

## ROYAL SOCIETY.

## METEOROLOGY FOR DECEMBER, 1866.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of month.	Bar. 37 feet abv. sea level, ing & reduced		Self - register Thermo- meters.				Wind.		Rain in inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	29.729	29.535	75	51	110.0	49.5	N NW W	.78	
2	29.605	29.535	75	50	99.0	47.5	N NW	.78	0.06
3	29.746	29.670	67	43	95.0	42.0	SW NW	7.80	
4	29.863	29.832	69	52	112.0	51.0	N SE	1.30	
5	29.776	29.454	72	54	92.0	51.5	NW N	3.12	
6	29.715	29.528	68	50	96.0	46.0	NW W	3.38	0.20
7	29.948	29.921	69	48	112.0	45.5	SW E SE	1.04	
8	29.887	29.647	78	47	119.0	48.5	N SE	.78	
9	29.715	29.687	71	51	110.0	49.0	SE	3.64	
10	29.656	29.591	68	44	110.0	43.0	NW W	3.72	
11	29.723	29.703	72	50	117.0	47.5	NW W NW	3.72	
12	29.791	29.682	73	52	90.0	50.5	NW SE	.52	
13	29.617	29.452	75	52	111.0	46.0	NW SE	3.12	
14	29.507	29.482	70	50	105.5	49.0	NW W NW	1.30	0.18
15	29.552	29.459	68	54	110.0	50.5	NW W NW	5.72	
16	29.722	29.655	66	46	103.0	48.5	NW S	1.30	0.12
17	29.742	29.687	63	47	69.0	47.0	SE S	3.64	0.44
18	29.548	29.301	60	47	63.0	47.0	S SW NE	1.04	0.72
19	29.124	29.068	56	45	58.0	43.0	NW N E	5.99	0.76
20	29.407	29.257	66	51	105.0	48.0	NW W NW	1.30	
21	29.383	29.139	64	49	68.0	47.0	NW SW	.26	0.88
22	29.309	29.211	71	50	115.0	48.5	NW	1.56	
23	29.595	29.479	69	45	110.5	44.5	NW W SE	.78	
24	29.667	29.622	67	49	98.0	47.0	NW W	2.86	0.07
25	30.077	29.854	71	50	111.5	46.5	SW E	3.64	
26	30.151	30.110	73	53	113.0	51.5	NW SE S	1.04	
27	30.049	29.780	61	51	119.0	49.0	NW SE SE	.78	
28	29.902	29.797	77	61	112.0	53.0	SE E	.78	
29	29.926	29.897	72	53	112.0	51.0	NW SE	2.86	
30	29.970	29.930	74	46	114.0	45.0	N SE	1.04	
31	29.994	29.907	74	48	111.5	46.5	NW SE	1.30	

Total force 74.63lbs 3.43

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Gauge. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds, are registered each evening at sundown.

The twenty years' standard tables are used for obtaining the difference from the average.

*Leafing, flowering, and fruiting of a few standard plants in the Royal Society's Gardens during the month :—*

- 10th. First bunch of Red Currants ripe.
- 11th. Common Privet commencing to flower.
- 18th. First bunch of Black Currants ripe.
- 20th. Melia Azederach commencing to flower.
- 26th. Doyenne L'Ete Pear commencing to ripen.
- 31st. Early June eating Apple commencing to ripen.

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Barometer mean, 29·662in., being 0·108in. below the average.

Temperature mean, 59·41°, being 2·66° ditto.

Solar intensity mean, 102 29°, being 4 71° ditto.

Dew point mean, 47·2°, being 1·60° ditto.

Humidity of air mean, '68, being '06 per cent. ditto.

Elastic force of vapor mean, '344, being '027 per cent. above the average.

Total amount of rain, 3·43in. being 2·11in. ditto.

Increase of spontaneous evaporation on rainfall 2·15in.

Mean amount of ozone, 8·35, being 2·01 of chromatic scale above the average.

Electricity active on the 1st, 3rd, 6th, 7th, 8th, 10th, 11th, and 15th.

Lightning on the 15th, and snow perceptible on Mount Wellington with fresh deposits during the month.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR DECEMBER,  
1865, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS,  
&c. BY E. SWARBRECK HALL.

