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OF

TASMANIA.

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ROYAL SOCIETY.

JANUARY, 1864.

ON THE CLUSTER κ CRUCIS, R.A., 12h. 43m. 36s. N.P.N., 149° 25′ 31″ (3435, H.) Lac. 1110 (Neb.). BY FRANCIS ABBOTT, F R A.S. Read June 3rd, 1862.

THIS delightful cluster, "which is estimated by Sir John Herschel to be formed of from 50 to 100 stars," most of which partake of well marked and varied colors, forming an object that is scarcely perceptible to the naked eye, but when under proper optical influence it is one of the most brilliant and interesting objects in the southern sky. This cluster is not only an object of interest from the extreme beauty of color and arrangement, but with respect, also to certain changes that are apparently taking place in the number, position and color of its component stars.

Some hesitation might be felt in following the author of the Cape observations, with the means he employed, were it not for the encouraging invitation that is given for other observers to note any remarkable change that may have taken place since those results were published. Having, therefore, no knowledge of any other observations being made, or popular account published of κ Crucis (except that at Feldhausen), I have adapted it for comparison with observations now made and given in the drawings* for the present epoch.

The color of all the stars, where distinct color could be detected, is given on the drawing; the smaller stars, however, from the 10th to the 14th magnitude, are generalized, and all partake of nearly the same color,—Prussian blue—some with a little more or less tint of red or green mixed with the blue. The same Greek letters have, with one exception, been used in the drawing as those used for the Cape monograph, but not exactly following those used in the catalogue, the letter and number, when in combination, are grouped together in brackets, and intended to show color and position only.

The 75 stars which are given in the drawing were observed and their position laid down with a 5-foot achromatic telescope, 4½ inch object glass, of excellent quality; the power used for the purpose of laying down the position of the stars was 135; but for the colors a comet eye-piece of 27 was found preferable. The colors, as well as the positions, were afterwards checked by a 7-foot achromatic, by Dolland. The evening of the 27th of May was chosen for confirmation; it was a capital night -no moon, quite calm, and the object near the zenith. But with such a night I was not able to bring out, with the means employed, stars of the 15th and 16th magnitude, given in the Cape catalogue.

In the Cape observations φ is laid down to the west of ε and δ; they are now, however, all three situated in a straight line, which, when continued, reaches the star ζ. A straight line also drawn through α and β cuts δ. But the two conspicuous stars in the drawing, υ and θ, as well as three small stars marked 12 above the belt, are not shown at all in the Cape monograph; there are also two considerable stars, κ and λ, to the far-west, which are not seen in the Cape description

The two stars α and β apparently retain their color, but γ has changed from greenish white to bluish purple; δ, from green to pale cobalt; ε, red to Indian red; ζ, green to ultramarine; φ, marked τ in the drawing, from blue-green to emerald-green; α^2, called ruddy, partakes now of much the same color as all the small stars of that magnitude.

P. S.—On the 25th of April, while observing the accompanying cluster κ Crux. at 8h. 20m. p.m., a remarkably fine meteor crossed the zenith from ν, in the constellation Centaurus, to Neb. Major. By esti-

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* The paper was illustrated by a colored drawing.

mation the meteor was about 15' in diameter, traversing about 60° in 4 sec. of time, leaving a long and remarkable train of sparks that continued from first to last about ten minutes, which gradually contracted into an oblong form from one to two degrees in diameter, and for a time appeared to station itself a little to the west of γ Crux. During the time of transit the meteor gave a brilliant illumination, much more incandescent than that produced by the full moon.

A remarkable effect followed, which w... apparently produced by the meteor. The night was clear, the sky brilliant with stars; so diaphonus was the state of the atmosphere that for many consecutive days Venus was seen by the naked eye, and her path traced across the sky in bright sunshine. The barometer stood at 30.124 in.; thermometer, 56°; elastic force of vapor, 317; humidity, 70, Under these circumstances, the meteor suddenly appeared, but immediately after the clouds began to collect from all quarters and concentrate about the paths of the meteor, until the sky was covered, and not a star could be seen. This aspect lasted only for a short time, when the clouds became dissipated, and in less than an hour from commencement the sky became as brilliant with stars as before.

Private Observatory, Hobart Town,
May, 1862.

METEOROLOGY FOR JANUARY, 1864.

Private Observatory, Hobart Town.

Years.	Barometer reduced to standard temperature, 32 degrees.	Mean Temperature of the Air.	Maxima Thermometer Readings.	Minima Thermometer Readings.	Mean daily range of temperature.	Degree of humidity, 100 complete saturation.	Extent of cloudy sky 10 for sky covered.	Mean amount of ozone 10 for maxima.	Total amount of Rain.
	In.	°	°	°	°				In.
1841	29.725	65.41	95.5	50.0	25.5	.56	4	—	0.03
1842	29.713	62.34	82.7	43.0	23.1	.62	5½	—	1.83
1843	29.636	62.00	87.7	45.6	29.9	.67	5¾	—	0.55
1844	29.878	60.47	89.2	47.2	20.7	.69	5	—	2.01
1845	29.757	63.12	91.0	46.2	21.8	.67	3¾	—	0.58
1846	29.630	61.75	95.0	45.0	21.8	.68	5¾	—	1.38
1847	29.690	61.80	91.4	46.1	21.8	.67	8¼	—	0.73
1848	29.731	60.21	82.7	43.0	20.5	.67	5	—	1.04
1849	29.726	59.74	105.0	43.0	21.8	.68	4½	—	0.72
1850	29.604	59.10	86.9	47.7	19.4	.71	6½	—	1.20
1851	29.631	62.00	91.1	46.0	19.3	.66	5½	—	2.33
1852	29.588	59.50	87.2	46.8	18.9	.77	5¼	—	1.46
1853	29.775	57.67	81.0	43.6	16.7	.72	6⅔	—	1.43
1854	29.646	62.25	93.3	45.0	23.4	.70	5½	—	0.54
1855	29.756	65.00	88.0	42.0	14.14	.79	6.55	—	0.48
1856	29.809	71.10	91.0	42.0	25.13	.67	6.50	—	0.99
1857	29.714	62.16	85.0	42.0	20.00	.70	6.90	—	2.58
1858	29.509	66.40	97.0	44.0	24.00	.63	4.45	6.92	0.40
1859	29.882	65.67	99.0	46.0	18.90	.67	6.37	5.90	4.61
1860	29.744	65.10	91.0	48.0	20.29	.67	5.22	6.82	2.22
1861	29.861	65.85	88.0	48.0	18.66	.69	7.00	6.79	2.12
1862	29.780	65.72	98.0	43.0	25.03	.61	5.58	6.21	0.93
1863	29.831	65.74	93.0	47.0	21.42	.65	4.44	7.33	2.39
1864	29.714	61.49	81.0	48.0	17.13	.65	5.77	6.93	0.71

The means in all cases are taken from the sums of each column, and not from the maximum and minimum.

Time of leafing, flowering, and fruiting, of a few standard plants, in the Royal Society's Gardens, for the month :—

10th—Veronica Angustifolia, in full flower.
12th—First ripe Apricot (Turkey) gathered.
15th—Grevillea Robusta, in full flower.
22nd—First ripe Jargonelle Pear, gathered,
30th—Catalpa Syringifolia, in flower.
31st —Mulberries commencing to ripen.

ANALYSIS OF THE OBSERVATORY RECORDS FOR JANUARY, 1864, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

In no month of the twelve, during the preceding seven years, has the mortality been so little as in the present month ; and the community so free from those diseases which usually prevail at this season of the year.

Atmospheric-pressure had a mean 29·714, all but identical with the 20 years' mean for January. The extreme month's range of the barometer was only ·898 of an inch, but it happened within four days. The minimum was 29·259 on the 26th, and the maximum 30·157 on the 29th. From the 23rd to the 29th, within one of half of the whole deaths of the month took place. The greatest movement of the barometer on any day was a fall of —·468 of an inch, on the 15th. There were rises and falls, exceeding one-fifth of an inch, on eleven other days.

The month's total *Wind-force*, 146·26 lbs., was more than double the average for January, being +74.50 lbs. above it. South-west, West, North-west, North winds were all much above the average, both in frequency and force. North-east, though below the average in frequency, exceeded it considerably in force. East, Southeast, and South, were all below the average, both in frequency and force. There were only 6 calms noted out of the 93 observations, which is $-11\frac{1}{4}$ less than the average in January. The strongest winds had a force of 10·42 lbs. pressure to the square foot, and were recorded three times. No hot winds occurred during the month. So windy a January had not occurred in the previous seven years.

The *Temperature* mean was 61·49 degrees, being —2.08 degrees less than the 20 years' mean. So cold a January has not happened since 1853, when the mean was only 57·67 degrees, being the coldest January of the last 23 years. In addition to this, 1852, 1850, 1849, had also colder Januaries than the present. The mean of the self-registering maxima and minima thermometers approximated very nearly to the foregoing, being 62.00 degrees. The maxmum shade temperature of the month was only 81 degrees, and was noted on the 1st. 1853 had also the same low maximum, but every other of the 22 years had a higher, ranging up to 105 degrees. The minimum shade temperature was 48 degrees. 1860 and 1861 had the same, and 1841 had 50 degrees, but all the other years were much lower. The month's range, therefore, was only 33 degrees, which is the smallest range ever before noted for January.

The *Daily Range of Temperature* had a mean of only 17·13 degrees, which is – 3·62 degrees below the 20 years' average. 1853 and 1855 had a still smaller daily range, but the other 21 years were much higher; the highest being upwards of 25 degrees. The extreme range on any day was 27 degrees, on the 1st and 25th. 1850 had only 25.10, but every other year was much above the present, the highest being 51·90 degrees. The smallest range on any day of the present month was 11 degrees, on the 12th.

Solar intensity mean, 107·64 degrees, is —2·99 degrees below the average of the previous 8 years, though +1·58 above January 1863. The greatest heat on any day of the month was only 123 degrees on the 1st. Every January of the previous 8 years, had a higher maximum solar heat than this. 81 degrees was the minimum of the month by this thermometer.

Terrestrial-radiation had a mean of 50·53 degrees, being —2·02 degrees below the 8 years' average. Only 1862, out of the 8, had a lower mean, *i.e.* 50.00 degrees. The maximum of any day, 57 degrees, was marked in the night of the 9th; the minimum, 43·5, occurred in the night of the 4th.

The *Rain-fall*, ·71 of an inch, was less than half the 20 years' average for January, which is 1.50 inches; but it ought to be remembered, that every one of the three preceding months had a great excess of rain precipitated. The five previous Januaries had all much more rain than the present month; indeed, 1859 had the maximum fall, 4·61 inches, for the last 23 years' Januaries. In six years out of the 23, there fell less rain in January than the present month has, 1841 the minimum, having the almost inappreciable quantity of ·03 of an inch. On only one day, the 24th, did sufficient rain fall,—·30 of an inch —to cleanse the surface channels of drainage. Nevertheless, the number of rainy days, 9, was slightly in excess +·34, above the average wet days of the previous nine years' Januaries.

Snow was seen on Mount Wellington on the morning of the 6th, but soon disappeared. It is several years since snow was noted on Mount Wellington in this month.

Spontaneous-evaporation bore a reverse proportion to precipitation to that recorded in December, 6·58 inches being registered.

Elastic force of vapor mean, 357, was —·27 less than the 20 years' mean.

Humidity, 65, was – ·3 less than the 20 years' mean for January.

Cloud mean, 5·77, is +·03 only above the 20 years' average.

Ozone was 6.73, which is +·27 above the mean of the previous six years. Last year's January, however, had still more ozone, *i.e.* 7·33. This was, no doubt, owing to the abundance of rain in that month. It is remarkable that the greater wind force of the present month has all but compensated for the smaller rain fall, in preserving a high state of atmospheric purity. It is certain that many of the winds indicated by the vane to be from North-west and North points of the compass were really deflected westerly winds, as evidenced by their coldness and purity, as well as being noted as such by the observations of the coast stations. The daily reports from Mount Nelson, Fortesque Bay, and Low Heads, are of great value in correcting our city observations on this point, and an extension of them to the east and west coasts, and interior towns would add much to the knowledge the meteorological returns convey.

Electricity was never absent at the 62 observations in the month. Positive was noted 24 times, with the high maximum tension of 7. Negative was recorded 38 times with the still higher maximum tension of 8. These records show a more frequent and stronger electrical condition of the air, than has ever before been registered in Hobarton.

Twenty-four deaths only have occurred in this, the first month of 1864. The seven preceding Januaries had respectively, in retrogressive order, 45, 55, 45, 72, 56, 74, 60. The average of the seven years, therefore, is 58 1-7th, or considerably more than double that of the present January, while that of the maximum year, 1858, is more than three times as much, and that of the minimum years, 1861 1863, not far short of twice as numerous. Furthermore it must be considered, that the mortality of the preceding two months of December and November was considerably less than the average. The smallest number of deaths recorded for any month of the twelve, in the seven previous years, was 29, and that never occurred in a summer month. January stands second of the months of the year for its high rate of mortality, yet the present month is about 17 per cent more favorable to life than has ever yet been recorded, even for the months of the healthiest character. Moreover, the diminution of deaths is principally at those tender ages, which afford the surest test of the salubrity of any season, climate, or locality, as will be evident by the following contrast :—

Jan., 1864.	Ages.	Jan., 1863, Minimum of 7 years.	Jan., 1858. Maximum of 7 years.
2	Under 1 year old	9	32
2	1 to 5 ditto	11	10
2	5 to 20 ditto	4	3
5	20 to 45 ditto.	6	21
6	45 to 60 ditto	6	
7	60 and above	9	8
24		45	74

Four deaths only of children under five years of age is without parallel in the mortuary records of Hobarton, for the last fourteen years at least. The same may be said also of the six under 20; yet the proportion of the population living at the present time, in this registration district under 20 years of age, is much greater, to the total population at all ages, than ever before was known. In the 25,000 persons, constituting the population of the Hobarton Registration District, the annual death-rate—were all the months of 1864 to be as auspicious to life as the first has been—would be only $11\frac{1}{2}$ per 1,000; that being also about the annual death-rate of the rural districts of Tasmania. The annual death-rate of the healthiest rural district in England and Wales is 15 per 1,000.

There were only three deaths tabled in the zymotic class, and two of these are scarcely entitled to be so classed, one being an invalid at the Brickfields Asylum, aged 55, registered "old age ? (senilis) and diarrhœa," and the other a babe only seven weeks old registered "dysentery." The undoubted zymotic case was a child two years old, registered "epidemic scarlatina" This fever has not been epidemic in Hobarton for many years previously, though mild isolated cases have frequently occurred. During the present month it put on the epidemic form, but the type was very simple, no doubt mainly influenced by the remarkably cool, salubrious weather that has prevailed for many months past. The last death from scarlet fever registered in Hobarton, was in October 1863, the previous one being in August 1862, in the January of which year there was also another. 1861 had one in July. In 1860 there was not a single death from this disease. 1859 had 2, in the month of February. 1858 had 13 altogether : *i.e.*, February 1, May 1, June 2, August 1, October 4, and December 4. 1857 had one in June. In the terrible epidemic of this fever in 1852-53, upwards of 260 deaths were registered from it. In the epidemic of 1842-43, only 66 were recorded. That some part of the amended hygienic condition of Hobarton, is owing to sanitary improvements—incomplete though they be—I do not think admits of doubt.

The remarkable exemption from bowel complaints this month is unparalleled. In December these diseases caused 10 deaths ; in January 1863, 14 ; January 1858, 17 ; January 1860, 23. Of the 3 deaths from consumption this month, none were born in Tasmania. Every year's records affords additional proof, for the fact I stated many years ago, of the exemption of the Tasmanian youths, from this terrible scourge of our fatherland. It is worthy of note—as the only instance on record—that not a death from any disease of the organs of respiration (with the exception of the cases of consumption included under another class and order) took place. The small daily-range and narrow extremes of temperature no doubt tended to produce this unusual result. It is also remarkable that but one death from accidental violence occurred: that of the Hanoverian sailor who fractured his spine by falling into the hold of his ship. No inquests were held in January, but one was subsequently held on the foregoing case.

In the 1st week of the month, 7 deaths took place; in the 2nd, 5; in the 3rd, only 1; in the 4th, 9; in the last three days, 2. On 16 days of the month, there was not a single death. The greatest number on any day was three each on the 4th and 6th. The most fatal period of the month was the 23rd to 29th inclusive, though only eleven deaths occurred in the seven days, and the previous five days were without a single death.

The registered *Births* were 67, being 7 less than in January, 1863.

FRANCIS ABBOTT.

NOTES ON THE POISON OF VENOMOUS SNAKES.

By J. W. Agnew, M.D.

[Read at a meeting of the Royal Society.]

When a wound has been inflicted by a venomous snake, it is well known that the first efforts should be directed to prevent the poison from being absorbed into the system. To effect this it is recommended that a tight ligature should be immediately applied close to the bite, between it and the centre of the circulation, and that suction should then be practised to the wound itself. This suction is of extreme importance, and though it is generally understood to be unattended by danger, I am aware that very many persons do not consider it to be altogether so, and that they would hesitate before taking into their mouth even the smallest quantity of a poison so virulent as that of the snake.

I am not aware if experiments have ever been conducted for the purpose of proving from actual observations whether or no the snake-poison can be swallowed with impunity, and I have thought it of some importance to endeavor to set the question at rest, not by the collection of hear-say evidence, but by experiments on living animals.

Having obtained therefore a common black snake, I dissected out both poison glands, having previously put a ligature round the ducts to prevent the loss of any of the venom. I then took a young chicken, and having its bill held open, thrust down its throat the entire of one gland—having first snipped it once or twice across in order to ensure the free escape of its contents when received into the stomach. After the act of deglutition was evidently complete, observation was continued for a considerable time, lest the contents of the stomach might be rejected, and the experiment be thus vitiated. No symptom however of the slightest distress ever manifested itself, and when food was offered it was readily seized and swallowed. Another chicken of the same age was next taken, and an incision having been made through the skin of the leg, the remaining poison-gland—previously snipped across as before, in order that the venom might freely escape—was pressed into the wound. The lips of the wound having been brought together by sutures, the chicken was then placed under observation. In twelve (12) minutes distinct symptoms of poisoning were manifested,—the eyes became dull, the wings dropped, the head fell—and death ensued in twenty-eight minutes and a half ($28\frac{1}{2}$) after the application of the poison.

Thinking it advisable to repeat the experiment on animals of a totally different nature, two very young cats were secured. The two poison glands having been taken as before from a black snake, one, after being cut across, was laid on the tongue of one of the cats, and was immediately swallowed. In a short time afterwards, a tea-spoonful of milk was placed before the cat, and as it was at once lapped up, it was very evident that the poison had been fairly taken into the stomach. Observation was continued for several hours, but not the slightest symptom was shewn of any effect having been produced by the poison, either on the stomach or the system at large. The second gland was now cut open, and inserted into a wound made on the hind leg of the remaining cat. Symptoms of poisoning were very soon manifest—the animal trembled—appeared disinclined to move—became dull and lethargic; but death did not take place until the expiration of two hours.

Now it is a generally understood fact, that the snake-poison acts with much greater certainty and rapidity in very young and small animals, than in those of greater age and size. The size and age of the subjects of the above experiments, rendered them therefore peculiarly susceptible of the influence of the poison, yet no effect whatever was produced when it was swallowed, although its influence was sufficiently marked when introduced into the system in the usual way, that is, by a wound on the surface. The results thus obtained were so decisive, that I did not think it necessary further to repeat observations which could only necessitate pain and loss of life, without adding anything to the certainty or truth of the conclusions arrived at.

In conducting these experiments in the manner indicated, one decided source of fallacy was avoided Had the entire poison of a snake been administered internally to one animal, while to another the poison of a second snake was externally applied, the results would have been the same as above. But it might then have been objected, that the poison-glands which were swallowed, had perhaps been exhausted of their venom before the death of the snake: or that the poison contained in them was not equal in virulence to that which was applied to the wound; and many experiments would have been necessary to set these points at rest. By applying however the poison of a single gland only, to a wound in one animal, the fellow-gland being given to another to be swallowed, it is certain that each subject of the experiment had not only an equal quantity of the poison, but that the virulence of the venom was identical in each—a point of great importance in forming a reliable conclusion as to the comparative effect of the poison when applied to a wound, or when taken into the stomach. It is thus proved that animals to whom the bite of a snake is fatal, and we know that man is in this category, may with perfect impunity swallow the poison.

In the treatment of snake-bites therefore, it is evident that the most effectual mode of relief, vigorous suction of the wound, may be resorted to when practicable without the slightest risk; and further, that it is of little or no consequence whether the poison thus taken into the mouth be swallowed or not. It is said that some risk might be run if a wound or sore of any kind existed in the mouth. Now,as in the process of sucking all fluids are strongly drawn inwards within the line of the teeth, it is clear that none of the sores which are of more common occurrence on the margin of the lips, such as cracks, sun-blisters, &c., could come within the action of the poison. Then as to sores of any kind about the tongue, when we consider how very limited in size they generally are—how low the absorbing power of a deceased surface is—also the very small quantity of poison that could be present at any one time in the mouth, together with the state of salivary dilution in which it must exist—and lastly the very small quantity of this fluid which could come even into temporary contact with the deceased points, we may safely conclude that the alleged danger from the presence of sores is altogether inappreciable. I notice this point somewhat in detail, because if the commonly received idea, that any sore in the mouth rendered the suction of a poisoned wound dangerous, were acted on, a most prompt and valuable mode of treatment might in many cases be left altogether unemployed. It is just possible however, that there might be a slight degree of risk if a recent wound existed on the tip of the tongue, as this part of the organ would necessarily, during the the action of suction, be immediately applied to the poisoned punctures. But the circumstances of such a case must be so exceptional and so unlikely to occur, and the danger—if any exist—is so hypothetical, that the point is scarce worthy of notice.

For the treatment of these accidents it is generally recommended, as has already been observed, that a ligature should be applied at the proximal aspect of the wound, and that suction, scarification, &c., should then be practised. These direction are, I think, somewhat faulty, as *moments* which under these circumstances are altogether invaluable, must necessarily be lost if a ligature is in the first instance to be sought for. I would rather recommend that the patient instantly on being bitten, should if possible, seize firmly by his teeth the tissues all around the punctures, and thus having arrested the poison before any of it could be taken into the system, should keep up suction vigorously until a ligature can be procured. This should consist of some strong fine material, such as whip-cord, boot-lace, a twisted strip of silk handkerchief—it would be dangerous to trust to any soft bulky substance—aud it should be applied as close to the wound as possible or its proximal aspect. The teeth might now be removed, and the skin being tightly pinched up, an incision should be made with a pen-knife or other sharp instrument, laying the two fang punctures* into a single wound, and a second and longer incision should be made between this and the ligature, parallel to the latter—or if the skin be well raised from the subjacent tissues,a small portion of it embracing the fang-wounds may with safety be cut out. Suction should then be immediately recommenced for at least twenty or thirty minutes, but the ligature may be allowed to remain for an hour or so longer. If the bite should have been received on any part of the body inaccessible by his mouth, the patient, if he has no companion who could act according to the above recommendations, should immediately seize with his fingers the skin at the seat of injury, so as to raise and isolate the region of the wound,and then proceed to scarify or remove the wounded part as directed, if its locality was such that he could do so without assistance. The fingers should not be removed until assistance has been procured. The immediate grasping whether by the fingers or the teeth, of the tissues round the fang-wound, will not only arrest the poison and confine it to the spot, but by the continuous pressure necessarily exerted, would probably cause the greater portion of it in many cases to exude at once from the wound. If it so happened, as might readily be the case, that neither knife or ligature is immediately available, this firm and steady grasp of the bitten part by the fingers until assistance was obtained would add materially to the patient's chances of recovery.

