | $29 \cdot 5602$ |
| Month of the highest average pressure.... . ... | 29.6382 |  | $\left\{\begin{array}{r}\text { in } 1849\end{array}\right.$ | ( 295602 |
| Highest monthly average pressure............... |  | Sept. | Jan., 1849 | June, 1864 |
| Month of the lowest average pressure .......... | Feb. | Junc | March, 1859 | 29.6525 Nov., 1859 |
| Date of the highest pressure in the year.......... | 29-4642 | 29.5714 | 294143 | - 29 ' 5886 |
| Highest pressure.............. | 27 $30 \cdot 422$ |  | Jan. 8, 1866 | Mar. 7,1878 |
| Date of the lowest pressure in the year.......... | 6 Feb . | $30 \cdot 357$ | 3 n 940 Jan. 2.1877 | $30 \cdot 139$ June 21894 |
| Range for the year. | 28.734 | $28 \cdot 699$ | (28166 | June 2,1894 29.035 |
|  | 1.688 | 1.6 .8 | $\left\{\begin{array}{c}2 \\ \text { 2 } 240 \\ \text { in } 1893\end{array}\right.$ | $\begin{aligned} & 1303 \\ & \text { in } 1845 \end{aligned}$ |

RELATIVE HUMIDITY.

|  | 1896. | Average <br> of <br> 55 years. |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |

Total
Numb
Month
Month
Greate Month fre Greate an

EXTENT OF SKY CLOUDED

|  | 1896. | $\begin{aligned} & \text { Average } \\ & \text { of } \\ & 43 \text { years. } \end{aligned}$ | Extr | Rrmes |
| :---: | :---: | :---: | :---: | :---: |
| Average cloudiness of the year.... .... .......Most cloudy month ....................Greatest monthly average of cloudiness .......Least cloudy month................... | 0.57January.0.80June.042 | $0 \cdot 61$ <br> Dec. <br> 076 <br> July, <br> 049 |  |  |
|  |  |  | 066 in'69'77 |  |
|  |  |  | ( | ${ }^{0.57}$ in 1856 |
|  |  |  | 0.89 | 0\%73 |
|  |  |  | $0 \%$ |  |

WIND.

| - | 1896. | Average of 17 years. | Ext | RRMES. |
| :---: | :---: | :---: | :---: | :---: |
| Resultant direction. | N. $8_{0}{ }^{\circ} \mathrm{W} \mathrm{W}$. | N. $61{ }^{\circ} \mathrm{W}$. | . $\cdots \cdots$ | ...... |
| Resultant velocity in miles........................... |  |  |  |  |
| Average velocity without regard to direction... |  |  |  |  |
| Greatest monthly average velocity.... | March. | March |  |  |
| Month of least average relocity.... | 100 | 11.49 | 10.54 in ' 80 | $8 \cdot 32$ in 78 Dee. 1875 |
| Least monthly average velocity... | August. | July 7.56 | 1388 | Dee. 1875 |
| Greatest daily average velocity .................... | Feb. 19 | 750 | July ${ }^{7} 78$ | July, 1881 |
| Day of least average velocity..................... | 38.53 Sept. $18{ }^{\circ}$ | 28.98 | Nov. ${ }^{17}{ }^{\prime} 70$ | Feb, 10, '85 |
| Hour of greatest absolute velocity.......... | Sept. 19 |  |  |  |
| Greatest velocity...... ......................... | 4 to 5 p.m. 50 50.0 | $\}_{45.67}\{$ | April 20 th , 8 to $9 \mathrm{a} . \mathrm{m}$. 600 | Jan. 17, ’85 10 to 11 a.m. |

Notk.-During the yaar 1896, the wind has been obtained from the records of the anemograph at the observatory at a lesser elovation than formerfy, and no records of the
been made with the result of former years. The extremes . The extremes are from the Island anemograph

RAIN.


SNOW.

|  |  |
| :--- | :---: | :---: | :---: | :---: |

SUNSHINE.


DIFFERENCES OF CERTAIN METEOROLOGICAL ELEMENTS FOR 1895 FROM THE NORMAL VALUES FOR EACH QUARTER AND YEAR.

|  | Bar. | Tem. | Rain. | Days Rain. | Snow. | Days Snow. | $\begin{aligned} & \text { Cloud- } \\ & \text { ed } \\ & \text { Sky. } \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

## PERIODICAL OR OCCASIONAL EVENTS, 1896.

January .....16. Large flock of Wild Geese flying S.W. Snow Buntings about.
Flocks of Grosbeak
Lowest water in Ray 20in. below $0 ; 23 \mathrm{rll}, 24$ th, great ice and rain storm. 29. Flocks of Grosbeaks again numerous

February.....27. Robins about.
March........11. Song Sprrrows. 17th, Spring birds numerous. 29th, Bronze Grackle, Moths numerous. First Thunder of year.
30. Robins numerous. Gray Birds, Wild Geese, Brown Butterfly,

April......... 3. Juncos. 11th, Plover. 12th, Meadow Lark, Frogs piping, Blue Bird.
6. Large flocks of Ducks in Bay. 7th, Last measurable snow. 8th, Schooner arrived.
13, Phobe bird, Golden Woodpeckers, Hawk, May beetle, Crocus in bloom. 14. Chipping Sparrow. Soft Maples in bloom. Lawn grass green.
14. Woodpeckers numerous. 15th, Cabbage Butterfly, Kingfisher. E1m in bloom.
18. Hepatica and Arbutus in bloom. 20th, Towhee numerous. 21st, Swallows.

May....... 23 . Frost.

1. Willow in leaf, 2nd, Urioles seen. Dandelion in bloom.
2. Cherry in blooin. 6th Humming Bird, Japonica in bloom. 7th, Plum in bloom. 8th, Apple in bloom. Elder in bloom. 10th, Lilac in bloom. Horse Chesnut in bloom. 14th, Mountain Ash.
June.
3. Night Hawks. 13th, Cherries ripe.

August..... Large flocks of Robins and Blackbirds. ome Snowballs in bloom. Swallows appear to have left. First frost and ice. 23 rd, First entry below $32^{\circ}$ of season.
27. Last Thunder Storm.

October...
October....... 8. First snow flakes, 17th. First measurable snow,
December... 22. Bay frozen. 25th, Sleighing.