No December of the previous eight years had meteorological conditions so favorable to health and life as the present month presents. In fact, for five or six years past, the character of December weather has in many respects altered for the better. The mean temperature has fallen lower, and the extremes have not been so great. Rain, particularly, has been more abundant. By the Royal-Observatory records for the 14 years, 1841 to 1854, the average rain-fall in December was less than an inch *i.e.*, '92 of an inch, and the wettest year of the whole, 1848, had only 2'36 inches. In the succeeding six years the mean rose to 1'73 inches, the maximum year, 1855, having a fall of 2'73 inches; while in the last five years, 1861 to 1865, the average has risen to all but 4 inches; the maximum, 1863, being 7'60 inches, the minimum, 1862, 1'73 inches. The latter alone being close upon half an inch above the 20 years' mean of the adopted standard. The purity of the air, also, as indicated by the ozonometer, has during the last four years, greatly exceeded the first four years, 1857 to 1861 of the series of observations. By the mortuary table it will be seen that the present December had a mortality considerably less than any of the previous eight years, and one third less than the average of the whole.

*Atmospheric pressure* ranged from the minimum, 29'068, on the 19th, to the maximum, 30'151, on the 26th. The month's extreme range, therefore, was 1'083 inches, within seven days. So low a maximum has not been recorded since 1854, or a lower minimum since the same year, except in 1863 when it was noted 28'954. Four, out of the last nine years, had a smaller extreme range for the month. The pressure mean for the month was 29'662, which is—'112 less than the average of the 20 years' adopted standard. This is a lower mean than recorded for any December since 1851. The greatest movement of the barometer in any 24 hours, was a rise of +'397 on the 25th; and the greatest fall,—'365 occurred on the 19th. There were only eight other days on which the movements exceeded one-fifth of an inch. Such moderate and little varied atmospheric pressure was favorable to health and life, and its preservative influence can be distinctly deduced from the mortuary records.

*Wind pressure* had a total of 74'63 lbs, which is—14'39 lbs less than the mean of the previous eight years. Nevertheless, arial movement was almost constant though never violent. The greatest force was 5'21 lbs pressure to the square foot, and was noted only at the 7 a.m. observation of the 19th. There were only nine observations recorded, "calm," being 4'86 less than the average of the calms for December. *North-west* was the prevailing wind, and largely above the average both in frequency and force. *West* and *South* were both above in frequency, but below in force. *South-west* was slightly above the average in frequency and force. *South-east* was below the average in number, but slightly above it in force. *North*, *North-east*, and *East* were all considerably below the mean in both respects. Wind movement on the whole, therefore, was propitious to health, taking into consideration the fact so often before noted, that many of the *North-west* winds are really deflected *Westerly* ones. No *hot winds* occurred in Hobart Town during the month.

*Temperature* mean, 59.41 degrees, is—2'66 degrees less than the December average of 20 years. November had a mean only a few decimals less. December last year, though, was slightly cooler, but with that exception there has not been so cool a December since 1852. The mean of all the maxima, or high-day temperatures, was 70.13 degrees, being nearly one degree and a half less than for November. The maximum, 81, occurred on the 27th, and is 14 degrees below the November maximum. The mean of all the minima, or low-night temperatures, was 49.15 degrees, being rather more than one degree higher than the corresponding records gave in the previous month. The minimum, 43, was registered for the night of the 3rd, and is four degrees above November's minimum. The day maxima mean in December last year was exactly the same as that of the present month, but the night minima mean was more than four degrees warmer. The mean of both the self-registering thermometers for the present month, was less than half a degree higher than

the mean of the three daily observations, and actually less than the same instruments gave in November by—24 of a degree. Temperature, therefore, was even more auspicious to health than wind movement and atmospheric pressure.

*Daily-range of temperature* had the mean of 20·36 degrees, which is only —19 less than the 20 years' average for December. Last year had a mean —3·69 less than the present month, indeed, no year since 1859 had such high daily variations, within such moderate extremes. The greatest range for any day was, 31 degrees on the 8th, the maximum shade temperature of that day being 78 degrees, and the minimum of the night temperature, 47 degrees—of the previous ten years, two had the same extreme range; three, less by two to seven degrees; and five, more, having from three to eleven degrees higher range. Notwithstanding the frequent changes of temperature, diseases of the organs of respiration were extremely few and slight, and not one death can be attributed to acute inflammation of them.

*Solar intensity mean*, 102·29 degrees, is —1·87 degrees below the average of the previous nine years, though above last year's mean by,  $\times 1\cdot78$ . Moreover the present month had —5·44 degrees less mean of sunshine than November had. The maximum, 119 degrees, was recorded on the 8th and 27th. November maximum was ten degrees higher, and 1864 December was 121. The minimum record of the solar thermometer this month was, 58 degrees on the 19th, on which day the rain fell copiously. It was the coldest day of the month, and Mount Wellington, when visible on the following day, was seen to have received a large addition to its snowy covering.