I may here notice the mode of treatment which I have been informed was

* In some notes on the anatomy of the teeth and poison-apparatus of our snakes,published in Vol. 2 of the Tasmanian Journal, I have already shewn that frequently only a single fang-puncture will be found.

pursued in these cases, by the aborigines of this island. It consisted in continuously beating the bitten part by a small rod, or rods, till the vitality of the tissues was entirely destroyed. Although it cannot be supposed that the mind of the aborigine who first practised this method was enlightened by science, it cannot be denied that the idea of thus rendering the bite innoxious is not, even on scientific principles, altogether unsound, as it is clear that neither absorption or any other physiological action could take place in tissues so deprived of vitality. It must however have been a tedious and very painful process, in some cases it must have been inapplicable, in others the tissues could scarcely have been destroyed before absorption to a fatal extent had gone on, but occasionally it is possible it may have proved effectual as a means of cure.

The last topical treatment which I shall notice, is one which has obtained a certain degree of notoriety in Tasmania and the neighboring colonies. I refer to the so-called antidote or specific of Underwood. Several years ago, a body of medical officers, of whom I was one, was appointed by Government to examine into, and report upon the efficacy of this application. Underwood appeared before us, and conducted a series of experiments with snakes, and living victims provided for them. As a very brief summary of the proceedings, I may state that two sets of animals were bitten by the snakes; to one set the antidote was applied, and to the other nothing was done; and as it was found that at least as many deaths occurred in the former set as in the latter, we could not do otherwise than come to the unanimous conclusion that the application was valueless as an antidote. Since that time I have observed in the local newspapers several notices of accidents from snake bites. in which I think dogs were the chief sufferers. In some of the recoveries which took place "Underwood's Specific" happened to be used, and was consequently lauded as a sovereign remedy for all such wounds. The deduction however is a very unsound one, as is proved by the experiments above referred to, when it was evident that the treatment, though conducted by Underwood himself, had no effect either way. At the same time I do not deny that in some cases it may have been beneficial in an indirect manner. The confidence of recovery it may have inspired in case of a man being bitten, would, by removing the depressing effects of terror, be a very likely means of bringing about a result, in which the curative qualities of the application itself had no part whatever.

In calculating the value of a remedy, it is to be borne in mind, that the bite of a snake is by no means invariably fatal to man, even when no treatment is adopted; in such cases the proportion of deaths to recoveries would, perhaps, be about as one to three or four. Leaving out of consideration the general influence of the seasons in modifying the virulence of the snake-poison—also the fact that the state of health and nervous susceptibility of the patient himself must always greatly influence the issue of any given case, a great deal will, probably, depend also on the manner in which the bite itself is given. If the snake is provoked and irritated, it will bite fiercely—all the powerful muscles of the jaws and poison-glands will be thrown into strong and continuous action—a large quantity of the venom will be poured into the wound, and such a bite, if the most prompt and vigorous treatment be not immediately adopted, will in all probability prove fatal. It will be in the recollection of many members of this Society that a marked instance this kind occurred about five years ago at New Town, to a man who professed to be able to handle these dangerous animals with impunity. On the other hand a rapid bite inflicted under the influence of surprise or alarm, could not inject the same quantity of venom, and would probably be proportionately less fatal in its effects.

Thus far as to local measures. The general treatment is of the most simple character, and consists in the immediate exhibition of some powerful stimulant, the effect of which is to be kept up by rapidly repeated doses, until the symptoms of depression induced by the poison have all passed away. The two great stimulants used for the purpose are alcohol under its various guises of brandy, whiskey, &c., and ammonia. The former has been given in some cases in this colony with good effect,* and is also extensively made use of in the United States of America, especially on the western frontier where rattlesnakes abound. It is given in quantities sufficient to produce intoxication,—a wine-glass full every half-hour to an adult—and the patient is not considered safe until this effect is present. Ammonia however as a stimulant, possesses probably a far superior efficacy. In Ceylon, this drug is considered to be of such value that in a code of instructions for the treatment of snake-bites, published under the

* See a paper on Snake Bites, by E. S. Hall, Esq., Australian Medical Journal, April, 1859, &c.

authority of Government, very precise and ample rules are given for its administration.

It is there stated that "this medicine if promptly and properly used (in addition to topical treatment) will inevitably cure people of the bite of all kinds of snakes." To these instructions (a copy of which I accidentally noticed in the *Argus*, when concluding these remarks) I need not further allude at present, as I shall give at length in an appendix that portion of them which refers to the exhibition of the drug; and in order to complete the subject, shall there supplement them by a few concise rules for the topical treatment. From the more general accessibility however of spirits of various kinds, I expect they will, as a rule, be made use of in the first instance; nor if it were so, would such treatment have any bad effect, even if the administration of ammonia were subsequently had recourse to.

It is to be remarked that probably neither of these agents can be looked upon, strictly speaking, as an antidote. They act not by rendering inert or destroying the poison itself, but by rousing and exalting the nervous system, and so by keeping the vital forces active, prevent the occurrence of that fatal coma, which so depresses all physiological action as to render impossible the elimination of the poison from the system.

In Ceylon and elsewhere, great virtue is attributed by the natives to the snake-stone, the application of which to the wound is believed to be a cure even for the bite of the cobra. On reference however to Sir Emerson Tennant's admirable work on Ceylon, it will be found that the stone possesses none of the powers of an antidote, and is in fact quite inert. It varies in composition, but appears generally to consist of charred bone, sometimes of chalk, or other absorbing substance, and it is possible when applied to the wound that the poison, at least in part, may occasionally pass into its open tissue by the law of capillary attraction. Again, it is by some believed that the Mongoos *(Herpestes Vitticollis)*, an animal common in Ceylon and elsewhere, which frequently attacks and destroys poisonous snakes, is able to do so with impunity from making use of a certain herb which acts as an antidote. It is asserted that on the receipt of a bite, which of itself would prove quickly fatal, the animal has only to retire to eat of this herb, and is then, Antæus-like, immediately enabled with freshly-acquired health and vigor, to renew the combat. Later observations however tend to throw considerable doubt on this story of the mongoos, and the probabilities are it will eventually be found, like many other tales of travellers, to be due not so much to a wilful misstatement of facts, as to a too hasty conclusion from erroneous and imperfect observation.

But although no direct antidote has hitherto been discovered, it is very possible in the progress of scientific research that such a desideratum may yet be found. In the meantime, if the means within our reach were but made use of in a sufficiently prompt and intelligent manner, I am satisfied that very few, if any, fatal cases would be the result of the bite of even the most venomous snakes.

APPENDIX.

On being bitten, the patient or any one present, should immediately seize with his teeth the skin round the wounded part and suck vigorously; a thin strong ligature, such as cord, boot-lace, or a twisted strip of silk handkerchief, is then to be procured and tightly applied as close as possible to the mouth above the bite. The mouth is now to be removed, and the wounded part being firmly pinched up, an incision is to be made through both fang-punctures, and a second incision, longer than this, between it and the ligature. Suction is then to be continued as before for twenty or thirty minutes, or till bleeding ceases—the ligature may remain for an hour or so longer.

If no assistant be present, and if the patient cannot reach the wound with his mouth, let him with his finger and thumb pinch it well up, so as to expose the fang-punctures, scarify as before, and after some bleeding has taken place, remove the fingers and apply the ligature. If from its position he cannot scarify the wound himself, let him hold it tightly pinched up and isolated till assistance is available.

If no other remedy be accessible, spirits of any kind may be taken in quantities according to age every twenty or thirty minutes till symptoms of faintness disappear. The Government of Ceylon however, authorises the publication of the following (condensed) statement as to the value of ammonia in these cases, after topical treatment has been applied :—

1. "This medicine, liquor ammoniæ, if promptly and properly used, will inevitably cure people from the bite of all kinds of snakes; and if those bitten

be otherwise sick, or whatever may be their state of health, this medicine will do them no harm.

2. After as much blood as possible has been taken from the wound, a little of the liquor ammoniæ is to rubbed in:

3. The medicine must be now be quickly given internally in doses according to the bitten persons age as follows :—

Age.	*Liquor Ammoniæ.*	*Water.*
To an adult........................	35 drops	In 5 table-spoonfuls
From 12 to 15 years..	20 to 25 „	„ 3½ „
„ 8 to 12 „	15 to 20 „	„ 2 „
„ 3 to 8 „	10 to 15 „	„ 1½ „
Infancy to 4 „	3 to 10 „	„ 1½ „

4. If the sick person's head has become deranged or heavy, the medicine must be given every twelve minutes until the head becomes well, the symptoms of collapse subside, and sensibility and warmth of surface are restored.

5. If the bitten person be just on the point of death this medicine should always be given, as it has frequently cured people even in this state.

6. When the patient has lock-jaw from the effect of the poison, or when his head is very bad, it should be held up, and the bottle placed close under his nose for him to smell.

7. The bottle should be kept tightly stopped, or the strength of the medicine will go quickly. A little wax round the stopper will prevent this.

8. When the medicine has been frequently used, the strength of the remainder becomes less, and more drops should then be given.

9, Sometimes the stopper sticks firmly in the bottle. It should then be gently struck with a piece of metal, or a rag dipped in almost boiling water may be wound round the neck, when it will generally be loosened. A little oil applied to the stopper before being put in the bottle will prevent sticking."

10. If much drowsiness be present, cold water should be frequently dashed over the face and chest. Warmth to be applied if necessary to the extremities &c.

METEOROLOGY FOR FEBRUARY, 1864.

PRIVATE OBSERVATORY, HOBART TOWN.

Years.	Barometer reduced to standard temperature, 32 degrees.	Mean Temperature of the Air.	Maxima Thermometer Readings.	Minima Thermometer Readings.	Mean daily range of temperature.	Degree of humidity, 100 complete saturation.	Extent of cloudy sky 10 for sky covered.	Mean amount of ozone 10 for maxima.	Total amount of Rain.
	In.	°	°	°	°				In.
1841	29.801	62.60	91.6	47.5	24.3	.67	6	—	3.10
1842	29.949	63.09	81.0	42.7	19.0	.72	$5\frac{1}{4}$	—	1.05
1843	29.869	63.19	90.4	48.5	19.6	.71	$5\frac{1}{3}$	—	0.11
1844	29.827	62.88	96.2	45.0	21.4	.63	$4\frac{1}{2}$	—	0.34
1845	29.758	60.47	83.0	48.8	18.4	.72	$5\frac{1}{2}$	—	1.91
1846	29.556	58.89	91.8	44.0	19.4	.70	7	—	2.64
1847	29.828	60.91	100.0	41.4	18.9	.71	$6\frac{1}{2}$	—	0.07
1848	29.951	59.31	81.0	42.7	16.2	.75	6	—	0.79
1849	29.783	56.58	85.8	40.5	18.4	.75	$5\frac{1}{4}$	—	1.02
1850	29.776	60.13	91.8	41.5	18.7	.71	$5\frac{3}{4}$	—	1.10
1851	29.866	61.17	97.3	46.2	18.8	.69	$5\frac{1}{2}$	—	0.58
1852	29.776	61.33	94.0	47.0	20.0	.70	$4\frac{2}{3}$	—	0.19
1853	29.570	58.23	77.8	42.7	15.7	.76	7	—	1.43
1854	29.847	59 28	89.9	42.0	19.9	.70	$5\frac{3}{4}$	—	9.15
1855	29.902	68.00	95.0	41.0	18.30	.79	5.75	—	0.18
1856	29.765	64.51	94.0	42.0	23.44	.68	6.79	—	0.68
1857	29.966	64.00	93.0	41.0	23.00	.71	5.70	—	0.43
1858	29.954	64.50	89.0	42.0	22.32	.70	4.30	7.50	0.42
1859	29.814	62.32	99.0	40.0	23.17	.66	5.00	6.03	1.70
1860	30.025	63.56	95.0	46.0	19.27	.65	6.25	6.96	0.33
1861	29.846	63.64	81.0	46.0	17.60	.73	5.37	6.89	4.16
1862	29.744	64.21	87.0	42.0	22.42	.64	5.15	6.02	0.22
1863	29.855	63.39	96.0	44.0	18.92	.69	6.34	7.87	2.40
1864	29.943	60.37	88.0	41.0	18.20	.69	4 92	7.04	1.43

The means in all cases are taken from the sums of each column, and not from the maximum and minimum.

Time of leafing, flowering, and fruiting, of a few standard plants, in the Royal Society's Gardens, for the month :—

8th.—Kerry Pippin Apple commencing to ripen.
10th.—Windsor Pear ripe.
12th.—Summer Bon Chretien commencing to ripen.
14th.—Green Gage Plum commencing to ripen.
20th.—Ash Seeds commencing to fall.
28th.—Sycamore seeds commencing to fall.

ANALYSIS OF THE OBSERVATORY RECORDS FOR FEBRUARY, 1864, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c.

By E. SWARBRECK HALL.

Some of the meteorological phonomena this month were adverse to health and life, but those of the reverse character so much preponderated, that the mortality is about 25 per cent. less than the average of February for the previous seven years.

Atmospheric pressure had the high mean of 29·943, which is +·093 above the twenty years' mean for this month. The maximum pressure, 30·368, occurred on the 28th; the minimum happened on the 19th, and was 29·391; the month's range was consequently ·977 of an inch, which is higher than the four previous years. The greatest movement of the barometer on any day was a rise of +·359 on the 1st, followed by a fall on the next day of —.357. There were only five other days on which the movements exceeded the fifth of an inch. The perturbations of pressure were, therefore, by no means great, but the high pressure was pretty uniformly continuous; and in combination with cold shade temperature and hot sunshine, injurious to health.

The *wind-force* this month, 57·49lbs., is so nearly the average of February, that it only differed by —·38. The strongest winds had a pressure of 5·21lbs. to the square foot, and occurred three times. The general character of ærial movement was :—moderate winds from the northerly quarters by night, and gentle breezes from the ocean quarters by day. Of the 29 observations at 7 a.m. 23 were noted as N.,N.W. and N.E. ; at 1 p.m.,22 were registered as E., S.E., S., S.W., and W. ; and at sunset 26 out of the 29 were from the same points of the compass. On the hottest day of the month, the 18th, the wind was from the N.W., but it was calm both at 7 a.m. and 1 p.m. This was the nearest approach to a hot wind during the month. Ærial movement was, therefore, propitious to health. The calms were 17, which is slightly above the average.

Temperature mean was only 60·37 degrees, which is —2·16 degrees colder than the 20 years' average, and about three degrees less than February last year. This has been the coldest February since that of 1854. Altogether there have only been six colder Februaries in the last 23 years. The mean deduced from the self-registering maxima and minima thermometers is 61·17°. The highest shade temperature of the month was only 88° on the 18th. The lowest was 44° on the 11th. The range, 44°, therefore, occurred within eight days. The minimum temperature was as low in 1863, but the maximum was 8° higher.

The *daily range of temperature* had a mean of only 18·20°, which is,—2·19°, below the 20 years' average. Only 1848, 1853, 1861, had a smaller daily range. The greatest range on any day was only 27° on the 16th ; the lowest was seven on the 13th. Only five years out of the last 23 had so small a maximum. Shade temperature, therefore, in all its aspects was very propitious to health.

By the *solar thermometer* the mean temperature of the month was, 108·13°, which is +·13 above that of the previous 8 years, but + 5·22° higher than February last year. The maximum by this thermometer was 129° on the 18th. Only 1856 and 1857 had a higher maximum out of the previous eight years. The minimum was 67° on the 8th, but excepting this wet day and the 18th, the sun's rays were very uniformly distributed throughout the days of the month, ranging from 94° to 121, but, only three times altogether, below 100. So much sunshine is favorable to health, provided due care is taken, but the reverse being unfortunately the rule, its dire effects are evident in the disproportionately high rate of mortality, from "diseases of the brain and nervous system" as will be seen hereafter.

Terrestrial-radiation mean, 49·10°, is—·57 of a deg. below the average of the previous 8 years, and—3° below 1863. The maximum was 59° on the 18th, the minimum 41 on the 24th, the latter being 2° lower than the minimum of 1863.

The *rain-fall* was 1·43 inches, which differs only from the 20 years' average by —·04 of an inch. From sunset of the 7th to that of the 8th, 1·10 inches fell, with a most desirable cleansing effect on the streets and gutters. On the 19th, the useful fall of ·20 of an inch, was precipitated. The number of days on which rain was registered, is 6, but it would be 7, were the records made from 12 p.m. to 12 p.m. The former is,—2·12 days below the average of the previous 9 years. February 1863 had nearly an inch more rain.

Snow never appeared on Mount Wellington during this month, but in February 1863, it was seen on the 27th and 28th.

Spontaneous Evaporation was 3·03 inches, or nearly double the rain-fall.

Elastic-force of Vapor mean, was, 363, being 10 below the 20 years' average.

Humidity had a mean of 69, which is—1½ below the 20 years' standard.

Cloud mean was, 4·92, which is—77 less than the 20 years' average, 1844, had 4·50 ; 1852, 4·67 ; 1858, 4·30 ; all the other 20 years had a much higher cloud mean than the present February.

Ozone had a mean of 7·04 which is +·16 above the 6 years' mean, though it is—'83 below what 1863 had, doubtless owing to the greater wind-force and rain-fall of that month. The range of the present month was maximum 9, minimum 5·5.

Electricity was palpable at every one of the 58 observations during the month. The positive indications were 16, with the maximum tension of 7·0. Negative was recorded 42 times with maximum tension of 7·5. No lightning was observed, or thunder heard, during the month.

The mortuary record this month bears a most favorable comparison with all the seven years' Februaries that preceded it. The *deaths*, 47, are 15 and one-7th less than the average of the whole. 1861 was numerically less—42—; but the following table, exhibiting the proportion of deaths in the different groups of ages in the present year, contrasted with the minimum and maximum years of mortality, and also that of February 1863, will show that the present is really the healthiest year of the whole, as the deaths under 5 years of age, are actually 4 less than in 1861.

Feb., 1864.	Ages	Minimum year. Feb., 1861,	Maximum year. Feb., 1859	Feb., 1863.
10	Under 1 year old	8	31	25
4	1 to 5 ditto	10	11	9
1	5 to 20 ditto	2	2	2
11	20 to 45 ditto.	3	18	12
8	45 to 60 ditto	8	5	5
13	60 and above	11	8	16
47		42	75	69

While last year had 22 more deaths than the present year, it is seen above that the groups of ages "5 to 60" only differed by 1864 having one more, while in the ages "1 to 5" 1863 had 20 more, and in "all above 60," 1863 had 3 more. In the "zymotic class" of diseases only 3 deaths occurred this month, one, a boy of 6 years old, from scarlatina, a child of nine months from diarrhœa, and a man of 37 from the same. In 1863, this class of diseases gave 28 deaths; in 1862, 27; in 1861, 13; in 1860, 19; in 1859, 29; in 1858, 28; in 1857, 6. The inferior salubrity of the numerically minimum year, 1861, is hereby again clearly demonstrated in comparison with the present year's February.

In the "constitutional class" of diseases, the deaths were 6, four being from consumption, and one of them born in Tasmania.

In the 1st order of the 3rd class, "diseases of the brain and nervous system" there were the large number of 17 deaths—4 from apoplexy; 4 from paralysis; 1 from epilepsy; 6 from convulsions; 2 brain-disease. January had only 3 deaths in this order of diseases. February 1863 had only 7. The meteorological cause of the fatality in this group, has been previously indicated.

In the 2nd order, "diseases of the organs of circulation" 4 deaths were recorded, and these diseases are much influenced by the same atmospheric phenomena as the former.

In the third order "diseases of the organs of respiration" only one death took place—a remarkable event.

Three deaths from *old age* were registered, the oldest being 89.

Only one death from *accidental violence* occurred.

There were two inquests held on deaths which happened within the month; February 1863 had 7.

In the first week of the month, 16 deaths took place. In the second 11. In the third 9. In the fourth 10. On the last day one. On five days in the month not a single death occurred. The greatest number on any day was 5, on the 1st, when the greatest movement in the pressure of the atmosphere was noted. The greatest number of deaths on any two consecutive days was 6, on the 25th 26th. The greatest number on any four following days was 9, and occurred 1st to 4th, 5th to 8th 14th to 17th; from 24th to 26th was the most fatal period having 8 deaths.

The registered *births* were 77, being two more than in February, 1863. The total births registered in all Tasmania, in 1863, were 205 four-sixth's less than the average of the previous six years, but the marriages last year exceeded the average, so that a different result may be expected this year. The colony gained in population, numerically, up to the 31st December, 789 individuals, but all by children born. The computed population on 31st December 1863, I make to be 93,117, being an increase of 3,140 since the census of 7th April 1861. With a population annually becoming so much younger, on the aggregate, an increased death rate, instead of the reverse, might reasonably be expected.

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MARCH, 1864.

The monthly evening meeting of the Society (being the first of the session of 1864) was held at the Museum, Macquarie-street, on Tuesday the 8th March, G. P. Adams, Esq., in the chair.

The following gentlemen having been nominated by the Council, were, after a ballot, declared to be duly elected Fellows of the Society:— H. Bilton, Esq., Glenorchy; J. G. Crouch, Esq., Hobart Town; A. T. Seal, Esq., New Town.

The following returns were laid on the table:—

1. Visitors to Gardens during February, 1,896.
2. Plants forwarded to Government Gardens, Auckland, New Zealand, in return for plants received, 43.
   Seeds supplied (papers), 48.
3. Tench supplied to Mr. Baynton, 12; do to Mr. Butler, for Lake Echo, 65.
4. Periodicals received, (the usual.)
5. Specimens forwarded to Dr. Witte, Royal Museum, Hanover, 46.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.
   (*a.*) Table for February.
   (*b.*) Summary and analysis of observations for ditto.
2. Port Arthur, from J. Boyd, Esq.
   (*a.*) Tables for November and December, 1863, and January, 1864.
   (*b.*) Reading of Government schooner's barometer for ditto.
3. Swansea, from Dr. Story.
   (*a.*) Tables for November and December, 1863, and January, 1864.

The SECRETARY read the usual Analysis of the Meteorological observations, together with a health report for the month by E. S. Hall, Esq.

The following presentations were brought under the notice of the meeting:—1. Twenty prepared skins of Queensland birds; from Mr. Waller, Brisbane. 2. Two samples of Sea Island cotton grown in Queensland; from Mr. Wright, Brisbane. 3. Jaw of Sperm Whale; from Mrs. Seal. 4. Ditto, from W. L. Crowther, Esq. 5. Specimen of Gorgonia from D'Entrecasteaux Channel; from Mr. Baynton, Brown's River. 6. Bronze Medal of Royal Horticultural Society, "Awarded to the colony of Tasmania for an exhibition of wheat, October 1862"; from the Commissioners for Tasmania. 7. Skull of "Schnapper"; from Mr. Wintle. " 8. Eleven specimens of Minerals and Fossils; from Miss E. Boultbee, Avoca. 9. Fossil (Spirifer Sp.); from Mrs. Geiss, Bridgewater. 10. Specimen of granite from Castlemaine, Victoria; from G. Whitcombe, Esq. 11. A piece of wood with clusters of oysters and mussels attached, found in the Derwent, near Mount Direction; from R. Cleburne, Esq.

The SECRETARY reported that in exchange for a liberal presentation received from Dr. Witte of the Royal Museum of Hanover, the Council had recently forwarded to that gentleman a collection of Tasmanian bird and other skins, which it was hoped would be found acceptable. [The present opportunity may be taken to intimate to the Fellows of the Society and others, that the Council are very anxious to receive either recent specimens, skins, or well prepared skeletons of the native devil (*Sarcophilus ursinus*), and of the native tiger (*Thylacinus cynocephalus*), also specimens of our reptiles, &c., which will be valuable not only as a means of enriching our own collection, but for the purpose of effecting exchanges with other museums, which would in every way be advantageous to us.]

The SECRETARY called attention to the copies of the report for 1863, on the table, which were now ready for distribution, and announced that from Monday, the 12th instant, the lower rooms of the Museum would be open to the public from 12 till 5 o'clock daily, Tuesdays excepted.

Mr. W. Johnston asked if it had not been determined that a public opening, followed by a conversazione, should take place, and that the Governor was to be invited to officiate on the occasion as President of the Society.

The Secretary explained that nothing definite had been agreed upon, but if a public opening were thought of, it would evidently be better it should take place when the arrangements of the Museum were complete throughout. Progress, however, was being made with the Geological collection on the upper floor. The Curator (Mr. Roblin) had already arranged a complete and valuable series of specimens, collected during the geological survey of Great Britain and Ireland, which had been forwarded to the Society from the Government School of Mines, London, and with the assistance of Mr. M. Allport, and Mr. Stephens, the remaining specimens would be classified with as little delay as possible. In the meantime as many enquiries were being made as to the period of opening the Museum, it was thought better that the public should at once be admitted to the portion already completed, than that further delay should take place.

Mr. Abbott remarked although a public opening just now would be impossible on account of the incomplete condition of the geological museum, the present partial one would not preclude a more formal ceremony on a future occasion.

Mr. Abbott then read a paper on the "Means which have been adopted for ascertaining the velocity of light, and the Sun's distance; with especial reference to the forthcoming transit of Venus over the Sun's disc,in 1874, and 1882." After indicating the extreme importance attached to this event by astronomers, Mr. Abbott alluded to the action already taken in reference to it by scientific bodies in various parts of the world. An extract from an address by the Astronomer Royal of England was read, specifying several stations at which observations on the transit would be of peculiar value. Of these stations Tasmania is one, but doubts are expressed as to whether the longitude of this place has yet been determined with the great accuracy which the circumstances of the case would require. Mr. Abbott hoped, however, that Professor Airey would be satisfied on this point on receiving from him a copy of the number of the Papers and Proceedings of this Society, containing Captain Kay's account of the very elaborate series of observations, on which the longitude of Hobart Town was calculated.

The Secretary after expressing his sense of the interest attached to the paper just read observed it was evidently of great importance that all those Governments who contemplated sending out observers to this hemisphere should be well informed of the means taken to establish with precision our exact longitude, and was certain the council of the Society would take special care that the subject should be attended to.

Mr. J. G. Crouch then, by means of the Gyroscope, exhibited some interesting experiments, shewing how the principle of gravity was modified by rapid motion. In one of these a solid metal wheel or disk, very thick at its periphery, 3½ inches in diameter, and fixed on an iron spindle, was made to revolve with extreme velocity. The spindle, which was about 4 inches in length, being in a horizontal position, a suspensory cord was then attached to one of its extremities in such a manner that its rotation was not interfered with, and all other support was removed. One end alone of the spindle was now held up by the cord, and the other projected at right angles to it, free and unsupported in the air. In this singular position, in spite of its own weight, and that of the wheel (1½ lb.) it continued to revolve as long as its extreme velocity was maintained. The same was the case when it was tilted up so as to form an angle of 40° with the cord, and it was only as the rotatory action of the wheel subsided that the distal extremity of the spindle gradually sank until the whole, suspended by the cord, assumed the vertical condition.

Mr. Facy, after alluding to the importance of Mr. Abbott's communication, and to the interesting character of the experiments just exhibited by Mr. Crouch, moved a vote of thanks to those gentlemen, and also to the donors of the various objects presented that evening to the Museum. The vote being carried unanimously, and accorded by the Chairman, the proceedings terminated.

Means which have been adopted for ascertaining the Velocity of Light and the Sun's Distance, with especial reference to the forthcoming transit of Venus over the Sun's disc, in 1874 *and* 1882.

[Read by Francis Abbott, F.R.A.S., 8th March, 1864.]

By M. Foucault's recent experiments on the velocity of light, astronomy has received a new accession, especially as it applies to the great question concerning the Sun's distance, a correct knowledge of which enables astronomers to mete out the exact distance and dimensions of every planet and satellite, and the distance of those fixed stars whose parallaxes are approximately known. Any error, therefore, in the Sun's distance entails a proportionate error in the distance of all the other heavenly bodies.

I have been induced to bring this subject before the meeting as astronomers have already begun to talk of preparing means and adopting situations for making unremitted observations on the next transit of Venus over the Sun's disc, in 1874 and 1882. It is essential to remark that the transits will take place in the month of December, and at that time the earth's South Pole will be turned towards the sun, and those regions of the earth included between the South Pole, and the southern limit of illumination will be carried by rotation, opposite to the direction of all the northern parts of the earth. Only two transits of this planet over the sun have occurred since Dr. Halley invoked the attention of astronomers to these rare astronomical events, viz., in 1761 and 1769. The transit of 1769 was most favorable, and afforded an opportunity which can only occur once in a lifetime.

Mr. Breen, Assistant Astronomer to the Royal Observatory at Greenwich, has made for the Astronomer Royal drawings both of the ingress and egress, together with the illuminated portion of the earth during the time of each transit. In these drawings, *Tasmania* for the first transit, 1874, is illuminated from beginning to end. This will appear clear by inspection, from the time of conjunction given on the diagram. At the second transit, 1882, the first contact is at 2h. 5m. 54s. a.m., on that day, 7th December, the sun does not rise at Hobart Town until 4h. 28m. a.m., the ingress therefore will not be visible.

So important have these observations appeared to astronomers that at the last transit of Venus, in 1769, expeditions were fitted out on the most efficient scale by the British, French, Russian, and other Governments to the remotest corners of the globe. The celebrated expedition of Captain Cook to Otaheite was one of them; and it is not more certain that this phenomenon will recur than that every provision will be made for observing it in every inhabited quarter of the globe. With the improved instrumental means, and the more accurate methods of observing, -should other things prove favorable—it is expected that the results may furnish an universal standard of astronomical measure.

"In the transit of 1861," says the Astronomer Royal,* "the result depended almost entirely upon an accurate knowledge of the differences of longitude of very distant stations, which are undoubtedly subject to great uncertainty. In the transit of 1769 it happened that the result depended almost entirely upon the observations made by Father Hell, at Wardhoe; and to these great suspicion has attached, many astronomers having, without hesitation, designated them as forgeries. It is evidently desirable to repeat the practical investigation when opportunity shall present itself."

The solar parallax from the observations of 1769—which Encke deduced from an elaborate discussion fifty years after they were made—is 8″.57116. This corresponds with a solar distance of 95,360,000 statue miles; and should the forthcoming transit of Venus prove unfavorable, any reduction of the possible error in the sun's parallax within the limit of one hundredth of a second will be hopeless for near two centuries to come.†

In glancing first at the two astronomical methods that have been adopted for measuring the velocity of light, and from which some apparent difficulties arose, owing to the extent of space through which the ray is transmitted, which, in stellar astronomy, surpasses in magnitude even the velocity of light, by which the luminous ray appears to be retarded in its passage, so that a distinction exists between the *actual* and the *apparent* interval of each successive transit. For example, the first satellite of Jupiter revolves round its primary in about 42½ hours, and as it takes light more than 40 minutes to pass over the average distance of Jupiter, the eclipse is not seen until so many minutes, on the average, after it has happened. Now if this delay were con-

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* Monthly Notices, R.A S.

† No other transits of Venus over the sun's disc will take place until June, 2004, and June, 2012.

stant, the interval of successive eclipses would not be altered. But in the course of six months the distance of the earth from Jupiter increases by the diameter of the earth's orbit, and in the next six months' changes back again. When the earth is nearest to Jupiter, the eclipse reaches us in abont 32 min., but when the earth is at the greatest distance, it takes 50 minutes to reach us.

It is clear from this that the intervals between successive eclipses are variable, being sometimes longer and sometimes shorter than the real intervals. Delambre discussed 1000 of these eclipses, observed between the years 1662 and 1802, from which he calculated the velocity of light to require 493.2 seconds to pass over the mean distance of the Sun. If this time, then, divides 95,360,000 statute miles, which is the Sun's distance, deduced from the transits of Venus in 1761 and 1769, the quotient 193,350 statute miles is the velocity of light in one second.

The second process which astronomy has supplied for obtaining the velocity of light, requires not *space* but a *velocity* which is commensurable with the velocity of light. In nature the velocity of the earth is compounded in this way with the velocity of light, and imparts to light an apparent path, differing by a small angle from the true path. The angular displacement thus caused between the apparent and the real places of a star is called *aberration*, from which Bradley explained anomalies in observation which had been until that time considered accidental. The displacement of a star works contrary ways at opposite seasons of the year. Half the difference between the extreme places is the distance from the apparent to the true place, or the *constant of aberration.* This, when known as an observed fact, establishes the ratio between the velocity of light and the velocity of the earth, and enables the astronomer to assign the value of the one with all the accuracy which pertains to his knowledge of the other.

The result of aberration obtained by Struve is 20″·35, from which the velocity of light is calculated to be 10,088 times as great as the velocity of the earth. The mean velocity of the earth is known from the magnitude of its orbit, that is, of the sun's distance.

Assuming the distance derived from Enck's parallax to be the most correct, the velocity of the earth in one second of solar time is 18,977 miles. This multiplied by the above ratio gives 191,513 miles for the velocity of light by Bradley's principle. It appears, therefore, that the velocities by these two astronomical methods differ by 1837 miles, a small quantity comparatively, being only *one per cent.* of the whole velocity.

The experiment on the velocity of electricity by Professor Wheatstone, published in 1834, suggested the possibility of measuring in a similar way the velocity of light, and to this purpose it was afterwards made applicable by Fizeau, from the results of which the French Academy referred the subject to a scientific commission. F. Arago next made experiments on rapid rotation, and, being aided by the refined skill of Briguet, he realised velocities in the mirror of 1000 turns in a second of time. These experiments have been of late much improved by M. Foucault, in causing a pencil of solar light reflected into a horizontal direction by a heliostat to fall upon a micrometric mark, which is made the real standard of measure. The rays which traverse this initial surface fall next upon a series of rotating mirrors, to which a constant velocity is imparted with air supplied by a high pressure belows.

M. Foucault's experimental results by means of this ne w apparatus, which he says has been purged of uncertainty, gives the velocity of light in space as 298,000 kilometres in a second of mean time. This value reduced to statute miles gives the velocity of light as 185,177 miles in a second—which is less by 6336 miles than the velocity admitted by science as computed from aberration. This difference between the result of experiment and those of astronomical observation, which come nearest to it, is three times greater than the variation between the velocity deduced from aberration and that derived from eclipses.

M. Foucault states that the mean results by his experiment can be trusted to the fraction of 1-500. Now the aberration of 29″·45, adopted by astronomers, cannot be at fault more than one 1,800th of the whole. How, then, is the velocity of light to be reconciled with the value of aberration. Is it possible there can be an uncertainty of three per cent. in the velocity of the earth? If there is an error in the velocity of the earth it is an error in space, and to diminish the earth's velocity sufficiently by a change of time would require an increase of nearly eleven days in the length of the year. The only other way of reaching the velocity of the earth is by diminishing the earth's orbit, and that would change proportionately the mean radius of the orbit—that is, the sun's mean distance. Can the sun's distance from the earth, then, be considered uncertain to the extent of three per cent. of the whole?

The limits of accuracy by which the sun's distance from the earth has been best determined is by solar parallax, or the angle between two or more stations at considerable distances from each other, in the northern and southern hemispheres, whose geographical positions are well known, and from which stations two astronomers point their telescopes, when looking at the sun, at the same moment. As the distance of the object increases, as for sun, or star, the base line is to be enlarged, and the angle thus obtained is the means by which solar parallax is associated with the sun's distance. In the case of the sun, the base line is measured on the earth's surface ; and in the case of a star from the extremes of the earth's orbit. The astronomer then makes use of Kepler's third law, which establishes a relation between the distances of the different planets from the sun, and their periods of revolution ; if either distance is found by observation, the other can be computed by this law.

The choice lies between Venus, at inferior conjunction, and Mars at opposition. The parallax of Mars may vary from 20″·7 to 19″·1, according to the position of Mars and the earth with respect to the perihelion of the orbit at the time of opposition. The parallax of Venus at conjunction may vary for the same reasons from 33″·9 to 29″·9. Venus, therefore, may be nearer to the earth than Mars, and the parallax more favorable. But Venus cannot be seen at conjunction, except when its latitude is so small that a transit across the sun's disc occurs. Then the two observers refer its place not to a star but to the sun, and the quantity determined is the difference of parallax between Venus and the sun, which will vary from about 21″ to 25″. The difference of parallax is not measured directly, but through the influence it produces on the duration of the transit at the two stations, and consequently upon a much enlarged scale.

The solar parallax may be derived from the parallax of Mars, when this planet is in opposition; Lacaille was sent in 1740 to the Cape of Good Hope for the purpose, and the parallactic angle observed between the direction of Mars as seen from that station and from the Observatory at Prais. The solar parallax then found was 10″·20, with a possible error not exceeding 0″·20. Henderson comparing his own observations of the declination of Mars at its opposition in 1832 with corresponding observations at Greenwich, Cambridge, and Altona, computed the solar parallax at 9″·028.

The solar parallax is also computed from the law of universal gravitation by means of the disturbed motion of the moon round the earth, and the unequal attraction of the sun on the two bodies. The magnitude of the disturbance is in some proportion to the distance of the disturber when compared with the relative distance of the two disturbed bodies; and this ratio of distances is the inverse ratio of the parallax of the sun and moon. By selecting one of the perturbations in the moon's longitude adapted to this purpose, Mayer, in 1760, computed the solar parallax at 7″·8. In 1824, Burg calculated this parallax at 8″·62. Laplace gives it at 8″·61.

The following table‡ gives the values of solar parallax and the sun's distance by the different methods of astronomy and by experiment :—

Observer or Computer.	Method.	Parallax ″	Distance. Miles.
Encke	By Venus (1761)	8·53	95,141,830
Encke	,, ,, (1769)	8·59	95,820,610
Lacaille	By Mars	10·20	76,927,900
Henderson	,, ,,	9·03	90,164,110
Gillis and Gould	,, ,,	8·50	96,160,000
Mayer	By Moon	7·80	104,079,100
Burg	,, ,,	8·62	94,802,440
Laplace	,, ,,	8·61	94,915,970
Pontecoulant	,, ,,	8·63	94,689,710
Lubbock	,, ,,	8·84	92,313,580
Lubbock	,, ,,	8·81	92,652,970
Hansen	,, ,,	8·88	91,861,060
Leverrier	,, ,,	8·95	91,066,350
Foucault	By Lights	8·86	92,087,342
Fizeau	,, ,,	8·51	95,117,000
Velocity of Light	By Eclipses	—	193,350
,, ,,	By Aberration	—	191,513
,, ,,	By Fizeau's experiments	—	194,667
,, ,,	By Foucault's ,,	—	185,177

‡ This table, together with some other datum, is taken from a recent article on the subject compiled by Professor Joseph Lovering, of Harvard College.

The Sun's mean horizontal equatorial parallax has since been computed by E. J. Stone, Esq., from observations made at the Royal Observatory, Greenwich, and the Government Observatory, Williamstown, Victoria, during the last opposition of Mars, in 1862. The mean result is $8''\cdot932$, with a probable error of $0\cdot032$.

It is clear from these resultants that the three astronomical methods, even if we select the most trustworthy, differ by three or four millions of miles—three or four per cent. of the whole quantity. The commonly received distance of the Sun is based upon Encke's profound discussion on the observations made at the last two transits of Venus. Encke decided from the weights of the observations, discussed on the mathematical principle of *least squares*, that the probable error in the Sun's distance, as given by the transits, does not exceed 1-230th of the whole quantity. Astronomers have also reason to believe that the adopted value of observation is correct within 1-1800th of the whole quantity. Foucault's is confident that with his improved apparatus he can banish all errors greater than 1-6000th of the whole quantity. It follows then, that one of these three elements, either the velocity of light, aberration, or the Sun's distance must be in error to the extent of three or four per cent. Which of the three must be changed?

This question remains to be answered by astronomers at the next two transits of Venus—December the 8th, 1874, and December the 6th, 1882*—for which purpose England, France, Russia, and America have already taken some preliminary steps for sending out scientific expeditions. In a paper read April 8th, 1857, before the Royal Astronomical Society, by the Astronomer Royal, rules are laid down, instruments described, and localities fixed upon—amongst the latter Van Diemen's Land is very favorably mentioned, but Professor Airy expresses a doubt whether the longitudes of any of the stations named, excepting those in Europe, are yet known with sufficient accuracy. Sir Henry Young (our late Governor) on being made acquainted with the opinion of the Astronomer Royal, at one of our Monthly Meetings, suggested that I should confer with Lieut. Brooker, and try to remove the doubt from the mind of Professor Airy. The result of this interview with Mr. Brooker was the deductions of the following resultant from Captain Kay's observations, made for the Magnetic Observatory, one copy of which was forwarded by agreement to the Royal Astronomical Society, and another copy to the Admiralty, 17th December, 1861:—

Captain Kay's communication to the Royal Society of Van Diemen's Land, in 1852, of the geographical position of the magnetic observatory, Hobart Town, gives such an elaborate detail of the means adopted for ascertaining its latitude and longtitude, that with verification by chronometric measurements, and—what may be possibly thought—accidental accordance from the measurements obtained between the Cape of Good Hope and Hobart Town, it may be fairly and reasonably assumed that the longitude of the observatory is (if not correctly known) but very little in error—less than half a mile; for in his tabulated record of the numerous observations by eclipses of the sun, by Jupiter's satellites, by moon-culminating stars, and by chronometric measurements, extending over a period of several years, by several observers, the extreme range of difference amounting to only 3½ miles. However, by the means of eight general results, it is reduced to less than half a mile of the probable truth. To attain a greater certainty would necessitate the establishment of a fixed observatory, with the best instruments,† and careful observations by experienced scientific observers."

Her Majesty's ship "Herald," Captain Denham, was in these waters on a scientific cruise in the year 1859, and in December of that year was stationed at Garden Island, Sydney. The result of the observations taken at that time by the officers of the "Herald" gave the longitude for Garden Island 10h. 5m. 1·9s. This would make the longitude for Hobart Town 9h. 49m. 28·8s., whereas Captain Kay's observations give it 9h. 49m. 29·6, making a difference of 8-10 of a second, which may be accounted for by the observations of the "Herald" being referred to the harbor, and Captain Kay's to the observatory. Trifling as 8-10 of a second may appear, unless accounted for, it would entail a considerable error in the sun's distance. The solar parallax is only about eight seconds and a half, and an error of 1-10 of a second includes an error of more than a *million of miles* in the sun's distance, in which a correction of three per

* A reconnaissance of Wilk's Land is also required to be effected, included between Sabrina Land and Repulse Bay, occupying an extent of about 400 miles. To secure observations both of ingress and egress in this track is considered indispensable.

† The telescope used at the magnetic observatory was a portable achromatic by Dolland, 42 inch focal length, and 2¾ inch apperture, on a pillar and claw stand.

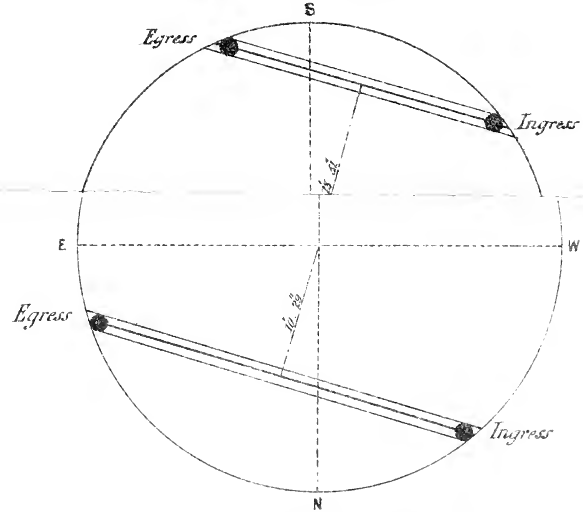
cent. only would run up to six hundred thousand millions of miles in the distance of the nearest fixed star. This enormous amount will appear clear when we consider that the base line applied is the diameter of the earth's orbit as computed by Encke, from the last transit of Venus, at 190,000,000 of miles, which is something utterly insignificant—a mere point which only produces a parallax on the star Sirius of 0″230.

Seeing, then, that a revision of the problem of the sun's distance is required, and that the colony of Tasmania is well situated for one of these stations, it might be advisable for either the Colonial Government, or the Council of the Royal Society supported by the Government, to make known to all those nations who are likely to send out expeditions the means by which the geographical position of Hobart Town has been arrived at, the result drawn from the mean of those observations, and the favorable position of the place for both transits.

Private Observatory, Hobart Town,
March 8th, 1864.

TRANSIT OF VENUS 1874 DEC^{R} 9TH

SUN'S DISC REVERSED



HOBART TOWN MEAN TIME OF TRANSIT

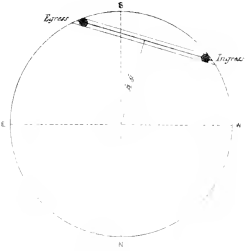
		h	m	s
1882 Dec^{r} 7th	*Conjunction*	2 .	5 .	54 a.m.
	Semiduration of Transit	3 .	1 .	43

The aberration of Venus, and small equations of the Sun's place, are omitted, which will give about 2′. 20″ to be added to the time of conjunction F. Abbott.

Survey Department, Hobart Town.