*Terrestrial-radiation mean*, 47·74 degrees is —56 of a degree below the mean of the previous nine years, and —1·45 degrees less than December 1864 had. 1864 had a range of  $16\frac{1}{2}$  degrees, the extremes being, 56 and 39½.

*Rain-fall*, in the aggregate, amounted to 3·43 inches, being + 2·11 inches more than the 20 years' mean for December though almost half an inch less than 1864 had. There were nine days on which it rained, (on the 2nd mixed with hail) the greater part (3·10 inches) of the deposit having fallen on six days between 14th and 21st inclusive. In the last ten days of the month only ·07 of an inch fell. In 1864 there were 17 wet days, being the ten years' average for December; so that the present month's rain was of a heavier character than usual. Of course the soil got thoroughly saturated, greatly to the satisfaction of horticulturalists and agriculturalists, and sanitarians greatly rejoiced at the thorough cleansing the gutters and drains received. Cool, wet Decembers promise healthy summers, and a small death roll. The snow that remained on Mount Wellington at the close of November, did not totally disappear until the 12th of December. On the 17th the mountain received a fresh deposit, and got several copious additions thereto afterwards, greatly to the delight of the Christmas excursionists to its summit. Many of the young Tasmanians had never revelled in such a scene before in their lives, and joined in the snow-balling, and other fun, as rapturously as the visitors from "home." The snow had not all gone when the year terminated. In December 1864 snow was never visible on Mount Wellington, notwithstanding the greater rain-fall of that month. *Lightning* was seen on the evening of the 15th, but no thunder heard during the month.

*Humidity mean*, 63, is + 1 above the 20 years' average, but —6 less than 1814 had.

*Spontaneous Evaporation*, 5·58 inches, was the most ever recorded for December.

*Elastic-force of Vapour* ranged from, 245 at 7 a.m. on the 3rd, to 510 on the evening of the 27th, and the month's mean was 344, being—10 less than the 20 years' average. This condition of the air was on the whole favorable to health and life, but on the last seven days of the month the Elastic-force of Vapour was continuously high, and that period was the most fatal to life of any seven consecutive days in the month.

*Cloud mean*, 6·30, was + ·84 above the 20 years' mean, though—·60 less than December 1864 had.

*Ozone mean*, 8·35, is the highest record made for the nine Decembers registered. Saturation, 10, was noted on the 18th and 19th. The minimum was 6·5 on the 27th. In a paper of Dr. Moffat's, read at the last meeting of the

British Association, the views I have so often enforced on the sanitary influence of this peculiar condition of oxygen in Tasmania, were confirmed by English records. Dr. Moffat alludes to its efficacy in choleraic periods, and proposes to generate and use it artificially as the most potent disinfectant. The slow combustion of phosphorus, as I exhibited it in my lecture on the subject in 1857, is the plan he adopts.

*Electricity* was much more active this month than in December 1864. The *positive* indications were 29, with a maximum-tension of 8, the *negative* 38 with maximum tension of 7. "Nil" was only registered at 4 observations, while 1864 had 13.

Thirty deaths for December is the smallest number ever recorded, being one-sixth less than 1864 had, and one-third below the eight years' average, as exhibited in the following table:—

Dec., 1865.	Ages.	Nov. 1865	Decembers.								Avg. 8 yrs. 1857-1864
			Min. 1864	1863	1862	1861	1860	Max. 1859	1858	1857	
8	Under 1	4	11	3	13	9	10	14	7	15	10 2-8
1	1 to 5	0	1	4	5	4	3	10	7	7	5 1-8
5	5 to 20	2	4	4	3	3	4	2	3	3	3 2-8
7	20 to 45	7	7	6	15	10	7	17	15	6	10 3-8
2	45 to 60	8	8	11	8	9	8	13	4	7	8 4-8
7	60 and above	16	5	11	8	11	6	6	9	10	8 2-8
30		37	36	39	52	46	38	62	45	48	45 6-8

In every group of ages but one, the deaths were less than the eight years' average. At "under 1 year of age," the mortality was above 20 per cent. less than last year, but two other years of the eight had a still smaller number. At "1 to 5," this year and last were alike, only one. At "5 to 20," this year's deaths were above the eight years' average, and more numerous than any one of the series. At "20 to 45," the deaths were considerably less than the average, though two of the eight years had each the same number, and two others each one less. At "45 to 60," the mortality was less than one-fourth of the average, and the least of the eight years; 1858 had twice as many as the present month. At "all ages above 60," the deaths were below the average, though considerably more than last year had, and one more than two other years of the series recorded. Four out of the seven were octogenarians, aged respectively, 83, 84, 85, 85.