TRANSIT OF VENUS 1874 DEC^{R} 9TH

SUNS DISC REVERSED

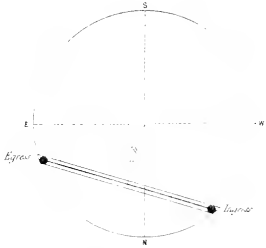


HOBART TOWN MEAN TIME OF TRANSIT

		h m s
1874 Dec^{r} 9th	*Conjunction*	1 57 54 p.m.
	Semiduration of Transit	2 4 41

TRANSIT OF VENUS 1882 DEC^{R} 7TH

SUNS DISC REVERSED



HOBART TOWN MEAN TIME OF TRANSIT

		h m s
1882 Dec^{r} 7th	*Conjunction*	2 5 54 a.m.
	Semiduration of Transit	3 1 43

The aberration of Venus and small equations of the Suns place are omitted which will give ...
2 2s to be added to the time of conjunction F. Abbott

METEOROLOGY FOR MARCH, 1864.

Private Observatory, Hobart Town.

Years.	Barometer reduced to standard temperature, 32 degrees.	Mean Temperature of the Air.	Maxima Thermometer Readings.	Minima Thermometer Readings.	Mean daily range of temperature.	Degree of humidity, 100 complete saturation.	Extent of cloudy sky 10 for sky covered.	Mean amount of ozone 10 for maxima.	Total amount of Rain.
	In.	°	°	°	°				In.
1841	29.972	61.45	89.0	43.2	22.2	.69	4	—	0.33
1842	29.947	59.14	81.0	47.3	19.6	.68	5	—	0.07
1843	29.847	59.91	83.6	41.2	18.3	.69	5½	—	0.02
1844	29.651	56.35	85.8	39.5	19.4	.69	5	—	3.22
1845	29.891	59.25	95.0	42.8	20.4	.71	4½	—	1.55
1846	29.796	57.87	98.8	40.4	19.4	.73	6½	—	2.15
1847	29.772	57.95	88.2	42.5	16.3	.75	6½	—	2.67
1848	29.743	59.56	81.0	47.3	18.2	.72	6	—	1.18
1849	29.575	54.73	75.0	39.0	16.8	.72	6¼	—	2.37
1850	29.820	65.53	97.0	42.0	20.2	.63	5¼	—	0.29
1851	29.674	56.98	80.0	42.1	17.5	.73	5	—	0.73
1852	29.887	58.12	87.2	40.6	18.6	.69	4⅔	—	0.31
1853	29.816	55.05	75.0	38.4	16.9	.76	5¾	—	0.80
1854	29.668	55.67	75.0	41.7	14.8	.78	6	—	7.60
1855	29.961	61.00	84.0	38.0	17.16	.70	5.25	—	1.38
1856	29.968	64.64	91.0	38.0	23.80	.73	6.41	—	1.63
1857	29.802	60.00	82.0	40.0	23.50	.69	5.55	—	1.04
1858	30.021	62.16	90.0	42.0	22.47	.70	4.34	7.10	2.38
1859	29.906	59.20	85.0	41.0	22.29	.69	5.47	6.21	0.26
1860	29.892	62.38	90.0	46.0	20.25	.69	5.00	6.87	1.68
1861	29.919	64.03	99.0	45.0	20.58	.67	5.63	6.76	0.82
1862	29.900	62.38	87.0	41.0	20.48	.69	4.70	6.61	1.09
1863	29.966	61.33	86.0	45.0	15.00	.78	6.80	7.92	4.87
1864	30.109	60.30	81.0	43.0	20.32	.74	4.05	6.96	1.26

The means in all cases are taken from the sums of each column, and not from the maximum and minimum.

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

12th.—Coe's Golden Drop Plum, commencing to ripen.
14th.—Seckle Pear, commencing to ripen.
21st.—Tips of Elm, turning yellow.
23rd.—Horse Chestnut, leaves turning brown.
28th.—Ash leaves commence falling.
31st.—Oak leaves commence falling.

ANALYSIS OF THE OBSERVATORY RECORDS FOR MARCH, 1864, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c.

By E. Swarbreck Hall.

The pleasant weather which so generally prevailed this month, excited almost universal commendation. To the sanitarian alone was the mischievous conditions palpable, which has made this month the most fatal to life of any March during the previous seven years.

Atmospheric pressure was so continuously high that the mean for the month, 30·109, is +·252 above the 20 years' adopted standard mean, and greater than that of any March on record. Only three times in the previous 23 years, has any month of the twelve, exceeded the present month in pressure, *i. e.*, July 1850, 30·113; July 1860, 30·193; August 1860, 30·160. The maximum 30·497 was attained on the 26th and was never so high in any March of the previous 23 years. The minimum was 29·580 on the 14th, which is also the highest minimum record for this month during the same period. The month's range ·917 of an inch, therefore, occurred in twelve days, and is not remarkable for its extent; 1856 and 1859, both had a greater range. The greatest movement of the barometer was a rise of + ·375 of an inch, between the 7 a.m. observations of the 25th and 26th. Only six times during the month did the daily perturbations exceed the fifth of an inch. It is almost an unexceptionable rule, that continuously high atmospheric pressure is accompanied with excessive mortality.

The *wind-force* was 52·46 lbs., which is 2·50 lbs. less than the March average. Fortunately the ocean winds had greatly the preponderance, both in number and force. Northerly winds were much below the average in both respects. At seven o'clock in the morning, wind from northerly points of the compass prevailed for 27 out of the 31 days. At 1 p.m., they were only noted 7 times, at sun-set 9 times, so that the sea-breezes kept up a good supply of Ozone, and counteracted to some extent the injurious effects of drought, high solar temperature and excessive atmospheric pressure. The strongest wind recorded had 5·20 lbs. pressure to the square foot, and was registered at 7 a.m. of the 15th. But at an earlier period of the same day a hurricane blew, with a force of 20·83 lbs. and did considerable damage to buildings, shipping, and especially fruit trees. It was a north-wester, but not a hot-wind.

The *temperature* mean was 60·30 degrees, which is + ·32 only above the 20 years' mean for March. Nevertheless it was colder than any March since 1859, when it was 58·20 degrees. The mean deduced from the maximum and minimum self-registering thermometers, differed less than usual from the former, being only 61·04 degrees. The maximum temperature of the month was only 81 degrees, and occurred on the 11th and is considerably below that of any March since 1854. The minimum 43 degrees was noted on the 4th, 22nd, and 26th. The months' range, 38 degrees, is less than has happened in any March since 1854.

The *daily range of temperature* had a mean of 20·32 degrees, which is only + ·28 above the 20 years' average, though it is +5·32 higher than March, 1863, had. The greatest range on any day, was only 29 degrees on the 22nd. Every March since 1854 has had a higher maximum than this. The smallest movement of the thermometer on any day was 13 degrees, and recorded on the 3rd and 16th. Shade temperature, therefore, in all its variations, was not inimical to health.

The mean of the *solar-thermometer* was, 107·87, which is +4·86 degrees, above the average of the previous 8 years, and, +12·23 degrees, higher than March, 1863, had. The long continuance of almost cloudless skies, as will be seen hereafter, accounts for this unusual abundance of sunshine. The maximum, 121, occurred on the 11th; the minimum, 74, was noted on the 19th, however, there were only six days altogether on which this thermometer indicated a lower temperature than 100.

Terrestial-radiation mean was 47·50 degrees, being —·88 of a degree, less than the 8 years' average, and —3.58 degrees lower than 1863 had. The maximum occurred on the 11th, and was 56·5 degrees, the minimum was recorded on the 6th and 22nd, being 39 degrees.

The total *rain* precipitated during the month was only 1·26 inches to the square foot, which is —·26 less than the March average, and —3·61 inches less than fell in March last year. There were only four rainy days, being ·6·37 days below the average number for 8 years of March. The downfall on the 3rd was ·83 of an inch, and thoroughly scoured the streets and gutters. Again on the 14th there was just rain enough to make the channels flow gently. On the other two days only enough fell to lay the dust, promote decomposition, and thereby pollute the atmosphere. *Snow* was never noted on Mount Wellington during the month.

The total of *spontaneous evaporation* was 2·94 inches.

Elastic force of vapor had a mean of 390, which exceeds the 20 years' average by +·35. Four times only in 23 years, has the elastic force of vapor in March exceeded that of the present month.

Humidity mean was 74, being —1½ less than the 20 years' average, but —4 below that of March last year.

Cloud mean 4·05 is below that of any March in the previous 23 years, except 1841, which had the decimals less. The 20 years' mean is + 1·36 above the present month.

Ozone mean, notwithstanding so many unfavorable atmospheric conditions, was + ·06 above the month's average, being 6·96. To the predominance of breezes from the ocean points of the compass, we owe this remarkable purity. Nevertheless, March 1863, owing to its copious rain-fall, had more than one degree more for its ozone mean. The range of the present month was from maximum 8·5, to minimum 5.

Electricity had 21 positive indications, with a maximum tension of ·75. Negative had 39 records, with a maximum tension of 6·5. There was only one day, the 14th, on which electricity was "nil."

The *deaths* for this month exceed in number those of any March during the previous seven years; but the previous four months were all below the average, and the total deaths in the first quarter of 1864 is less by 30 1-7th than the average of the corresponding quarters of the previous seven years. In the following table the deaths are arranged in groups of ages, and contrasted with those of the minimum March, and the previous maximum, as well as that of the foregoing month of February :—

March 1864.	Ages.	Minimum year, March 1859.	Maximum March '59.	Feb. 1864.
25	Under 1 year	15	26	10
13	1 to 5	9	17	4
2	5 to 20	4	3	1
11	20 to 45	8	7	11
13	45 to 60	8	5	8
9	60 and above	4	8	13
73		48	66	47

The deaths under five years of age are 38, or rather more than half of the total mortality. February had less than one third, but March, 1858, had nearly two-thirds. March 1859, the minimum year, had exactly one-half of the total deaths under five years of age.

In the *Zymotic class of Diseases*, the deaths were 35. The greatest proportion of these (26) were bowel complaints. The preceding month of February had only 3 deaths in the Zymotic class.

In the *Constitutional class* the deaths were eight, two of them from consumption, but neither native born Tasmanians.

In the class of *Local Diseases* the total was 19; of these eight belonged to the order of *Diseases of the Brain and Nervous System*; four to the *Circulatory System*; two only to the *Respiratory System*; two to the *Digestive System*; two to the *Urinary System*; one to the *Reproductive System*. In the class of *Developmental Diseases*, the deaths were eight, two of them from old age, respectively 86 and 88 years old.

In the class of *Violent Deaths*, &c., the deaths were three. The *Inquests* were five. In the first week of the month 12 deaths took place; in the second week 20; in the third 18; in the fourth 16; on the last three days 7. On five days of the month there was not a single death. The greatest number on any day, was 5, on the 18th and 24th. The greatest number on any three consecutive days, was 12, on the 9th, 10th, 11th, and 24th, 25th, 26th. The most fatal period of the month, was, the six days, 6th to 11th inclusive, when 21 deaths occurred.

The registered *births* were 58, being 21 less than March, 1863, had.

In all the registration districts of Tasmania, the deaths registered for the quarter ended 31st March, 1864, are only 340. 1863, had 390; 1862, 387; 1861, 397; 1860, 440; 1859, 451; 1858, 497; the average of the six years being 427, or nearly 20 per cent. more than the first quarter of the present year had. The gradual diminution of deaths yearly, in this the most fatal season of the year to life, is a remarkable fact; particularly when considered in relation to the annually increasing proportion of the Tasmanian born constituents of the total population, to the rest; and, also, the absolute numerical increase on the whole. The inference to be legitimately drawn from these facts, is, that the rate of mortality in the native born population will be very much less than that of their British parents, and very much less than that of British children of corresponding ages. The deaths then, in this, the usually most fatal quarter of the year, are for the whole island, at the very low rate of about 14½ per thousand per annum, being half per cent. less than that of the healthiest registration district of England and Wales.

It is worthy of note to remark, that while the month of March has been so much more unfavorable to health in Tasmania than February and January were this difference did not exist on the Australian Continent. March, in Victoria, was (I gather from the weekly health reports of its able Registrar-General) quite as favorable as the two previous months. It becomes therefore an interesting problem to solve, (by ascertaining the peculiar climatic differences during the period), what atmospheric condition or conditions varied so much, as to give the clue to the cause? In the absence yet of the published meteorological tables for Victoria, I cannot make a rigid comparative analysis, but generally I believe, the greater rain-falls on the Australian continent, contrasted with ours so much below the mean, affords one striking exemplification of the probable cause or causes.

F. ABBOTT.

APRIL, 1864.

The monthly evening meeting of the Society, was held on Tuesday, the 12th instant, A. Kennerley, Esq., in the chair.

Among the Fellows present were Mr. C. Gould, G. P. Adams, F. Abbott, sen., F. Abbott, jun., L. Susman, A. M. Nicol, J. G. Crouch, H. Hunter, D. Lewis, H. Bilton, G. R. Napier, M. Allport, J. Facy, T. J. Knight, Q.C., H. S. Wintle, E. S. Hall, and Dr. Agnew, Hon. Sec. Professor Neumayer, of Melbourne, was present by invitation as a visitor.

L. Roope, Esq., having been nominated for election as a Fellow of the Society, was, after a ballot, declared to be duly elected.

The following returns were laid on the table :—

(1.) Visitors to Museum during March, 222.
(2.) Ditto Gardens ditto, 2,104.
(3.) Plants sent from Gardens : per Percy, to H. Lows, London, one case containing five large Tree Ferns.
Per Isabella Brown, to Messrs. J. Backhouse and Sons, York, one case plants.
(4.) Plants received, from Mr. C. Diehl, New Zealand, 39.
(5.) Books and periodicals received.

METEOROLOGICAL RETURNS.

(1.) Abstract of observations taken in Tasmania, from 1st July to 31st December, 1863.
(2.) For Hobart Town, from F. Abbott, Esq.
(*a*). Table for March.
(*b*.) Summary and analysis of observations for ditto.
(3.) For Port Arthur, from J. Boyd, Esq.
(*a*.) Table for February.
(*b*.) Ditto for March.
(*c*.) Reading of government schooner's barometer.

The SECRETARY read an elaborate analysis of the meteorological table for Hobart Town, with the usual monthly health report, by E. S. Hall, Esq.

The presentations consisted of :—

(1. Two Mounted Postage Stamps (5 and 10 cents), used as money in the United States in 1862, from A. Clapham, Esq., of Scarborough, per J. Milligan, Esq.
(2.) Two Japanese Coins and one "Taeping," from Captain C. C. Abbott, per J. Milligan, Esq.
(3.) Twelve samples of Cotton, in various stages of preparation for manufacturing purposes, from J. Milligan, Esq.
(4.) Two Turtles, from China Seas, from Mr. A. Bilton.
(5.) Canoe Paddle, from a native boy of Savage Island, per Mr. O. H. Hedburg.
(6.) Ancient Spanish Gunlock, from Mr. Hampton.
(7.) Musk Flies, from Rev. E. P. Adams.
(8.) Forty-nine Geological Specimens, from C. Gould, Esq.
(9.) The Annual Address (for 1863) of the President of the Royal Soicety of England (General Sabine), from E. S. Hall, Esq., to whom it was presented by the author.

The SECRETARY read a letter from Dr. Mobius, President of the Museum of Hamburgh, offering to make exchanges with our Museum. (For the purpose of making exchanges with other countries, prepared skins, skeletons, or fresh specimens of our animals, birds, reptiles, &c., will be gladly received at the Museum.)

Mr. ABBOTT laid on the table the usual half-yearly abstract of the Lighthouse Registers, and read some observations upon it, containing among other matters a detailed account of the great storm, or cyclone of the 25th and 26th October, 1863. This was traced from Spencer's Gulf, having passed across the south-west portion of the continent of Australia, in various parts of which its effects were severely felt. It reached Portland Bay on the 25th, and King's Island on the following day.

Some extracts from the log of the Offley, and from letters from the Superintendent of King's Island light-house, and the Captain of the Wonga Wonga were also read. From these accounts, and from the registers kept, it appears that Portland Bay or King's Island must have been about the centre of the storm.

Mr. ABBOTT remarked that he regretted the Society did not possess a regular series of the Adelaide Meteorological Registers, as he considered that Mr. Todd's tables—if not the best—were equal to any in the Southern Hemisphere. The prevailing gales and squalls in these colonies, having their origin chiefly in the Southern Indian Ocean, and passing in sequence over Adelaide and its vicinity before reaching us, rendered it desirable to have a register from that place, it being situate in the direct path of the storms.

Dr. HALL observed that it was needless to remark on the importance of the Meteorological Observations, which through the courtesy of the Marine Board, we have been supplied with from the various stations round our coast. To make these complete, however, it would be most desirable that similar observations should be made at some central station in the island, such as Oatlands or Campbell Town.

Dr. AGNEW explained, (as on a former occasion) that the importance of an inland station was fully recognised by the Council, and that instruments had been supplied to gentlemen at George Town and Campbell Town for the purpose of making observations. These after having been carried on for a short period soon became irregular, and then ceased altogether. He was sure, however, the Council would at any time do what they could to assist any competent volunteer who would undertake to continue these observations effectively.

Mr. ABBOTT suggested that possibly some of the masters of the government schools might undertake the duty. If done regularly, very little time—not more than fifteen minutes daily—was required.

Professor NEUMAYER, from Melbourne, having been introduced by the Secretary, was kind enough to favor the meeting with a short address. After passing an eulogium on Mr. Abbott for his labors in the cause of meteorological science, he observed that he thought it would be interesting to many of the Fellows of the Royal Society to have the modern instruments for the observations on Terrestrial Magnetism described to them, in order that they might be able to compare them with those formerly in use at the Magnetic Observatory, kept up for so many years in this locality. The chief difference between them was the size of the magnets, as the needles in the new apparatus were only four inches long, while the bars of the old magnetometers had a weight of between twelve (12) and twenty (20) pounds. All other differences between the two sets of instruments were of a less essential kind, and there was only one instrument to which he should more particularly refer as quite peculiar to the system of instruments employed by him; this was the Differential Inclinatorium of Professor Lamont. He went on to describe the instrument which is constructed of two soft iron bars, which becomes magnetic by the induction of our earth. The instruments were shewn and explained to the meeting in as simple a manner as the nature of the subject would admit of. Professor Neumayer further mentioned it had been often said that further observations on Terrestrial Magnetism were superfluous in our part of the globe as the excellent set of observations taken during a period of thirteen years at Hobart Town by Captain Kay and his staff had furnished everything requisite for the advancement of magnetic science. High as was his opinion of the work just alluded to, he had to protest against such opinions, and any one conversant with the science in question would bear him out in the statement that although many highly valuable discoveries had been made of late in the phenomena connected with Terrestrial Magnetism, the theory of it had not been materially advanced, and how then could it be said that further exertions would be superfluous. And again, the observations made at Melbourne during the last seven years by himself must be considered as joining to the Hobart Town series, furnishing as they do a continuation, and repetition of the investigations of a former period. His present visit was to establish the connection between both series still more closely, and also to determine what changes had taken place in the values of the Magnetic Elements since the Hobart Town observations were concluded. In conclusion, he would only mention that he had suceeeded in making a series of observations at Melbourne, extending over a period of seven years—and that during five years *hourly* registrations of Magnetic and Meteorological observations had been recorded. Simultaneously with this extensive work he had also carried out a Magnetic Survey of the colony of Victoria, and to give an idea of the difficulties he had to overcome in completing this important work, he would only mention that he had to travel 11,000 miles, from the sea-level to an elevation of 7,300 feet, and through country where he had to cut his track, and carry his instruments on horseback. His labors in this hemisphere were to be published at home in several large volumes, which the learned Professor expressed a hope of being able to lay before the Royal Society in about two years. (Applause.)

Mr. WINTLE read some remarks on the "Evidences of the Shell Deposits seen around Hobart Town, not being produced by the Aborigines, and the period of their origin being Post Tertiary," in support of views brought forward in a former paper, which he understood had, at least in part, met with the approval of Mr. Gould. With reference to Mr. Wintle's statement that the remarks on this subject, previously submitted by him to the Society, had been approved of by Mr. Gould, Mr. Gould stated that the long time which had elapsed since that period prevented his remembering them distinctly, but his impression was that they had not been approved of by him. He proceeded to say that Mr. Wintle's observations simply confirmed an already known fact, viz., the existence of comparatively recent deposits all round the Island. He thought there was no reason for supposing there had been oscillations of level during the deposition of the bed enumerated in Mr. Wintle's section. As to the precise age, it would be desirable to collect more specimens to compare with existing species. After the meeting Mr. Gould's attention was drawn to a statement of Mr. Wintle's that his section rested on an equivalent of the new red sandstone, this is incorrect, as also a statement made by Mr. Wintle at a previous meeting that some of the rocks of Mount Wellington are of the Silurian age, and which he had erroneously stated to be the opinion of Mr. Gould.

Mr. GOULD proposed a vote of thanks to the donors of presentations, and to the authors of the papers just read, and added that he was sure the meeting would feel much gratification in giving their special thanks to Professor Neumayer for the very interesting address they had just had the pleasure of listening to.

Professor NEUMAYER returned thanks, observing that he had every reason to be highly gratified with the attention and courtesy he had received, not only in Tasmania, but also in the neighboring colonies of Victoria where he had resided for several years. During that period having had many opportunities of studying it, he had acquired a great regard for the Anglo-Saxon character. He saw how well suited the race was for the great purpose of colonisation, as it possessed a keen eye, not only for the practical of every day life, but also for all that was sublime and great, and was consequently enabled to apply, and adapt itself to circumstances of the most varied character. He would indeed have been well content to pass the remainder of his life among them, but having been sent out by the King of Bavaria for a special object, it was now his duty to return, in order to lay before the scientific world of Europe the result of his labors. His friend Mr. Marwedel, however, would always know his address, and if at any future period it was thought his services could be of use, he would promise, it would at all times give him the greatest pleasure to do anything that might be in his power to promote the interests of the Royal Society of Tasmania.

EVIDENCES OF THE SHELL DEPOSITS

SEEN AROUND THIS CITY, NOT BEING PRODUCED BY THE ABORIGINES, AND THE PERIOD OF THEIR ORIGIN BEING POST TERTIARY.

[Read by H. S. Wintle, 12th April, 1864.]

A PAPER which I read before this Society, in November last, on what I was then pleased to consider, and still believe to be, post tertiary marine deposits, having called forth expressions of strong doubt with regard to the position I assigned to them in geological scale, and also to the mode of their origin, I here beg to furnish the *data* on which I base the conclusions therein set forth, and which I think will show that such conclusions are not so rash or premature as may have been imagined.

In a vertical section of these shell-beds exposed in the face of a cliff forming part of the river-bank at Sandy Bay, and which was referred to at some length in the paper just mentioned, the following order of strata is met with :—

First.—A bed of rich vegetable soil, possessing an average depth of 18 inches, in which no shells are seen, but containing fragments of charcoal, &c.

Secondly.—A stratum of comminuted shells, all of recent species, imbedded in a coarse black sandy soil. Average depth, 2 feet; and containing small quartz, and greenstone pebbles. No charcoal.

Thirdly.—A stratum of large rounded pebbles derived from the adjacent felspathic trap, and greenstone, with occasionally pebbles of sandstone—thinly interspersed with very small fragments of the over-lying shells.

Fourthly.—A stratum of comminuted shells of recent species, same as above. Average depth, 1 foot.

Fifthly.—A thin stratum of marl reposing upon what I believe to be the equivalent of the English New Red Sandstone.

Now let us enquire under what circumstances the formation of these several beds took place, and examine one by one in the ascending order, commencing with the marl, which forms the lowest stratum of the series. Whether this marl is of marine, or fresh water orign, there is no direct evidence to show; but there is sufficient evidence to prove it was formed in still water at some considerable depth. This is not the case with the shell bed reposing on it, for that unmistakeably proves that the shells originally occupied a zone not far from the shore, and where the water was more or less agitated, as seen by the water-worn fragments of contiguous rocks associated with them. Here, then, is a change seen in the relative positiou of land and sea. That portion of the sea bed—assuming the marl to be of marine origin—is found at a later period to be close to the shore. Or if of fresh water-origin, gives evidence of the land having subsided beneath the sea-level. The bed of pebbles, some of them being actual boulders, argues a still more disturbed state of the water. These pebbles may have been deposited either by tidal action, or by an ancient rivulet having gceat force at certain periods. But they speak in favor of the former action as being the most probable cause, owing to the order of their arrangement. Immediately resting on this bed we have the first stratum of shells, showing that if the pebbles were strewn over a beach, of which there is very little doubt, another sinking of the land took place in order that they might be covered by another generation of testacea. Then a final elevation to be covered by eighteen inches of vegetable mould.

Assuming that the foregoing hypothesis is inadmissable, and that these shell-beds are the work of the aborigines, let us ask what could have induced them to spread the shells so uniformly over any given area?—and what possible motive could they have had in collecting such minute specimens as these I lay before you? The first-formed bed, it will be remembered, rests upon marl. Allowing this to be as hard and dry, as we find it now, at the time when the blacks were supposed to camp there, we have no evidence to show that it was an easy distance from the water. Facts go to prove that, on the contrary, it was under water at the time of the shell deposit.

My reason for assigning to these deposits a post tertiary origin is, that in no instance have I found the uppermost bed covered by strata of probable tertiary age, and further, that apart from the recent character of the shells, their condition favors the inference of their being the equivalent of the post tertiary beds of Europe.

METEOROLOGY FOR APRIL, 1864.

Private Observatory, Hobart Town.

Years.	Barometer reduced to standard temperature, 32 degrees.	Mean Temperature of the Air.	Maxima Thermometer Readings.	Minima Thermometer Readings.	Mean daily range of temperature.	Degree of humidity, 100 complete saturation.	Extent of cloudy sky 10 for sky covered.	Mean amount of ozone 10 for maxima.	Total amount of Rain.
	In.	°	°	°	°				In.
1841	29.738	52.84	78.5	37.0	18.2	.76	6	—	1.11
1842	29.762	52.62	77.2	39.6	15.1	.73	5	—	0.89
1843	29.919	52.59	79.2	37.3	16.4	.78	5½	—	1.96
1844	29.764	50.00	68.0	39.6	15.1	.79	4½	—	0.92
1845	29.980	54.22	78.5	37.0	16.4	.76	4	—	0.24
1846	29.741	53.32	72.2	41.5	14.2	.80	7½	—	2.68
1847	29.818	53.23	73.4	38.0	14.4	.82	7½	—	1.74
1848	29.790	56.86	77.2	39.6	18.9	.72	3	—	0.51
1849	29.771	49.36	70.7	37.0	15.1	.79	6½	—	1.46
1850	29.862	54.83	79.3	36.0	17.3	.73	5	—	2.19
1851	29.999	53.79	78.8	37.5	16.4	.75	5½	—	0.18
1852	29.926	53.68	76.0	40.0	12.6	.69	6¼	—	4.99
1853	29.738	56.06	75.3	42.3	14.4	.80	6½	—	1.18
1854	29.921	62.00	82.0	41.4	11.0	.81	7⅔	—	2.72
1855	29.898	58.38	89.0	36.0	15.90	.78	6.50	—	1.17
1856	29.719	50.00	90.0	30.0	21.80	.74	6.33	—	5.01
1857	30.050	54.00	85.0	35.0	23.80	.70	5.21	6.07	0.79
1858	30.022	56.37	78.0	32.0	22.20	.73	4.00	7.24	0.44
1859	29.873	57.42	80.0	35.0	20.10	.70	6.17	6.45	1.43
1860	39.036	57.42	89.0	42.0	18.83	.77	5.90	6.88	2.86
1861	29.993	57.62	80.0	39.0	18.40	.76	7.00	6.80	2.51
1862	29.936	55.51	73.0	38.0	18.90	.74	5.10	6.96	1.88
1863	30.078	54.77	76.0	40.0	18.20	.79	5.13	7.41	2.24
1864	30.000	56.15	77.0	37.0	15.86	.82	6.54	6.93	2.18

The means in all cases are taken from the sums of each column, and not from the maximum and minimum.

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

1st. Chrysanthemums commencing to flower.
5th. Elm leaves commencing to fall.
15th. Coe's, fine late red plum, commencing to ripen.
20th. Mountain ash leaves commencing to fall.
25th. Black mulberry leaves commencing to fall.
30th. Hornbeam seeds ripe.

ANALYSIS OF THE OBSERVATORY RECORDS FOR APRIL, 1864; IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

The present month has been more fatal to life than any April of the previous seven years. The meteorological phenomena generally, both in daily phases, and the means of the month, depart considerably from the usual character of the month.

Atmospheric pressure had the mean of 30·000 inches, which is + ·115 above the 20 years' standard mean, but + ·163 higher than the mean of the first sixteen years of the series. 1857, 1858, 1860, 1863, alone, out of 23 years, had slightly higher means, the last named being 30·078 inches, and the maximum. The maximum pressure of the month, 30·402, occurred on the 30th, and the minumum, 29·380, on the 24th, the extreme range of the month 1·022 inches therefore, happened in the last week of the month. The daily perturbations, moreover, were frequent and extensive. The greatest on any one day, was a fall of — ·517 of an inch, on the 13th, followed by a rise of + ·429 on the 14th a fall again next day of — ·317; and another rise on the 16th of + ·360. On the 25th there was a sudden rise of + ·515 of an inch. Altogether there were fourteen days out of the thirty, on which the movements of the barometer, from noon to noon, exceeded one-fifth of an inch. Atmospheric pressure, therefore, this month, differed widely in its details, from that of March, and the death records of both months show, that the latter was more injurious than the former, in the proportion of 12 to 4, in diseases of the "brain and nervous system," and the "organs of circulation."

Wind-force had only an aggregate of 21·84 lbs., which is —26·33lbs. less than the mean of the previous seven years' Aprils, and nearly 20 per cent. less than that of the previous minimum April, 1861. Only south-east winds exceeded the average, both in frequency and force. East, south-west, west, and north-west, were all numerically above the usual prevalence, but of so gentle a character that the force of each was much below the mean. North, north-east, and south were all below the average both in frequency and force. The calms were 41, being + 15 more than the average—1861, however, had 44 calms—out of the 30 records at 7 a.m., calms were registered 21 times; at 1 p.m., 6 times; at sunset, 14 times. April last year had nearly double the wind force of the present month. A stagnant condition of the air we breathe, is peculiarly inimical to health, but it is a rare event in the breezy climate of Tasmania. The strongest wind recorded during the month, had only 2·60lbs. pressure to the square foot: and was only noted five times.

Temperature mean was, 56·15 degrees, being + ·5! more than the 20 years' average, and + 1·38 degrees warmer than April, 1863 was. In the previous 23 years there were only six Aprils with a warmer mean. The maxima and minima self-registering thermometers give a mean very little higher, being 56·56 degrees. The maximum, 77 degrees, was noted on the 1st; the minimum, 57, on the 30th.

The daily range of temperature had a mean of only 15·81 degrees, which is — 2·06 less than the 20 years' mean, and — 2·34 below that of 1863. The greatest range on any day, was 22 degrees, on the 1st, 12th, and 14th. The minimum range was 8 degrees on the 9th and 10th.

The solar-thermometer mean was 95·00 degrees, which is +3·54 degrees above the average of the previous 8 years, but +5·89 degrees above April, 1863. The maximum occurred on the 1st, and was 120 degrees, and was higher than any of the previous 8 years had. Ten other days had a temperature above 100 degrees. The minimum was 64 degrees on the 9th.

Terrestrial Radiation mean was 45·51 degrees, being +2·89 degrees above the average, and almost the same above 1863. The maximum was 56 on the 4th, the minimum 32 on the 30th.

Rain fell on 16 days of the month, being more numerous than in any April of the previous 9 years, and exceeding the average of the whole, by + 4·4. It also exceeded April last year by five days. The total of rain guaged was 2·18 inches, which is + ·40 above the 20 years' average, but—·06 less than April, 1863 had—on only two of the 16 wet days was the rain precipitated vigorously enough, to scour the street gutters, and conduce to health; on the other 14 the effect of the deposit was thereby to moisten the surface, and with the other concurrent meteorological phenomena, to promote decomposition and consequently pollution of the atmospheric air. The first shower in the month (3rd) was preceded by 17 days of continuous dry weather. This well exemplifies, how much totals, and means, may mislead, in judging of the hygienic effects of meteorological phenomena; and how necessary it is to scrutinize the daily details, to be enabled to form satisfactory conclusions. *Snow* was seen abundantly on Mount Wellington on the morning of the 25th, but no trace of it could be seen on the following day.

Spontaneous evaporation was only 1·49 inches being less than that of any April in the previous seven years.

The mean *Elastic force of Vapor* was 376, being +52 above the mean of the 20 years. It is also the maximum of the 23 years, though the sickly April of 1854 was nearly as high.

Humidity mean, 82, was +6½ above the 20 years' standard. April 1847, alone, out of the previous 23 years, was as high. For humidity and elastic force of vapor to be both at the same time, above the average, is a most unusual occurrence. The rule being, when humidity is high, for elastic-force to be low, and the reverse when humidity is low.

Cloud mean was 6·54, which is +·84 above the 20 years' average. There have only been four Aprils more cloudy in the past 23 years. This is an unusual event with so much solar heat as is recorded for this month, and shows how intense must have been the sun's rays in the shortened time of their operation.

Ozone mean, 6·93 is actually + ·10 above the average of the previous 7 years, though—·48 less than 1863 had. The maximum was 10, being the point of saturation, and the minimum ·5. The predominance of sea-breezes, with the washing the air so frequently underwent from the numerous light showers, offers a feasible explanation of this unexpected result, under so many other conditions calculated to minimize it.

Electricity was no exception to the abnormal character of so many other of the meteorological phenomena of the month. There were only 5 positive records, with the low-tension of 4. April, 1863, had 16 with tension of 4·5. The negative indications were so numerous as 42, but with only a tension of 4·5. In 1863 negatives were only 33, but with half a degree higher tension. The predominant belief that much negative electricity is usually associated with the asthenic types of disease, is corroborated by the great excess of zymotic diseases this month, over all the other classes, as will be seen hereafter.

The *deaths* this month were 54, which is higher than that of any April of the previous seven years, and + 9 one-seventh above the average of the whole. On children up to nine years of age, has the greatest share of the mortality fallen ; while old people above 60 have not died at a rate remarkable either for excess or otherwise ; but adults, from 20 to 60, never before added so few to the mortuary record. The following table will give the clearest exemplification of my statements :—

April, 1864.	Ages.	Maximum.	Aprils 1863, 1861.	Minimum, April, 1862.	March 1864.
15	Under 1	5	10	7	25
18	1 to 5	8	13	3	13
4	5 to 20	3	1	1	2
5	20 to 45	10	6	10	11
5	45 to 60	11	10	10	13
7	60 and above	11	8	6	9
54		48	48	37	73

33 deaths under 5 years of age out of a total of 54, is not much short of two-thirds of the whole, which I think is almost without parallel in this city. Large as the general mortality was in the previous month, the proportion under 5 years of age was little more than half ; but when I add that in the present month, the 4 deaths 5 to 20, were two each, of children aged respectively 6 and 9 years, and that the two deaths in this group in March were aged 11 and 16, the contrast becomes still more striking. The proportion of deaths, too, tabulated for the five classes of disease into which all modern statists nosologically group their mortuary records, is quite as much at variance with the normal numbers, as that of the ages is :—

April 1864.	Classes of Diseases.	April 1863	1861	April 1862.	March 1864	Average of Aprils of 7 years 1857-1863
32	1. Zymotic	7	17	9	35	9 6-7ths
4	2. Constitutional	9	4	5	8	7 2-7ths
13	3. Local	24	21	16	19	20 1-7th
5	4. Developmental	6	6	4	8	5 1-7th
0	5. Violent	2	0	3	3	2 2-7ths
54		48	48	37	73	44 6-7ths

In no one April, of the previous seven years, were Zymotic diseases so numerous as in the present. The previous maximum, 1861, had, as the table shows, but little more than half the number. The deaths in this class were scarlatina 5, diphtheria 2, croup 1, fever 2, dysentery and diarrhœa 22. No previous month, since the present epidemic of scarlatina commenced, had so many deaths registered from this cause. Still, as one at least of the deaths did not take place until after three weeks, I should suppose the cause of death was some sequela of scarlatina, rather than scarlatina directly. The boy who died of it at 9 years old, I was called in to see a few hours before his demise, and it would be more correct to ascribe the cause of death to "foul air" than the disease itself. For reasons personal to myself, I will not at present enter into the details of this case, though I hope it will afford me at some future time a good subject for enforcing the necessity of ample cubic space, and efficient ventilation in this disease, as well as all others. In one of the diphtheria deaths, the attack supervened after scarlatina, which seems to have been of rather frequent occurrence during the present epidemic. So many deaths from bowel complaints never before occurred at this season of the year, though the hot, stagnant, and moist condition of the weather, sufficiently indicate the predisposing cause. All the other classes, the table shows, to have had less than the average of deaths. There was only one death from consumption, but he was Hobartonian by birth. There were no inquests, an event of rare occurrence.

In the first seven days of the month the deaths were 15; in the second, 16; in the third, 12; in the fourth, only 7; in the last two day, 4. On the 2nd, 19th, 26th, 27th, and 28th, no deaths occurred. The greatest number of deaths on any day was 5 on the 10th; and the most fatal period of the month was the four days 10th to 13th inclusive, during which 13 deaths took place. Of the total 54 deaths, 6 occurred in the rural district of Glenorchy, 3 in that of Queenborough, the rest in the city. The Hospital had only 9, which it is patent arose from the small proportion adult deaths bear to the total mortality.

The registered *births* were 62, which is precisely the same that April 1863 had.

FRANCIS ABBOTT.

MAY, 1864.

The monthly evening meeting of the Society was held at the Museum on Tuesday, the 10th May. The chair was taken by His Excellency at half-past seven o'clock.

Among the Fellows present were Captain Steward, the Ven. Archdeacon Davies, Dr. Agnew, Hon. Sec., Messrs. F. Abbott, sen., F. Abbott, jun., H. S. Wintle, J. Facey, W. Johnston, L. Susman, G. R. Napier, A. Kennerley, T. Giblin, M. Allport, J. Woolley, J. Davies, M.H.A., J. Barnard, T. Stephens, W. L. Dobson, Dr. Butler, Lieut. Seddon, R.E., &c., &c.

The following gentlemen (having been previously nominated by the Council) were, after a ballot, declared to be duly elected Fellows of the Society:—Professor Neumayer (as corresponding member), Colonel Crawford, and Mr. J. T. Robertson.

The following returns were laid on the table :—

1. Visitors to the Museum during April, 336.
2. Ditto to Gardens, ditto, 1,454.
3. Tench supplied—Mr. Allport, 36; Mr. Hull, 12; total, 42.
4. Seeds received from Dr. Milligan (papers), 43.
5. Periodicals received (the usual).

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.
   (*a*) Table for April.
   (*b*) Summary and Analysis of Observations for ditto.
2. Swansea, from Dr. Story, table for March.

The SECRETARY read an Analysis of the Meteorological Observations for April, together with a Health Report for the month, by E. S. Hall, Esq.

The presentations were as follows :—

1. From Dr. Milligan, London, the undermentioned seeds :—Pinus Webbiana, 2 papers Pinus excelsa, 4 do Cedrus deodora, Large Sunflower, 6 papers Stocks, 6 do Asters, 2 do Rhododendron campanulatum, 1 do Rhododendron anthropogon, 1 do Primula cartusoides, 1 do "Jemboo" of India, 1 do of an American Grass, said to withstand excessive droughts. The five last named being new to the Gardens.

17 Papers of Vegetable Seeds, of which a few are new to the Gardens.

2. A Black Cockatoo, from Mr. Watson, of Brown's River.
3. Fern impression found in Seymour Coal; 4. Carraway Seed grown in Hobart Town; and 5. Sample of Colonial Grape Wine, from Mr. Vautin.

The wine was tasted by several members after the meeting, and was thought to be a very pure, genuine, and pleasant beverage. Its cost to the maker, who grows his own grapes, is about fourteen pence per gallon. The Secretary mentioned that Mr. R. P. Adams has also made a very excellent wine from our common Sweet Water grape.

Dr. AGNEW then observed that he wished to bring under the notice of the meeting the subject of "Traction Engines," and their suitability for the carriage of heavy goods and passengers on common roads. About five or six months ago he had noticed, as doubtless had also many of the Fellows then present, a correspondence on the subject in the local newspapers, and the arguments then brought forward by Lieut. Seddon, R.E. (who wrote under the signature of "Why Not"), appeared quite conclusive as to the great value of these engines for the purpose already indicated. He thought, however, as the question was one of great importance, it would be very advisable to obtain some still more practical and authoritative information in reference to it, and had accordingly written home to two large manufacturers, the Messrs. Aveling and Porter, of Rochester, and Bray's Traction Engine Company, London. He had seen in the *Illustrated London News* very favorable reports on the performances of the engines of both these companies, but he thought the latter had two points in its favor, first, the fact that its engines were in constant use in H. M. Dockyards at Woolwich, and also that the Earl of Caithness, so well known as a practical mechanician, was one of its directors. In writing home he had asked if engines of two kinds could be furnished for travelling on the main road between this and Launceston—one with slow speed for heavy weights, such as merchandise or farm produce; the other for the rapid conveyance of passengers. At the same time he had given as accurate an account as possible of the nature of the road itself, its length, its various inclines or gradients, &c., and the fact of snow occasionally lying, in the winter season, many inches deep in the midland districts, was also alluded to. Before reading the replies, received by last mail, to these letters, he would beg permission to read the following extracts from an article in the *Mechanics' Magazine*, of January last, which he thought was a sufficient answer to the question which had been so frequently asked—Why, if these engines are as efficient as is stated, have they not long ago superseded the use of horses on common roads and elsewhere? "When we reflect that a speed of fifteen miles an hour has been maintained on good turnpike roads for long journeys by steam power, we will see how small was the chance which horse power would have had for the conveyance of mails and passengers, who often regard speed as everything, against such a rival. Had it not so fallen out that the Manchester and Birmingham Railway was inaugurated just at the time it was, our roads would long ere now have been almost wholly given up to the traction engine and steam omnibus. The attention of the engineer would not have been directed into a different channel." "It (the traction engine) may be regarded as the progenitor of the railway locomotive and a glance at the past will show that its career has been distinguished by a series of mechanical successes which seldom fall to the lot of inventions, so dissimilar to anything presented by the records of the past. Reasoning by analogy we are justified in assuming that a machine which has been constructed with success in the infancy of the mechanical engineer's art, can present no difficulty now, and the *experimentum crucis* of examining into these questions and circumstances of traffic presented daily all over the country prove that the traction engine now performs its task with an ease and punctuality which leave little indeed to be desired. Its use is, in short, no longer an experiment. It will no longer bear to be treated as such. The competition between steam and horses on the road is no longer a question of mechanics, but of pounds, shillings, and pence, and viewed in this way, steam has every advantage." "Formerly we were told that traction engines spoiled the roads. We hear little of this now, experience proving the contrary." "We never yet heard of a dangerous accident resulting from the use of steam on common roads, and a somewhat extended personal experience goes to show that with the most moderate care horses will pass an engine as easily as they will a carriage." He (Dr. Agnew) also stated that the same magazine contained reports of two large meetings of road trusts in England, at which a motion was made to the effect that means should be adopted for prohibiting traction engines from travelling on the highways during the day, on the plea that they took up too much room and that they would be a cause of accidents by frightening horses. In both cases the motion was at once negatived—in one, by a majority of 30 to 3, and the other by 50 to 2. This, he thought, was very important, as coming from men who were enabled to form an opinion on the matter from personal observation.

The following report on the subject, by a Select Committee of the House of Commons, as long back as 1831, was read:—

"That sufficient evidence has been adduced to convince your committee—

"1. That carriages can be propelled by steam on common roads at an average rate of ten miles an hour.

"2. That at this rate they have conveyed upwards of fourteen passengers.

"3. That their weight, including fuel, water, and attendants, may be under three tons.

"4. That they can ascend and descend hills of considerable inclination with facility and safety.

"5. That they are perfectly safe for passengers.

"6. That they are not, or need not be, if properly constructed, a nuisance to the public.

"7. That they will become a speedier and cheaper mode of conveyance than carriages drawn by horses.

"8. That they admit of greater breadth of tire than other carriages, and, as the roads are not acted on so injuriously as by the feet of horses in common draught, such carriages will cause less wear of roads than carriages drawn by horses.

"9. That rates of toll have been imposed on steam carriages, which would prohibit their being used on several lines of roads, were such charges allowed to remain unaltered."

Allusion was also made to the case of Messrs. Koll, Greig, & Co., carriers between Glasgow and Kilmarnock, who have practically acknowledged the inferiority of horse draught by adopting the traction engine for their business;

and also to the fact of the Earl of Caithness having travelled in a steam carriage at the average rate of twenty miles an hour, on the common highway from London to Edinburgh.

The following letter from Messrs. Aveling and Porter, of Rochester, was then read :—

"Rochester,
"February 19th, 1864.

"Sir,—We are in receipt of your obliging favor of the 23rd December last, and, as the most complete reply to your enquiries, we send you a copy of our catalogue, with illustrations and descriptions, of our traction engines.

"The engine described in p.p. 4 and 5, is the one especially adapted for goods traffic on the high roads. This will travel with a load of, say 20 tons, at the rate of two miles per hour, over most roads, and at twice that speed with half the load, viz., 10 tons at four miles per hour. Engines made to travel faster than this one can only be geared for speed at the expense of power—and fast passenger engines we have never attempted to make, nor do we remember an instance of a successful one being turned out. The class of engine required for this traffic is of so entirely different a nature from what we make, that we have always declined entering upon the experiment.

"We should be glad to establish a system of traction engines upon the road you mention, and we hope from a perusal of our catalogue that you may believe in the feasibility of doing so, and write us again accordingly.

"If you could instruct any of your English correspondents to act for you, and make it their business to see our engines, and judge for themselves of their adaptability, we should have much pleasure in giving them every opportunity in our power of doing so.

"We are, Sir,
"Your obedient servants,
"AVELING & PORTER.

"Dr. Agnew, Hobart Town, Tasmania."

Extracts from the pamphlet accompanying the letter were read showing that the engine was capable of drawing, at a rate of six miles an hour, waggons laden to the extent of 20 tons, along common roads; and up and down inclines twice as steep as any between Hobart Town and Launceston, at the rate of three to four miles an hour.