Dec., 1865	Classes of Disease	Nov., 1865	Decembers.							Avg. of 8 yrs. 1857-1864.	
			Min. '64	1863	1862	1861	1860	Max '59	1858		1857
7	1. Zymotic	3	9	9	9	7	8	12	9	11	9 2-8
7	2. Constitutional	9	7	6	9	8	3	7	6	8	6 6-8
11	3. Local	21	15	18	25	20	19	32	21	23	21 5-8
13	4. Developmental	4	3	4	4	7	4	4	3	5	4 2-8
2	5. Violent &c.	0	2	2	5	4	4	7	6	1	3 7-8
30		37	36	39	52	46	38	62	45	48	45 6-8

*Zymotic diseases* only caused 7 deaths, being considerably below the eight years' average. One other year, however, 1861, had precisely the same number, but all the other seven more. Five deaths were caused by *bowel-complaints*, all at ages below seven months. A girl, nine years old, died from what is registered "*Low-fever*." Another girl, of two years old, died from *Diphtheria*,

but did not properly come within this Registration-district, having been brought from a country district when dying, after being ill many days.

*Constitutional diseases* caused a mortality slightly above the average. One boy, nine years old, had been suffering for years and the case considered so hopeless, that no medical practitioner had been called to see him for three years past. The other six were all cases of consumption, aged respectively, 15, 18, 28, 31, 41, 53. The two youngest, and the one 31 years old, were all born in Tasmania. Two of them were employed in business that causes a higher rate of deaths in England from consumption, than any other occupation. December 1864 had five deaths from this disease, two of them being Tasmanians.

The *Local class of diseases* had little more than half the average of deaths, or of what occurred in the previous month of November. No December of the previous eight had anything near so small a mortality in this class. The 1st order, *diseases of the brain and nervous system*, had more than half of the whole mortality, *i.e.*, 6. Three from *apoplexy*, two from *convulsions*, 7 and 8 days old only, and one from *brain-disease*. This class in December 1864 had one-third more deaths. In the 2nd order, *diseases of the heart and organs of circulation*, two deaths occurred, 1865 had the same in number. In the 3rd order, *diseases of the lungs and respiratory organs*, there was only one death, a man aged 64, from a chronic affection. 1864 had only one death in this order and of a still older person. In the 4th order *diseases of the stomach and organs of digestion*, the deaths were alike in both Decembers—2. Last year had a death in the 5th order, but there were not any in this year's December.

In the *Developmental class of diseases*, the mortality was below the average, though two other years of the eight had as small a number. All three were from old age, respectively 83, 84, 85 years old.

In the 5th class *Violent and Accidental*, one, a man of 30, was murdered by *fracture of the skull*, &c.; the other, a child three months old, was suffocated, overlaid in bed. Both the previous Decembers had the same number of deaths in this class, but the eight years' average is nearly twice the amount. *Inquests* were 4 being twice as many as in December 1864. In *Hospital* there died, inclusive of one of the inquest cases, only 6; and two of them were from country districts. In December 1864 the hospital deaths were 10. At the *Male Invalid Asylum* two deaths occurred, aged 55 and 84. Last year had six deaths. A female-invalid, 85 years old, died at the *Cuscades* establishment. Of the 30 deaths, 16 were males, 14 females,—a normal proportion. Three died in the Glenorchy division of the Registration district, the rest in the city. On eleven days of the month no deaths occurred, and the greatest number on any day was three. In the first week the deaths were 6; in the second, 7; in the third 6; in fourth, 8; in the last three days, 3. Never before were the deaths so equally distributed in weeks. The most fatal period of the month was the four days, 26th to 29th, when 9 deaths occurred. One was accidental, but all the others were from diseases of long standing. On the 26th, atmospheric pressure was at the maximum of the month. On the 27th, both sun and shade temperature were at the highest, as well as elastic-force of vapour. On the 28th, the 7 a.m., temperature, and the wet-bulb and terrestrial-radiation thermometer gave the highest record for the month. From the 24th to the end of the month no rain fell. No other four consecutive days had more than 6 deaths.

The *Births* registered were 61, being five less than in 1864.