The following was the answer from Bray's Traction Engine Co. :—

"Bray's Traction Engine Co. (Limited),
"17, Warwick-st., Regent-st., London, W.,
"February 19th, 1864.

"Sir,—In reply to your favor of 16th December last, we beg to furnish you with the following particulars respecting this Company's engines, and send, per book post, a pamphlet containing full description of the same.

"The price of a 20 horse-power (nominal) engine with two cylinders 9" diameter by 15" length of stroke 120 lbs. working pressure of steam, is £1,500.

"The price of a passenger engine, capable of travelling at the rate of 12 miles an hour, £1,250.

"The price of an engine (10 horse-power nominal), with two cylinders, 7" diameter × 15" length of stroke, 120 lbs. working pressure of steam, is £1,250.

"If fitted with all the extra appliances for transmitting power as described in pamphlet, £200 per engine extra.

"The above prices include delivery at London, Liverpool, Bristol, or Glasgow, but not, the packing or shipping charges, which are borne by the purchaser. The cost of packing is about £25.

"The terms of payment are net cash, payable in three instalments, as customary with the trade.

"The engines are constructed in every respect of the very best quality of workmanship and materials with the view of keeping the cost of maintenance and repair as low as possible.

"Being supplied wiih double acting pumps, they act most efficiently as steam fire engines, whilst they can also, if required, be fitted with the various appliances for transmitting power, before referred to, so as to adapt them to all the purposes of fixed or portable, as well as traction engines.

"They can thus be used for ploughing, driving machinery, sawing or felling timber, pumping, hoisting, &c.

"The engines are geared for two speeds—with heavy loads from $2\frac{1}{2}$ to 3 miles an hour, and with light loads or empty waggons from 5 to 6 miles per hour:

"The foregoing are the averages of speed on a fair level road, all circumstances, such as stoppages for water, being taken into consideration. The speed, however, may be increased even beyond six miles an hour, though that is a sufficiently high rate for a heavy goods engine to travel.

"The weight of a large engine is about 14 tons, and of the second size, about 10 tons. The width, from outside to outside of driving wheels, is about 7 feet, though of course this is increased, if the wheels are made very wide to admit of the engine travelling over soft ground.

"The engines are respectively about 21 and 18 feet long over all by about 10 and 9 feet high to the top of framing. The driving wheels are 7ft. 6in. by 6ft. 6in. in diameter, by 12 to 15in. wide; the steering wheels are 3ft. 6in. and 3ft. in diameter, by 10 to 12in. wide.

"The consumption of coke or steam coal is in the large engine about 84lbs. per mile, in the smaller machine about 56lb., per mile taking the average of roads. In Woolwich dockyard the engine does not burn more than about $2\frac{1}{2}$ cwt of coke per day. The fire box can be constructed to admit of wood being used as fuel if necessary. The tanks contain about two hours' supply of water, and a day's supply of fuel can be carried on the engine.

"A large engine will draw about 30 tons on ordinary roads, with gradients, say one in twelve, while a small one will draw about 15 tons. On hard, smooth, level roads, a much greater weight than above quoted can be drawn with ease (see experiments detailed in pamphlet, p. 17).

"The Company also supply waggons capable of carrying from 8 to 10 tons of goods, mounted on springs, fitted with proper couplings, break-power, arrangements for backing, &c., complete to accompany engines, which they track accurately, either singly or in train, even in turning corners at right angles, price £100 each.

"The price of passenger cars capable of holding say 20 passengers, fitted complete, £200.

"For dockyards or arsenals, or any fixed work, two attendants (one a skilled mechanic) would be sufficient for the engine, but when long distances have to be traversed, another laborer or two would be necessary to attend to waggons, &c.

"The following is an estimate of the daily expenses of a large engine and waggons, supposing they work 250 days in the year, and that twelve waggons were employed so as to allow four being always loading, four unloading, and four in transit:—

	£ s. d.	£ s. d.
Wages—Driver, who can also do repairs	0 7 6	
,, Steerer	0 4 6	
,, Stoker	0 3 0	
		0 15 0
Fuel—1 ton coke or coals		1 0 0
Stores, grease, tallow, oil, and cotton waste		0 3 6
Maintenance and repairs on engine 10 per cent.		
Depreciation on ditto .... 10 ,,		
Interest on outlay .... 5 ,,		
Total 25 per cent. on say £1700	1 14 0	
Ditto on waggons 15 per cent. on £1,200	0 14 6	
		2 8 6
Margin for tolls and other contingencies.........		0 13 0
		£5 0 0

"An engine will draw four waggons loaded with 8 tons each, say 32 tons on any ordinary road, at a speed of about three miles an hour. It would, therefore, take such a load a distance, say, for example, fifteen miles, and return with the empty waggons the same distance, 30 miles in all, in one day of ten hours.

"The cost of this would be, as shown, £5, or at the rate of $2\frac{1}{2}$d. per ton per mile, whereas if a load could be found for the engine to bring back equal to the one it took, the cost would be reduced to exactly one half, or otherwise in proportion to the load. The price would probably be increased abroad by the higher rate that would have to be paid for labor and fuel.

"The snow would not make any difference as to the working of the engine, the wheels being fitted with "spades" or "teeth" capable of being protruded or withdrawn at pleasure (see pamphlet, p. 3).

"It will not be requisite to have an additional steering wheel to the engine, there being two already, which are perfectly capable of turning the engine and waggons round the sharpest corners.

"Trusting that this information will be sufficient for your purpose, and induce an order.

"We are, sir,
"Your obedient servants,
"Bray's Traction Engine Co.,
"Pro J. BUBB.

"Dr. Agnew,
"Hobart Town, Tasmania."

Extract from a letter from the same Company to H. C. Seddon, Esq., R.E., date, 19 Feb., 1864:—

"The price of a passenger engine, fitted so as to be capable of travelling 12 miles an hour, with the number of passengers mentioned in your letter, up an incline of 1 in 12, is £1,250."

Mr. Seddon calculates this would give a speed of upwards of 30 miles an hour on a level road. The number of passengers mentioned was one hundred.

From their pamphlet, extracts were read from reports on the performances and capabilities of their engine, from engineers, farmers, officers of Her Majeety's dockyard, &c., &c. One from the celebrated engine makers Penn and Son, speaks of "the successful manner in which they (traction engines) have removed the large portions of the machinery for the engines of the Warrior and Black Prince, under every circumstance of weather, in loads varying from 25 to 35 tons, exclusive of truck, &c." * * * * "We have not found your engine to be so destructive to the roads, on account of the great breadth of the wheels, as horses' feet, when drawing a heavy load."

Mr. R. Armstrong, C.E., states :—"The nearly two hours of unexampled rough work you have just now with me seen it go through, the up and down hill, steeper even than one in seven, jolting, twisting, and knocking about, over deep holes, and round sharp corners with so much ease, and no detriment whatever that I can discover, ought to be satisfactory to any one, &c. * * * It may fairly be considered as a strong compact dray horse which will not make but *mend* a common road, &c."

As to the power of the engine in dragging with ease, over bad roads, and even on soft boggy ground where no road existed, such loads as no waggon drawn by horses could attempt, Lieutenant Halkett (14th March, 1862), says: —"It had three waggons attached loaded with 9,000 bricks, the weight of the load, including waggons, being about 30 tons, with which it went to Clapham Common. On the hard road the draught indicated was about 1,800 lbs., increasing in some cases where it was very muddy—there having been about forty-eight hours' previous rain—to as much as 2,200lbs. The train went on the grass, which was very soft and slippery from the rain, and drew the load along without difficulty, the draught being about 3,000 lbs. The wheels of the engine let an impression in the ground about the depth of half an inch, whilst the waggon wheels made tracks as deep as two inches. For the purpose of experiment the train went on a *very boggy piece of turf*; after moving over it for a short time the waggon wheels sunk to the depth of six inches in a bad place, whilst those of the engine were scarcely two inches deep. The draught power exerted increased to 4,500lbs., when the wheels of the engine slipped round without moving the train. The driver having gone so far on the plain surface of the wheel, then brought the auxiliary power of the blades to bear, throwing them out about 1½ inch, which exactly doubled the power of the engine, since the dynomometer registered over 9,000 lbs., and the engine drew on the load without further difficulty. In order that he might be understood, Lieutenant Halkett explained that Telford averaged the draught of waggons at one-thirtieth of the load, or about 70lb. draught on a spring to every ton weight of the waggon and load together; but this may be increased by bad roads and appliances to 100lb. per ton. The engine, therefore, had shown its *ability to draw from* 100 *to* 130 *tons* on a good level road. These figures are quite independent of the power exerted by the engine to move itself. This result he considered entirely satisfactory, since no traction engine had hitherto been found capable of exerting a greater draught power than 4,500lbs. It was, therefore, calculated that on increasing the breadth of the tire of the wheel, and putting on slower gearing, by the use of his rail system of agriculture to guide the implements, one of these engines could draw with ease thirty ploughs after it, ploughing five inches deep, at a speed of about 1½ mile per hour, or plough sixty acres per day, &c."

From *The Illustrated London News*, May 29, 1838,—"The next experiment was drawing a load of ten tons up Dover-hill, a gradient* varying from 1 in 7 to 1 in 11; it went up with perfect ease, and also came down with the same load. * * * The engine is an 8-horse, and is fitted with Baron's patent cup surface boilers, and is worked to a pressure of 60lbs. to the square inch. The weight of the engine is 6 tons. * * * The carriage was loaded with three 68-pounder guns, of a total weight of 20 tons, and steamed away from the Royal Arsenal, past the Royal Artillery Barracks, with the utmost ease, although this portion of the journey was a considerable incline, &c."

The Times of November 13th, 1858, says:—"It was put through a course of tests in dragging heavy loads of timber *at a speed of six miles per hour*, along the stoned thoroughfares, winding round the narrow curves, and performing a rapid circle in the presence of the Commissioners, as well as Sir John Rennie, the engineer, and the various authorities of the yard. The Commissioners expressed themselves extremely satisfied, &c."

Again, at a trial at Uxbridge, 28th April, 1860,—"There could not have been found a worse road for a trial than the one selected, abounding in sharp turns, bridges of sudden rise and pitch, and the fearful Chandler's-hill; but they proved of no impediment to the way of the engine, which has continued at work all the week."

On another occasion (*The Express*, March 30th, 1861),—"The large engine was attached to a "total load of about 38 tons," in the presence of the Marquis of Breadalbane, the Earl of Caithness, Mr. John Penn, Mr. Mathews, and many scientific gentlemen. On leaving the factory the road for some distance has a gradient of about 1 in 15, but the engine drew the immense load with the utmost ease at about three miles per hour, &c."

The Times of October 29, 1861, says:—"A new engine of great power and improved construction performed the operation with marked success. Each truck load exceeded 35 tons weight, exclusively of the engine weighing another 12 tons. It climbed the steep ascent leading from the factory, and through the narrow windings and acclivities with apparent ease, and performed the distance of about two miles in half an hour. Messrs. Penn and Son, who were present, witnessed with satisfaction the performance of the traction engine, and expressed their satisfaction, &c."

On another occasion "An engine was set to work three ploughs in form over a light loamy soil, the ground rather wet; the quantity of work in a day of ten hours was at the rate of six acres, at a cost of not more than 4s. per acre * * The land was as effectually ploughed as if it had been done by horses."

Finally, remarking that the facts just noticed must speak for themselves, Dr. Agnew mentioned that Mr. Askin Morrison had informed him he had written home by last mail for one of these engines, leaving it to his agent to select it from any manufactory he chose. There are now many makers, and each may have some peculiar excellence. We may hope, therefore, to see a traction engine fairly at work in the course of 8 or 10 months at furthest.

Mr. Morton Allport then read a paper on the Trout and Salmon Ova, explaining at the same time the arrangements of the hatching ponds by means of a colored drawing.

At the conclusion of the paper discussion ensued as to the future management of the young trout and salmon, but it being Mr. Allport's intention to report upon this subject in a future communication it is not further referred to at present. One of the original in boxes which the ova came from England, shewing the manner in which they were packed, was exhibited.

Archdeacon Davies suggested that it would now be well to consider what measures should be taken to express the sense which he was sure we all felt of the obligation we were under to Mr. Ramsbottom, Mr. Youl, Messrs. Money Wigram and others, who had all worked so well together in carrying out this great enterprise of the introduction of the salmon.

Mr. T. Giblin was sure that the Royal Society would only be too anxious to do all that lay in its power to give due honor and credit to all concerned in the undertaking; but he also thought, considering the great national importance of the work which he now hoped was about to be crowned with entire success, that the whole colony as it were, should through their representatives in parliment take further action in the matter, and either by a vote of thanks or by some more substantial means, shew their sense of the great service that had been rendered to Tasmania.

After further discussion it was agreed that for the present the matter

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* The gradients on the Sandhill at Launceston, and on the hill at Pontville, are one in twenty and some parts one in eighteen. The steepest portion of the Main Roads a short rise south of Pontville Bridge which is one in fifteen.

should be allowed to rest with the "Commissioners for the Introduction of the Salmon," with the understanding that the Royal Society was willing and anxious to respond to any suggestions that might be offered as to the best mode of expressing its appreciation of the zeal, energy, and intelligence which had been so happily exercised in conducting the great experiment thus far towards a successful issue.

The SECRETARY was glad to direct attention to one portion of Mr. Allport's paper where it was shewn that the original idea of introducing the ova was due to this Society, which also first took action in the matter by the appointment, from among its members, of a committee whose duty it was to consider the best means for giving practical effect to the idea. The Society received a grant of public money—a small grant certainly, only £200 a-year, yet he had heard it said that this was too much, and that we made no return for the money. This could only have been said by some one ignorant of what we had done, and what we have been at all times anxious to do for the good of the colony as the proceedings of this evening alone might testify. In future, at all events, it could not be repeated as we had now returned to the public a hundred-fold what we had received, by having been in some degree instrumental in initiating a movement so fraught with benefit to the community.

Archdeacon DAVIES proposed (Mr. Johnston seconded) a vote of thanks to Mr. M. Allport and Dr. Agnew for the very interesting communications they had brought before the meeting.

His EXCELLENCY, in conveying thanks, observed he was very happy in doing so, as he cordially agreed with the motion. He could not but express the extreme gratification he felt at the good fortune which at last had so deservedly attended the efforts made to introduce the salmon ova, and was sanguine that a splendid success would eventually crown the exertions of those who were still engaged in carrying out the enterprise.

The meeting then terminated.

ACCOUNT OF THE RECENT SUCCESSFUL INTRODUCTION OF THE SALMON OVA TO TASMANIA.

[Read by Mr. M. Allport, on the 10th May, 1864.]

At the request of Mr. William Ramsbottom, I have now the pleasure of giving to the Fellows of the Royal Society, a detailed account of the recent successful introduction of salmon ova to our waters, but before doing so, I wish to call attention to the fact that the Council and Fellows of this Society were the first to recognise the vast importance of this undertaking to the best interests of Tasmania, and to take practical measures to ensure its success.

In the year 1858, this Society appointed a sub-committee to enquire into and report upon the subject. That report is to be found amongst the transactions of the Society for the same year, and I need not, therefore, further allude to it, but, to show the continued interest taken by the Fellows in this question, I would call to your recollection the reception accorded to Mr. Black, after the disastrous attempt made in the S. Curling, and to Mr. William Ramsbottom, on the arrival of the Beautiful Star, two years ago. Indeed, as early as the year 1857, Mr. Marwedel, a Fellow of this Society, forwarded to our then Secretary a letter, in which he referred to an interview with M. Coste, who has made many valuable contributions to the science of piscicultre, and who then suggested the packing of salmon ova in damp moss, but did not in any way refer to the use of ice; which, as will be presently seen, is essential to success. Again, the ull particulars of Mr. Ramsbottom's first voyage were published by the aid of this Society, and these particulars now foim a valuable portion of our records.

Upon referring to the account of that first voyage, I became convinced that any person might well amongst all the discomforts and disasters of a passage such as that made by the Beautiful Star, have given up all hope, and never have turned his attention to the litle box, which was broken open, and pitchng about loose in the ice-house on board that vessel. Not so Mr. Ramsbottom, however, for he carefully removed the broken lid and moss, and examined the ova, which, to his amazement, were still at the end of some 80 days, alive and well, and to this circumstance alone is to be attributed our present success.

Upon receiving Mr. Ramsbottom's first report, the present Commissioners, who were appointed several years ago by the then government, decided upon sending Mr. Ramsbottom to England expressly to try the experiment of packing ova in ice, with a view to retarding their development, and this experiment was accordingly tried in London, under the direction of Mr. Youl, during the winter of 1862 and 1863. The wonderful success of that trial, showing that ova may be hatched safely after being buried in ice 150 days, has been fully published to the world, but I have never yet seen a good explanation of why this was likely to prove successful. Even Mr. Frank Buckland, in his book on fish-hatching, speaks of freezing the ova, and thereby greatly misleads his readers. It was long ago shown that actually to freeze ova, was to kill them in a few days, or at most, weeks. The question then was, how could they be kept at an equable temperature, just above the freezing point? If a block of ice (the sensible temperature of which is 32° Fahrenheit) be immersed in water of a higher temperature, a portion of the ice will melt until the heat of the water falls to 32°, but no more of the ice will be afterwards melted until the temperature of the water is again raised. If the ice could cool the water below 32°, a portion of the water would be frozen, but to effect this a further portion of the ice must be melted, and water at 32° is not capable of melting ice. If vessels containing creams be immersed in ice for a month, no change would take place in their contents, but convert a portion of the surrounding ice to water by the admixture of any deliquescent salt, and the submerged creams are instantly frozen. Therefore, by this beautiful provision of nature any substance above the freezing point, buried in ice, can never fall to the freezing point till the ice next to it is converted to water, and so long as any ice remains, the buried substance will continue at a low temperature certainly, but above the freezing point, and to this principle we are indebted for our present success.

Now, to come to Mr. Ramsbottom's present voyage. After many interviews with the owners of various ships, Mr. Youl (to whom this colony is greatly indebted for his determined perseverance in this respect) received the munificent offer from Messrs. Money Wigram & Co. of 50 tons of room, gratis, in their clipper ship Norfolk, bound to Melbourne. An ice-house, capable of holding 30 tons, was built in a situation admirably chosen for the purpose, on the lowest deck amidships, and equi-distant from stem and stern; in the position in which the motion of the vessel would be least felt. With much difficulty, and at the cost of great personal exertion on the part of all concerned, about 90,000 salmon ova, and about 1,500 trout ova were obtained, and safely packed in deal boxes, each a foot long, eight inches wide, and four inches deep. In some of the boxes, a layer of charcoal was first placed on the bottom, then a layer of moss damped in pure water, then ova were lightly placed on the moss, and the whole covered with another layer of damp moss—upon which the lid was screwed down. In the remaining boxes the charcoal was omitted, the packing otherwise being the same. Through the lid and bottom of each box several small holes were drilled, and all the ova were packed in 181 boxes. The boxes were next placed on the bottom of the ice-house, which was filled up with blocks of Wenham-lake ice, and the whole securely closed. All being complete, the vessel sailed from London towards the end of January last and left Falmouth on the 28th of that month. For some time before his arrival at Melbourne, Mr. Ramsbottom naturally felt very anxious as to the condition of his precious freight, or, as he expressed it, every time the vessel bumped against a sea he mentally ejaculated, "There goes another thousand of them!" On the 15th of April, the Norfolk arrived in Melbourne. On the next day, the ice-house was opened, and the small boxes unpacked. The lid of one box was then removed by Mr. Ramsbottom, with fear and trembling, but, to his great satisfaction, a large number of the embedded ova were found to be alive. Eleven of the small boxes were then left in Melbourne, and the remaining 170 were placed on board H. M. C. S. S. "Victoria," in large open packing cases, with holes drilled in the bottoms. Broken ice was spread on the tops of the small boxes in each packing case, larger ice was piled on the cases, and the whole were then covered with bags of sawdust and blankets. About half the ice had melted during the voyage. Mr. Ramsbottom speaks in very high terms of the prompt and efficient assistance afforded him by Captain Tonkin and the officers and men of the "Norfolk," to whom Tasmania therefore owes a large debt of gratitude. Captain Norman and the officers and men of the "Victoria" also evinced the most lively interest in all the proceedings, and seconded all Mr. Ramsbottom's efforts for the speedy transport of the ova to the Derwent in a manner beyond all praise. On the 17th April the "Victoria" left Melbourne and arrived at Hobart Town on the 20th. The packing cases and ice (of which latter there still remained more than ten tons) were then carefully placed on a barge, packed as before, and were towed to New Norfolk by the steamer "Emu" which was detained until a late hour on the night of the 20th for the purpose. From New Norfolk the barge was towed by boats to the Falls on the morning of the 21st, and the packing cases were then landed and slung on stout poles and carried by hand to the ponds already prepared at the River Plenty. The remaining ice was transferred to the ponds in carts, the contents of each being well covered with straw. The first batch of cases arrived at the ponds about the middle of the day on Thursday the 21st April last, 90 days after the placing of the ova on board the "Norfolk."

On their arrival Mr. Ramsbottom immediately proceeded to prepare the gravel beds for the reception of the ova. A slight description of the ponds is here necessary. These ponds were arranged in accordance with plans brought by my brother Mr. Curzon Allport from the Stormontfield establishment on the Tay, which he visited at my request for this express purpose. Water is led from the River Plenty by a race to a small plot of grass land above flood mark. Sluices are placed on this race to regulate the supply of water. From the main race a smaller one leads directly into the clearing pond, which is circular, about five feet deep, and forty feet in diameter. Thence the water is led by two covered wooden troughs into an open wooden trough at right angles with the covered troughs. From the open wooden trough small sluices let off the water in any quantity desired directly into the gravel hatching beds. These consist of wooden boxes about five feet long by two feet wide. There are 12 of them arranged in 4 rows. The water passes with a slight fall into the upper end of the first box in each row, over the lower end of that box into the upper end of the second box, and so on to the lowest, where the water from each row passes over a series of shallow gravelly pools to a pond, about 120 yds. long, and forty feet wide, varying in depth from 2 to 9 feet. All the surplus water from the clearing pond also finds its way into this larger pond by a covered drain, ensuring a permanent supply of clear cool water. All the entrances to and exits from the pond and hatching beds are carefully guarded by covering them with perforated zinc. As the day on which the first of the ova arrived at the Plenty was warm with a bright sun shining, a tent was erected over the gravel beds; the temperature of the water in which was found to be about 55° Fah.

Ice was then freely placed in the transverse open trough at the upper end of the gravel beds and the temperature thus reduced to 44°. About four o'clock on Thursday the 21st April the first box of ova was opened, and, to the dismay of Mr. Ramsbottom, a very large proportion of the eggs were dead; but in the second and third boxes affairs looked more hopeful, and by the time a dozen were unpacked, it was manifest a large proportion would be saved. In unpacking, as soon as the lid of each box was unscrewed, the top layer of moss was quickly removed and the lower layer of moss with the ova was then lifted out, and at once turned upside down on to the cool water running over the gravel beds. By this means the ova soon separated from the moss and distributed themselves amongst the gravel, after which the moss was carefully removed bit by bit. Mr. Ramsbottom and myself continued unpacking by candle-light through a great portion of Thursday night and renewed the work at daylight on Friday morning. By Friday night the last of the boxes were finished and Mr. Ramsbottom calculated that about 35,000 living and healthy ova were safely deposited. Of these only about 150 were trout ova, which were placed in a separate gravel bed constructed on purpose and enclosed at each end by perforated zinc.

The ova placed in the small boxes were obtained and packed by various persons in different parts of Great Britain; and it is a highly gratifying fact that the boxes packed by Mr. William Ramsbottom himself contained a far higher percentage of living ova than any of the others, thus proving that he had profitted greatly by the experience gained in the experiment tried in London.

The percentage of living ova varied greatly in the different boxes; but the largest number were invariably found in the boxes in which the ova were more thinly scattered amongst the moss and were subjected to only just enough pressure to keep them steady.

During the unpacking on Thursday night several living ova were unavoidably picked out and left in the heaps of damp moss besides the gravel beds through the night. On searching the heaps of moss on Friday morning I recovered several ova from amongst the moss, and one or two from the stones underneath, and transferred them safely to the water.

Bedded in the moss of one of the boxes I found an English wasp which evinced slight signs of animation. On placing the insect in the sun for a few minutes it became quite lively and walked quickly away. It is true that wasps are scarcely desirable subjects for acclimatisation, but surely this circumstance ought to teach us a useful practical lesson as to introducing valuable insects or other low organisms especially in their embryonic stages.

A few of the boxes of ova had been placed in the vaults of the Wenham-lake Ice Company for six weeks before the "Norfolk" sailed; and in these boxes, though a larger percentage of the ova were dead, the eyes of the fish were distinctly visible in those which were living—the development of the embryo having reached a higher stage. The ova from one of the boxes were placed in an ingenious apparatus prepared by Dr. Officer close to the ponds. This apparatus consisted of two tubs of gravel upon which the ova were placed, the whole being so arranged that a small stream of iced water flowed from a cask through each tub.

Before the whole of the ice was used up the temperature of the water in the River Plenty fell to 42° and has averaged about 47° since. The only object in cooling the water with ice at first was to prevent the transition of temperature being too sudden. It speaks volumes for the arrangements here that the percentage of living ova now in our breeding ponds is larger than was obtained at the same stage in the experiment in London although they had not in that instance undergone a sea voyage. For several days after the deposition of the ova Mr. Ramsbottom was busily engaged in removing all dead ova and pieces of moss, charcoal, &c., from the gravel beds. For several days afterwards the average death rate was a mere fraction. During the last few days the rate has slightly increased, which was to be expected as the mortality is always greater when the ova are on the point of hatching.

The development of the bulk of the ova has been visibly progressing up to the present time and on the 4th instant Mr. Ramsbottom had the high gratification of seeing the first trout burst its egg in Tasmanian water, and, on the following day, the first salmon.

Up to the present time about 7 salmon and 23 trout have been seen free of the egg, but it is impossible to give any estimate of the number now hatched, as the instinct of the little creatures warns them to wriggle away out of sight under the gravel, and thus many escape detection for the first few weeks of their existence.

I have already mentioned that 11 boxes of ova were left in Melbourne. No one can feel more grateful than I do for the noble manner in which the sister colonies of Victoria and New Zealand (especially the former) have aided us in our experiments, and I am sure that my fellow commissioners will agree with me that it will be both our pleasure and duty if the present experiment goes on to a successful issue, to furnish those colonies with an ample supply of the first ova taken in Tasmanian waters; nevertheless, had I been aware that there was any intention of retaining a portion of these particular ova in Melbourne, I should have made a strong appeal to the Acclimatisation Society of Victoria to give up such intention, as the retaining them could only result in the certain loss of so many ova.

Suppose that of the 700 living ova now in Melbourne 50 per cent. should live to be smolts (a high average when we consider that they are to be subjected to the treatment of those who have had no practical experience in fish hatching), these 350 smolts will at the proper season be placed in a river ill adapted for them, and will be liable to the attacks of many unforeseen enemies, and to unforeseen difficulties in obtaining food, in a sea the temperature of which is probably too high.

Under these disadvantageous circumstances, the conviction is strong on my mind that not one of those 350 fish would ever be seen again. On the other hand 350 additional fish passing down the Rivers Plenty and Derwent to the sea would materially add to our chance of seeing and retaking a few spawning fish on their return from the sea.

We have recently seen how difficult it was to obtain spawn from many well stocked rivers in Great Britain containing hundreds of thousands of salmon, how much more difficult then will it be for us when we can only send a few thousand down to the sea, and how unwise to throw away a chance of success by withdrawing even 100 fish from our small stock.

METEOROLOGY FOR MAY, 1864.

Private Observatory, Hobart Town.

Years.	Barometer reduced to standard temperature, 32 degrees.	Mean Temperature of the Air.	Maxima Thermometer Readings.	Minima Thermometer Readings.	Mean daily range of temperature.	Degree of humidity, 100 complete saturation.	Extent of cloudy sky 10 for sky covered.	Mean amount of ozone 10 for maxima.	Total amount of Rain.
	In.	°	°	°	°				In.
1841	29.924	49.41	75.5	35.0	15.1	.78	6	—	0.53
1842	29.664	50.45	67.0	34.2	11.1	.76	5	—	2.09
1843	29.994	51.26	72.4	37.0	13.2	.81	5½	—	0.10
1844	29.880	50.15	69.0	36.2	10.6	.82	4½	—	2.24
1845	29.817	48.43	66.5	34.3	15.0	.84	4¾	—	0.72
1846	29.864	48.19	63.0	38.7	12.9	.79	5	—	0.65
1847	29.835	47.64	65.0	33.4	14.4	.83	5½	—	1.49
1848	29.839	49.05	67.0	34.2	13.9	.83	6	—	4.38
1849	29.855	47.58	67.7	30.6	14.4	.85	6½	—	3.59
1850	29.834	50.68	70.0	36.3	13.9	.78	6½	—	0.57
1851	29.751	49.11	68.3	38.0	12.2	.82	5¾	—	0.74
1852	30.008	48.63	64.7	34.0	13.2	.88	6	—	1.46
1853	29.728	48.99	61.1	34.6	13.4	.80	6⅓	—	1.28
1854	29.834	49.18	66.0	36.3	11.0	.80	6	—	1.22
1855	29.474	51.00	67.0	35.0	13.21	.79	6.00	—	3.31
1856	29.926	51.96	69.0	35.0	19.51	.84	7.00	—	2.42
1857	30.082	50.24	69.0	33.0	22.40	.72	4.60	5.67	0.19
1858	29.997	53.00	77.0	35.0	18.58	.79	5.09	7.00	4.14
1859	29.719	51.70	71.0	37.0	15.54	.75	5.22	6.19	1.47
1860	29.821	53.03	73.0	35.0	15.74	.73	6.00	7.09	1.70
1861	29.917	52.78	71.0	40.0	18.38	.83	5.41	6.39	3.31
1862	29.975	50.01	67.0	34.0	18.74	.81	5.43	6.22	2.55
1863	29.897	52.35	69.0	36.0	15.45	.84	6.44	7.02	2.40
1864	30.002	52.14	70.0	33.0	17.16	.76	6.00	7.40	0.84

The means in all cases are taken from the sums of each column, and not from the maximum and minimum.

Time of leafing, flowering, and fruiting, of a few standard plants, in the Royal Society's Gardens, during May, 1864 :—

7th. First Medlar ripe.
10th. Caronilla glanca commencing to flower.
20th. Ailanthus trees bare of leaves.
25th. Diasma alba commencing to flower.
28th. Photima serrulata commencing to flower.
30th. Spirœa prunifolia commencing to flower.

ANALYSIS OF THE OBSERVATORY RECORDS FOR MAY, 1864; IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

In many respects the weather this month was a great improvement upon that of April, and the reduction of infantile mortality thereby effected, was considerable ; on the other hand, some of the meteorological phenomena were very inimical to invalids, and the deaths of adults consequently much more numerous ; so that the total mortalitywas still greatly above the May average of the previous seven years.

Atmospheric pressure mean was, 30.002 inches, which is + ·174 above the 20 years' standard average for this month. This makes now three months in succession, with a mean for the month, above thirty inches—an event without parallel in the last twenty three years. The Mays of only 1857 and 1852, equalled or surpassed the present month's mean, being respectively, 30·082., 30·008. The movements of the Barometer, too, were both extensive and frequent. The extreme range of the month was, 1·262 inches. In the previous seven years —1859 only, had a greater range, *i.e.*, 1·275 inches. The minimum 29·187 occurred on the 11th; the maximum, 30·449 on the 22nd. The latter has only been thrice higher in May during the previous 23 years, *i.e.*, 1852, 30·482; 1847, 30·467; 1845, 30·492. There were many lower minima. The greatest movement of the Barometer within any 24 hours, was a rise of +.680 on the 28th; a fall of—·539 took place on the 11th, followed by a rise on the 12th of +·493; altogether, there were perturbations exceeding one-fifth of an inch on 10 days. The high mean pressure, and great fluctuations, were very obnoxious to invalids; as the death records in diseases of the brain, and organs of circulation, and respiration, testify.

Wind-force, 91·62 lbs., was +48·32 lbs. more than the average of the previous seven years, and much higher than any one May of the whole seven. S.W., W., and N.W. prevailed at 73 out of the 93 observations, and had 78·35 lbs. of the total force. From all other points of the compass, the winds were below the average in number, and in force also, except E., which had +·06 only above. The strongest wind had a pressure to the square foot of 10·42 lbs., and was noted twice. So much ærial movement had a very purifying effect on the air and was beneficial to healthy persons, either young or old, but combined with the high and varying pressure, and wide fluctuations of temperature, it proved very fatal to invalids. Calms, 31, singularly enough, were within a fraction of the average for May.

Mean temperature was 52·14 degrees, which is +1·63 above the 20 years' average; last year, however, May's mean, was +·21 warmer. The mean, deduced from the maxima and minima thermometers, is 53·19. The maximum was 70 on the 5th, the minimum 33 on the 29th. Only in 1857, during the last nine years, did the temperature fall so low. The month's range, 37 degrees, exceeded any of the three preceding years' Mays.

The daily range temperature mean, was 17·16 degrees, which is +1·86 degrees above the May average, and nearly as much above May last year. On the 29th and 30th the maximum range, 28th, was noted; but on eight other days a range of 20, or above occurred. The minimum range was 8 degrees, on the 16th. These fluctuations of temperature were injurious to persons weakened by chronic diseases.

Solar temperature had a mean of 85·29 degrees, being +4·45, above the average of the previous eight years. This is very remarkable, as the cloud mean was also above the average. The maximum of the sun thermometer was 100 degrees, on the 5th, and this is higher than was noted for any May of the previous five years. The minimum was 63, on the 18th. This hot sunshine with great atmospheric pressure, &c., wide range of temperature, and strong winds, probably accounts for the increase of deaths from apoplexy and other diseases of the brain and nervous system.

Terrestrial radiation had a mean of 41·13 degrees, which is +1·97 above the average of the previous eight years. The maximum was 50·5 on the 5th; the minimum 28·5 on the 29th.

The total deposit of *rain* was only ·84 of an inch, being —1·01 less than the 20 years' mean fall for this month. It is also below that of any year since 1857, when it was only ·19 of an inch. Last year's May had nearly three times as much as the present. There were 12 days on which rain fell, but on only two of them, the 11th and 17th, was it sufficient to cause the street channels to run. The average wet days for May is +·32.3 higher. For the eight days, 20th to 27th, not a sprinkle of rain took place. Strong dry southerly winds well charged with ozone abounded in this period, and made catarrhs very prevalent, though without any deaths resulting therefrom.

Snow fell on Mount Wellington on the 17th, and remained on the 18th, but could not be seen on the following day. Another fall took place on the 28th, and continued on the mountain until the month expired.

Spontaneous evaporation exceeded precipitation being 1·27 inches.

Elastic-force of Vapor mean, was 298, which is —11 below the 20 years' average.

Humidity mean was 76, being —3 below the 20 years' mean.

Cloud mean was 6·00, which is +·30 above the 20 years' average for May.

Ozone had a mean of 7·40, which is +·90 above the 7 years' average, and higher than any one of the seven. The maximum was 10, and the minimum 5.

Electricity had 17 positive imdications, with a maximum tension of 6; and 44 negative, with maximum of 5·5, "Nil" record was only made once, at the sunset observation of the 14th. *Lightning* was recorded on the evenings of the 11th and 27th.

47 *deaths* this month, though 7 less than the preceding, is + 8 three-sevenths more than the average for May of the seven previous years. In only one of the seven, May, 1861, were the deaths more numerous, *i.e.*, 50; but more than one-third of those deaths were caused by measles, at that time prevailing epidemically. May, 1859, had the smallest mortality that has ever occurred in any month of a year during the last seven years, *i.e.*, 29. In the following table it will be seen that the bulk of the deaths this month has fallen upon adults, being exactly the reverse of what occurred in the previous month, and even higher than any of the other three months contrasted with it.

May 1864.	Ages.	April, 1864.	Maximum. May, 1861.	Minimum, May, 1859.
9	Under 1	15	12	7
6	1 to 5	18	16	5
2	5 to 20	4	9	1
10	20 to 45	5	5	7
12	45 to 60	5	3	5
8	60 and above	7	5	4
47		54	50	29

The classes of diseases too, which caused the greatest share of the mortality this month, and those compared with it, is as different as the ages at which death took place :—

May 1864	Classes of Disease.	April 1864.	Max. May 1861.	Min. May 1859	Average of Mays of 7 years 1857-1863
7	1. Zymotic	32	23	2	7 6-7
12	2. Constitutional	4	7	9	7 1-7
23	3. Local	13	14	12	16 6-7
4	4. Developmental	5	4	2	5 2-7
1	5. Violent	0	2	3	3 3-7
47		54	50	29	38 4-7

It is thus evident that *zymotic* deaths were somewhat below the May average, and *violent* greatly less than the average; while *constitutional* were much above the average, and, in fact, above any year of the seven. *Local* were, also, considerably above the average, and actually more than any year of the seven, except 1858, when this class had 25 deaths. *Developmental* is slightly more than the seven years' mean, four of the seven having the same number—4—1860-3, but 1859 and 1862 only two each. *Violent* was very much less than the average, and only May, 1860, had as small a number. Of the 23 deaths in the *zymotic* class in the maximum May, 17 were from measles, at that time epidemic; so that with those deducted, the actual number of *zymotic* deaths would be one less than in the present month. The 7 *zymotic* deaths this month were respectively,—1 from diphtheria, 1 from typhoid-fever, after scarlatina, 4 from bowel complaints, 1 registered "worm fever." The *constitutional class* had three times as many deaths as in April; all were chronic affections of long standing, and all above 33 years old, except two children, aged two and seven months, respectively. The diseases were—cancer 4, mesenteric disease 1, consumption 6 (not one of the number being Tasmanians by birth), water in the brain 1. The *local class* too had a disproportionately large share of the total mortality, *diseases of the brain and nervous system* caused 10 of the number, *i.e* :— *apoplexy, paralysis and brain disease,* all adults from 40 to 82 years of age, having 6; the other 4 were *convulsions* in children from one day to four months old. *Diseases of the organs of circulation* caused 4 deaths; recorded *diseases of the heart, &c.* Notwithstanding the variable, temperature and windy character of the month, and the general prevalence of catarrhal affections during the last week of the month, *diseases of the organs respiration* only caused 4 deaths, but all were of an acute inflammatory character. The *organs of digestion* had only one death; the *urinary organs* 3, and *integumentary system* 1. The deaths in the *developmental class* were 2 infants, and 2 women, but require no comment. But one death arose from *violent or accidental* causes, *i.e.*, a man aged 42, who in a state of intoxication fell down some steps, was taken to Hospital in a state of insensibility, but having only slight external marks of injury, (a mere bruise on the back of the head) he survived nine days having recovered the powers of speech and locomotion, and eating well. The *post mortem* examination revealed a very severe and extensive fracture of the base of the skull (the sphenoid bone completely shattered) and a clot of blood in the front part of the brain. The coroner's jury returned a verdict in accordance with the medical evidence, *accidental death from a fall*. Three *inquests* took place, while the previous month had not one, though May 1863 had 7. Of the 47 deaths, 4 occurred in the Glenorchy and 3 in the Queenborough districts, the rest in the city; 25 were males, 22 females, being an unusual equality of the sexes; 10 deaths occurred in the Hospital, but 3 of them were admissions from country districts, and 2 from the male Invalid Asylum. The weekly number of deaths was unusully uniform, the first having 12, the second 9, the third 11, the fourth 10, and the last three days 5. On the 5th, 9th, 15th, 24th, not one death occurred; and the greatest number on any day was 4 on the 16th. The most fatal period of the month was the four days, 16th to 19th inclusive, when 9 deaths took place; within these days the barometer rose +·717 of an inch, and the depression of temperature was great.

The registered *births* were 70, being +9 more than May 1863 had.

F. ABBOTT.

OBSERVATIONS OF THE OCCULTATIONS OF JUPITER AND HIS SATELLITES BY THE MOON, APRIL 24TH, 1864. Lat. 42° 52' 13" S., Lon. 9h. 49m. 29s. 6 E. BY F. ABBOTT, F. R. A. S.

The sky on the morning of the 24th was alternately clear and hazy after rain that fell on the previous night; a few bands of strata clouds were dispersed here and there which occasionally passed over the Moon and Jupiter, and at times caused both the planet and its satellites to have an unfavorable appearance for the occultation.

The light of both Jupiter and the Moon, was seen at intervals with good definition, but was notably less brilliant than could have been wished for at the time of conjunction, notwithstanding the air was calm and undisturbed.

Apparent conjunction of the—

	h.	m.	s.		
4th Satellite, 1st contact	6	19	40	0	a.m.
,, Disappearance	6	19	41	7	,,
3rd Satellite, 1st contact	6	20	24	2	,,
,, Disappearance		20	26	8±	,,
1st Satellite, 1st contact	6	22	20	0	,,
,, Disappearance	6	22	21	9	,,
Jupiter, 1st limb	6	23	35	5±	,,
,, 2nd ditto	6	25	24	8	,,

Atmospheric pressure, 29.514 in.
Temperature, 47°.

Shortly after the disappearance of Jupiter, small vapory clouds accumulated and passed over the Moon, which prevented any observations being made on the 2nd satellite and the emersions.

The planet with the whole of its satellites passed behind the Moon in a chord near the centre, and if the sky had been clear at the the time, both the immersion and emmersion could have been correctly noted.

Jupiter at the first contact on the enlightened limb of the Moon appeared of a bluish-green color, and the out-line of the Moon's limb was at the time affected with a tremulous motion, which rendered the planet's actual immersion doubtful to two or three seconds. After once oncluding upon its disappearance, a portion of its disc seemed to reappear for an instant in the fluttering of the Moon's edge.

The telescope used on the occasion was an unexceptionably good 5-foot achromatic with 4 inch clear aperture, power 135. Means for micrometer measures were provided, but the sky at the time was unfavorable.

The chronometer used was found by transit observation a few hours previous to be one second and sixty-seven hundredths fast (+1.67") which is not accounted for.

Private Observatory,
Hobart Town, 1864.

NOTES ON THE AURORA AUSTRALIS OF THE 8TH JUNE, 1864.

BY F. ABBOTT, F.R.A.S.

At 8 hours p.m., a distinguished feature of a rich and rare Aurora appeared, commencing in the horizon about 20° E.S.E., forming an angle of about 20° to the equator, at which point it took a path bordering on the equator nearly due east and west. At 8 hours 20 minutes it formed an inverted cone with the apex apparently 1½° wide, pointing to the horizon,and the base about 3½° wide, with an altitude of 60°. At this period it became very peculiar in its external properties; forming a large column of a clear silvery lustre, destined to span the heavens in one entire arch. Its progress in this form became steady and regular, but slow, until it reached the meridian, when it commenced to form another inverted cone, with the apex pointing due west. At about 8 hours 40 minutes it became a most superb object, the brightness of its white light was so excessive as to drown the Via Lactea, and its form a double cone, each cone with a slight curve—best described as resembling the form of the Diatom *Gyrosigma elongatum* under the microscope, the Aurora having a dark line, as in the Navicula, running along its centre, in diameter about 5°±. At 8h. 45m. the Aurora band reached from α Capricornus to α Leo, passing over a portion of Sagittarius, Scorpius, Libra, Virgo, and Jupiter to Leo—the stars in each constellation being distinctly seen.

On the apex of each cone reaching the two extreme points they both as of one accord, began simultaneously and gradually to disappear, and by a slow process the cones, receded with a fluttering and rolling motion, arriving at the base nearly together. At about 8h. 55m., the whole had vanished from sight.

On the same evening, and during the time of the above phenomenon, a very strong Aurora, or Southern light, illuminated the horizon for a space of 20°, on each side of the Pole, but it was quite distinct from, and had no apparent connection with, the very peculiar and interesting band that formed a path along the Zodiac.

The meteorological state of the atmosphere at the time was humid. Rain fell on seven out of the first eight days in June, but the sky was clear and almost cloudless during the Aurora.

Atmospheric pressure 29·681.

Temperature 45°.

Private observatory,
Hobart Town,
13th June 1864.

METEOROLOGY FOR JUNE, 1864.

PRIVATE OBSERVATORY, HOBART TOWN.

Year.	Barometer reduced to standard temperature, 32 degrees.	Mean Temperature of the Air.	Maxima Thermometer Readings.	Minima Thermometer Readings.	Mean daily range of temperature.	Degree of humidity, 100 complete saturation.	Extent of cloudy sky 10 for sky covered.	Mean amount of ozone 10 for maxima.	Total amount of Rain.
	In.	°	°	°	°				In.
1841	29.913	46.21	62.0	33.6	13.6	.85	5	—	1.23
1842	29.659	45.12	59.0	34.7	10.5	.81	5	—	4.41
1843	29.816	47.62	62.5	37.0	12.0	.86	$5\frac{1}{2}$	—	1.91
1844	29.790	43.89	63.2	33.2	13.3	.85	$4\frac{1}{2}$	—	2.74
1845	29.799	45.04	63.6	32.3	16.5	.85	4	—	4.27
1846	29.954	45.69	60.8	33.2	12.7	.87	$6\frac{1}{4}$	—	2.29
1847	29.644	43.09	59.0	31.5	14.9	.90	$5\frac{1}{2}$	—	0.56
1848	29.950	45.81	59.0	37.7	12.3	.85	6	—	1.12
1849	29.866	44.73	56.8	29.4	13.4	.87	$5\frac{3}{4}$	—	2.46
1850	29.903	45.56	61.8	30.7	13.9	.86	$6\frac{1}{3}$	—	0.70
1851	29.794	47.01	59.0	34.8	10.9	.85	$5\frac{1}{3}$	—	2.35
1852	29.919	45.37	63.5	32.7	11.9	.86	$5\frac{1}{2}$	—	0.22
1853	29.917	44.03	57.6	29.8	11.6	.89	$5\frac{3}{4}$	—	0.35
1854	30.031	44.85	54.1	34.0	9.6	.90	$7\frac{1}{3}$	—	0.33
1855	29.857	50.00	72.0	31.0	13.14	.83	4.50	—	1.29
1856	29.657	48.80	71.0	33.0	20.46	.80	6.33	—	1.15
1857	29.822	49.30	67.0	33.0	20.20	.83	5.90	4.80	3.42
1858	30.057	49.26	70.0	33.0	20.96	.77	4.50	6.38	1.12
1859	30.005	49.23	66.0	35.0	17.26	.81	5.67	6.22	3.80
1860	29.885	47.33	67.0	33.0	15.46	.83	6.00	6.25	1.30
1861	29.751	50.92	69.0	35.0	18.93	.79	5.16	6.50	1.58
1862	29.961	45.97	66.0	29.0	18.56	.81	4.92	6.68	1.23
1863	30.062	48.01	68.0	32.0	16.63	.82	5.42	6.59	0.89
1864	30.031	47.42	65.0	32.0	15.13	.82	6.17	6.90	3.71

The means in all cases are taken from the sums of each column, and not from the maximum and minimum.

Time of leafing, flowering, fruiting, &c., of a few standard plants in the Royal Society's Gardens during June, 1864.

1st. Leaves of Maclaura aurantiaca falling.

3rd. First flower of early Narcissus open.

14th. Leaves of Common Privet shedding.

20th. Flowers of Snow Flake commencing to open.

29th. Black Mulberry bare of leaves.

F. ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR JUNE, 1864; IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

June commenced with such a genial fall of rain, that excited hopes that the mortuary record of the month would fall below the average; but the subsequent weather was so abnormal in many respects, that again, for now the fourth month in succession, the deaths are considerably above the average of the previous seven years' Junes.

Atmospheric pressure had a mean, 30·031, which has only been exceeded twice in the previous 23 years:—1863, 30·062; 1858, 30·057. 1854 had exactly the same mean, and every other year, except 1859, had a mean below 30 inches. The present month is + 00·164 above the 20 years' adopted standard mean, but + 00·77 higher than the average of the first 14 years of the series. The extreme range of the month was, 1·094 inches, and happened within three days, the minimum, 29·291, having occurred at the evening record of the 7th; and the maximum, 30·385, on the morning record of the 10th. The fluctuations of pressure were both numerous and high, the highest being a fall of —·715 of an inch on the 24th. On the 4th there was a fall of — 234 of an inch, and next day a further fall of — ·437 of an inch, making a total fall of — ·671 in the 48 hours. The greatest rise on any day was + ·690 of an inch, on the 9th. But the most remarkable condition of the barometer was observed between the evening of the 24th and the close of the month, during which the mercury continuously rose; on the 26th as much as + ·542, and for the six days altogether + ·912 of an inch. At the same time the temperature was the highest for any similar period of the month. The ozone the same, and yet the wind vane marked, mostly, northerly winds and of considerable force. The last seven days of the month had the greatest number of deaths, 20. The previous seven had only 13, though one day, the 21st, had seven of that number. That day had a high, and rising atmospheric pressure, without wind, low temperature, cloudy, electricity almost absent, and ozone much below the month's mean.

Wind force total was, 28·60 lbs, only the Junes of 1857 and 1861 having more the former being, 37·23 lbs., the latter, 29.04 lbs. The present month's force exceeded the average of the seven previous years, by + 3·83 lbs.; yet the calms, 46, were + 3 above the average; thus showing that the winds were of unusually great force, when there were any. S.W., W., and N. W. were all above the average both in frequency and force. The latter was recorded 43 times out of the 90 observations, and as having 10·92 lbs. out of the total force. But as I have often before remarked, the coast, &c. stations, at the same time recorded west or south-west winds, there being no doubt that the course of the valley of the Derwent, with the position of Mount Wellington, frequently causes a north-westerly deflection of what are really winds from the west and south-west points of the compass. North winds were considerably below the average frequency, though nearly one pound above the mean in strength. N.E. winds were nearly as much above the average in frequency, as north were below, but were a few decimals below the mean in force. From all the other three points of the compass, the winds were below the average, both in number and strength. The greatest force of any wind during the month was 2·60 lbs.—twice noted from the south, with the rain on the 1st. Once N.W. on the evening of the 5th, the same from the north at noon of the 6th, and from the west on the evening of the 24th and noon of the 25th.

Temperature mean by the three daily observations was, 47·43 degrees, being + 00·30 above the 20 years' mean. The *Wet-bulb-thermometer* approximated unusually near to the foregoing, being 44·86 degrees. The present month's mean, however, is + 2·15 degrees above the 14 years' mean of the observations at the Royal Observatory Ross Bank, in the Queen's Park. The maxima and minima thermometers give a mean of 48·66 degrees. The highest record of the former was 65 degrees, on the the 29th, the three previous days were all 60, and the one succeeding was 63. No other day of the month reached 60, except the 3rd, which attained 61. The mean of all the maxima is only 56·23 degrees, so that the warmth of the last five days of the month was peculiarly great. The minimum record was 32 degrees on the 10th and 13th, and the mean of all the minima of the month, 41·10 degrees. 1863 had the same minimum, 1862 had 29, 1855 had 31, all the rest of the nine years had higher minima, than the present, and the whole nine higher maxima. The extreme range of the month, was 33 degrees, being below that of any of the preceding nine years' Junes, except 1859, which had only 31 degrees.

The *daily range* mean, 15·13 degrees, is — ·17 below the 20 years' mean, had less than all the previous years, since 1855, which had only a daily range of 13·14 degrees, 1863 had 16·13. The extreme range on any day of the month only amounted to 22 degrees, and was recorded on the 10th. No year since 1854, had so small an extreme. The least range on any day was 6 degrees on the 19th.

The *solar temperature* mean was, 72·46 degrees, being — 2·29 degrees below the mean of the previous eight years, but + 1·46 degrees higher than June 1863 had. The highest temperature noted by this thermometer, was on the 29th, and 89 degrees; the lowest was 52 degrees on the 14th. The number of cloudy days, accounts for the small total of mean solar temperature, and at the same time shows, that the sun's rays, on the sunny days, were really hotter than is usual in this month.

Terrestrial radiation mean was, 37·80 degrees, being + 1·20 above the mean of the previous 8 years, and + 00·31 above 1863. The minimum record was 28·5 degrees on the night of the 13th, and that is — 2·5 below the minimum of 1863. The maximum temperature of this thermometer was, 47·5 degrees on the 20th.

Rain-fall total was, 3 ·71 inches, which is + 1·82 above the 20 years' mean. Though January, February, March, and May, had all a rainfall below the average, the half year's total is actually + 00·12 more than the 20 years' average of the first six months of the year. 2·70 inches of the present month's fall, was precipitated on the first two days of the month, with fresh southerly winds. Rain was recorded on all the first nine days of the month, except the 4th, and amounted altogether to 3·54 inches. In this period the fewest number of deaths took place. From the 10th to the 18th inclusive, there was not a sprinkle of rain, and only ·17 of an inch fell during the last twelve days of the month, distributed through five of them. The last 12 days of the month had 32 out of the 54 deaths in the month.

Snow was permanent on Mount Wellington throughout the month, but underwent frequent mutations of increase and decrease.

While *spontaneous evaporation* exceeded the deposit of rain in May, in this month it was far below it, being only 1·42 inches.

Elastic force of vapor mean, 273, was so near the 20 years' June mean, that it was only—1 less.

Humidity mean, 82, was—$1\frac{1}{2}$ below the 20 years' mean.

Cloud mean was 6·17, being +0·68 above the 20 years' mean.

Ozone mean, 6·90, was the highest recorded for any year of the previous seven, and + ·70 above the mean of the whole. To the high atmospheric pressure, combined with this abundance of ozone, may be attributed the great prevalence of catarrh this month —Dr. Dongan Bird in his recent interesting and valuable little book, "On Australian Climates" confirms the opinions long since published by me, that "excess of ozone, particularly if the air is dry, causes irritation of the mucous membranes, particularly those of the pulmonary and gastic tract, &c. It has, in fact, upon the animal and vegetable organism, an action similar to that of oxygen, in an exaggerated form; it stimulates the rapid performance of all the vital functions, and their associated operations—respiration, circulation, excretion, secretion, assimulation —the circle of successive repair and destruction in which life consists, and whose coincidence and equality constitute health. It is nature's atmospheric stimulus, which, in an overdose, becomes, like alcohol, a poison." Many persons confound catarrh with influenza. In the latter, however, as was signally exemplified in the destructive epidemic that prevailed at this season in 1860, ozone was at a minimum or altogether absent.

Electricity.—There were only three positive indications recorded, with a maximum tension of five. Negative was noted 41 times, but with only a maximum tension of 4·5. There were 16 nil records. On the evening of the 8th and 9th the aurora australis was seen, and on the first night exhibited a most beautiful and unusual appearance, a broad arch of tremulous white light, extending across the sky from nearly east to west, and enduring for some time.

The *deaths* were 54 this month, being × 7 six-sevenths above the average of the previous seven years, and more than any one of them, except 1861, which had 59; measles at that time prevailing epidemically, as catarrh has been during the present month. The table following contrasts the ages at death of the present month, with the seven preceding Junes, and with the previous month of May :—

June, 1864.	Ages.	May, 1864.	Junes. 1863	1862	Max. 1861	1860	1859	1858	Min. 1857	Avg. 7 yrs Junes 1857–1863.
14	Under 1	9	6	10	9	12	11	7	9	9 1-7
10	1 to 5	6	6	3	20	5	5	8	8	7 6-7
4	5 to 20	2	3	5	4	0	4	3	2	3
7	20 to 45	11	9	14	14	11	14	15	8	12 1-7
9	45 to 60	12	10	11	5	3	9	9	2	7
10	60 and above	8	14	10	7	5	5	5	3	7
54		48*	48	53	59	36	48	47	32	46 1-7

* One more death registered since the May report was drawn up.

The greatest proportion of the mortality this month has fallen upon those under 20 years old, and those above 60. The deaths between 20 and 60 years of age (16) are less than in any of the Junes in the table, except 1860 (14), and 1858 (10). The maximum year of mortality, 1861, had more deaths at 1 to 5 years of age, and 20 to 45; an equal number at 5 to 20; but less in all the other groups of ages. It must not, however, be forgotten, that the relative proportion of the living population in each group of ages, is annually varying, and with a general tendency to an increase of those under 14 years of age, and those above 60. By exhibiting the number dying in each year in the five great classes of disease, as in the following table, it will be seen what type of sickness has been most induced by the meteorological character of the month :—

June, 1864.	Classes of Disease.	May, 1864.	Junes. 1863	1862	Max. 1861	1860	1859	1858	Min. 1857	Avg. 7 yrs Junes 1857–1863.
5	1 Zymotic	7	4	9	23	2	11	8	9	9 3-7
6	2 Constitutional	12	5	8	7	9	10	10	3	7 3-7
33	3 Local	24	29	26	25	20	21	17	14	21 5-7
6	4 Developmental	4	8	4	3	4	6	7	4	5 1-7
4	5 Violent	1	2	6	1	1	0	5	2	2 3-7
54		48	48	53	59	36	48	47	32	46 1-7

Zymotic deaths are little more than one half the seven years' average, and only two out of the seven had fewer. This is a true test of the general atmospheric purity of the present month. One of the deaths, however, in all probability, was due to habitual breathing of a locally poisoned atmosphere.

Constitutional deaths are also less than the seven years' average. Of the six recorded, four were cases of *Consumption.* One of the number being a native born youth. The deaths in the *local class* are greatly beyond the seven years' average, and more than any June of the seven. This augmentation arose from the comparatively large amount of deaths from *convulsions*, and *diseases of the organs of circulation and respiration*, the latter having the unusually large number of 14 deaths, (the previous month had only 4.) These were all from the prevailing *catarrh*, and its inflammatory sequences, *bronchitis*, *pleuritis*, and *pneumonia*, the causes for which have been indicated in the meteorological analysis. The *developmental class* had somewhat more deaths than the 7 years' average. Four out of the six deaths were from old age, respectively aged 62, 72, 85, 92, the last being an invalid at the Brickfield's Asylum. The fifth class, *violent* and accidental deaths, had considerably more than the seven years' average. Of the four deaths, one was a child, killed by a cart running over him; another was a girl, accidentally burnt by her clothes igniting from a bonfire; the third was a sailor, found drowned; and the fourth died from lock-jaw *(traumatic tetanus)* from a slight wound, but in a constitution probably predisposed from occupation and habits.

Inquests took place on three cases dying within this month. June, 1863, had five. In the hospital nine deaths occurred. Junes, 1863 and 1862, had respectively 13 and 12. Two of the cases this month were from country districts. Of the 54 deaths of the month, five died in the Glenorchy district, three in the Queenborough, and the rest in the city. 32 were males, 22 females. On the 6th, 7th, 11th, 18th, 20th, 23rd, 26th, not a single death occurred. In the first week of the month, seven died; in the second, 10; in the third, 16; in the fourth, 14; in the last two days, 7. The last seven days of the month, had 20 deaths; the previous seven, only 13; though one day—the 21st—had seven of that number. The next seven days in retrogressive order had only 10; the fourth, 9; and the first two days, 2. For any two consecutive days, the greatest number of deaths was eight, on the 21st, 22nd, and 27th 28th.

The registered *births* were 71, being five less than June, 1863, had.

JULY, 1864.

The monthly evening meeting of the Society was held at the Museum, on Tuesday, the 12th July, the Ven. Archdeacon Davies, V.P., in the chair.

Among the Fellows present were :—Messrs. C. Gould, T. Stephens, M. Allport, J. Allport, F. Abbott, sen., F. Abbott, jun., H. S. Wintle, G. J. Crouch, J. Johnston, J. Facey, G. P. Adams, A. T. Seal, H. Bilton, Lieutenant-Colonel Crawford, Dr. Hall, Dr. Agnew, Hon. Sec., &c.

The following gentlemen (having been previously nominated by the Council) were, after a ballot, declared to be duly elected Fellows of the Society :—Lieutenant Seddon, R.E., Messrs. Russell Young, H. L. Roberts, and J. Pillinger.

The usual Monthly Returns were laid on the table, viz. :—

(1.) Visitors to the museum during June, 480.
(2.) Ditto to gardens, ditto, 509.
(3.) Plants and seeds supplied from gardens :—To Archdeacon Davies, 36 papers colonial seeds; to Messrs. Handyside & M'Millan, Melbourne, 106 plants and one bundle of cuttings; to Dr. Mueller, Botanic Gardens, Melbourne, 14 papers of coniferous seeds.
(4.) Plants received :—From Messrs. Handyside and M'Millan, Melbourne, 6 bulbs, 7 plants, and 1 graft.
(5.) Tench supplied :—Mr. Morrison, 18; Mr. A. Moses, 6; total, 24.
(6.) Books and periodicals received.

Meteorological Returns :—

(1.) Hobart Town, from F. Abbott, Esq.
  (a.) Table for June.
  (b.) Summary and Analysis of Observations for ditto.
(2.) Port Arthur, from J. Boyd, Esq.
  (a.) Tables for May and June.
  (b.) Reading of Government Schooner's Barometer, for ditto ditto.
(3.) Swansea, from Dr. Story.
  (a.) Tables for April and May.

The SECRETARY read the usual monthly analysis of the Meteorological Observations, together with a Health Report for June by E.S. Hall, Esq.

The following presentations were brought under the notice of the meeting :—

1. From Mr. Thomas Buxton, Sen., of Little Swanport, 7 coins, viz:—1 shilling of Queen Elizabeth; 1 Spanish quarter dollar of 1721, 1 Roman coin found in the River Dove, near Tutbury Castle, England; 1 India copper coin; 1 Chinese ditto; 1 farthing of Charles 1st.; 1 ditto of William 3rd.
2. From Mr. R. Rothwell, 4 coins, 1 American cent; 1 Chilian copper coin; 1 twenty cash, (East India Company) 1803; 1 Portuguese coin.
3. From Miss Nicholas, 1 Chinese coin, and a medal struck in memory of the late Duke of York.
4. Specimen of Vicuna wool, presented by C. Ledger, Esq., per Justin Browne, Esq.
5. From Mr. H.S. Wintle, sample of bituminous coal from Brown's River.
6. From G. Selwyn, Esq., Government Geologist, Melbourne, 14 quarter sheet maps of geological survey of Victoria, and 8 sheets of geological sketch map of Victoria.
7. From His Excellency, Colonel T. Gore Browne, a pamphlet on the Malta and Alexandra Telegraph.
8. From the Royal Geographical Society, London, transactions of the society, Vol. 32, 1862, and proceedings of ditto, Vol. 8, No. 1.
9. From the Royal Institution of Great Britain, proceedings of the institution, Vol. 4, part 1, No. 37, and part 2, No. 38, 1863. Report for 1862. List of officers for 1863. Notices of proceedings part 12.
10. From Lieut.-Colonel Crawford, cones and seeds of cedar of Lebanon.

The SECRETARY informed the meeting that the following recent specimens of Tasmanian animals had been received from W. Gellibrand, Esq., and were in course of preparation for the Museum :—2 Native Tigers (*Thylacinus cynocephalus*); 2 Native Devils (*Sarcophilus ursinus*); and a Wombat (*Phascolomys wombat.*)

Mr. STEPHENS exhibited a small branch of an apple tree studded with large patches of a "blight," which he feared was a new variety. On examination with a glass the patches were found to consist of masses of insects' eggs of extreme minuteness. As they differ from any which he had ever previously examined, Mr. Stephens promised carefully to watch their development, and report upon the subject on a future occasion.

Mr. M. ALLPORT begged to report that the young salmon and trout were going on in a very satisfactory manner. Of the former, almost all had lost the umbilical sac; and of the latter, all had lost it. It was calculated that the young trout now number about 250, which was even better than had been anticipated. Mr. Allport then read a very interesting paper on the natural enemies which the salmon would have to contend with in our seas and rivers. Specimens from the Museum of many of these predaceous animals were exhibited on the table, amongst them were the platypus, beaver rat, seal, jaws of porpoise and black-fish, black swan, ducks, cormorants, &c.

On the conclusion of the paper, Mr. GOULD observed that he feared the black-fish, referred to by Mr. Allport, as likely to prove chiefly a nocturnal destroyer of the salmon, would be found to be also a very formidable enemy during the day. It was satisfactory, however, to know that this would only be the case in some of the northern and western rivers, where alone the black-fish are found, and could not affect our southern streams, which were, perhaps, in other respects also, the best adapted for the salmon.

Mr. WINTLE mentioned it had been suggested to him that the Murray Cod might be introduced into our rivers with advantage.

Mr. M. ALLPORT said this had been thought of many years ago. The fact was, however, the cod was a most voracious fish, and it would certainly be unwise at the present juncture to introduce such an insatiable enemy among our young trout and salmon. He thought it probable too that our waters were too cold for the Murray fish. He had doubts, however, of the propriety of attempting their introduction at all, as in reference to their value for the table he had heard very conflicting and contradictory statements.

Mr. STEPHENS stated the Murray cod was not a fine fish. It was well enough for inland districts when no other could be obtained, but could only be called good in comparison with very bad fish. It was not nearly so good as our black fish, and by its introduction therefore we would only lose, through its great voracity, some of our good fish without gaining any corresponding advantage.

Mr. WINTLE read some notes on the Hobart Town sandstone. In reference to a fossil one found some years ago in the sandstone quarry in the Domain, and which has been pronounced by Professor Owen to be the humerus of a Labyrinthodont reptile. Mr. Wintle having alluded to the possibility of the locality not having been carefully searched for other specimens, Mr. M. Allport begged to assure him that the quarry had, immediately on the discovery of the bone, been most thoroughly and repeatedly explored, both by himself and Dr. Milligan, but without result. They had fully recognised the value of the specimen, and had spared neither time nor trouble in the search.

Conversation ensued, in which Mr. Gould and Mr. Stephens, in discussion with Mr. Wintle, expressed doubts of the correctness of the conclusions he had arrived at as to the age, &c., of the sandstone. A vote of thanks having then been recorded for the papers and presentations, the meeting, after a more than usually prolonged sitting, broke up.

ON THE NATURAL ENEMIES OF THE SALMON IN TASMANIA.

[By MORTON ALLPORT.]

Having so far succeeded in the great work of the introduction of the salmon to Australia, it now becomes necessary to consider what difficulties we may have to encounter from the presence of creatures in our Tasmanian waters, likely to prey upon the ova, the fry in their early stages, or the full grown fish.

Many persons imagine that enemies will be more numerous here than in Great Britain; I do not think so, and have endeavored to make a list of our indigenous animals likely to prove injurious. And first as to those found in the fresh waters;—pre-eminent amongst which stands the beast with a bill, the platypus (*Ornithorynchus anatinus*). This sleek creature will prove the chief scourge to the natural spawning beds in our rivers, for he is not only well fitted by nature with rapid powers of locomotion in water, and to hold his own in strong ripples, but he can remain under water for several minutes at a time, and whilst there can burrow to the bottom of the deepest spawning rids and avail himself of the beautiful spoon with which he was furnished at his birth, for the very purpose, one would think, of scooping up ova.

When the large fresh water lobsters found in the northern rivers are depositing their spawn (each ovum of which closely resembles in size and appearance the ovum of the salmon) the platypus is generally very busy in the neighborhood, and if caught and opened at this time, many of these creatures will be found to contain upwards of a pint of spawn each. I have little doubt that the young fish in its first helpless state would be taken just as greedily, though I have not yet been able to test this fact. When the Tasmanian grayling, the sole representative of the salmonidæ in our waters (erroneously called the fresh water mullet or herring) are spawning, I have repeatedly seen the shoals driven away by the unwelcome appearance of a platypus, probably on the look out for a supply of ova. It is in the quiet waters of our most secluded lakes that the platypus is now found in the greatest abundance, and it is in such places that he will, for some time, delay the natural increase of the trout which must before long be established there. The last time I visited Lake St. Clair the day was so bright, and the water so still, that the noble beech trees, which clothe the eastern slopes of Mount Olympus, seemed to be continued far down into the lake, and it was next to impossible to say where the trees ended and their reflections began; the result was that the slightest disturbance on the placid surface of the water, caused a ripple and was instantly detected. On approaching some of these ripples in a boat, I discovered that each was caused by a platypus rising to breathe. Once there were five of them on the surface together within a radius of a few hundred yards, and one dived immediately under the boat, from which I could see him most distinctly in the brilliantly clear water. On timing them I ascertained that they frequently remained under water more than two minutes when undisturbed, and, if alarmed, I have no doubt they could increase the time of immersion considerably.

The only other mammal likely to be destructive, and which is common to both fresh and brackish water is the yellow bellied beaver-rat or musk-rat (*Hydromys chrysogaster*). This creature, one of the few placental mammals indigenous to Tasmania, is nocturnal and piscivorous, and must be carefully excluded from all fish-breeding establishments. When the ponds in my father's garden were stocked with a small species of carp introduced here, many years ago, from the Mauritius, the beaver-rats made great havoc amongst the fish till I shot and trapped several, some of them in the very act of dragging their prey from the water. Though still numerous, these creatures seem, like our carnivorous marsupials, to retire rapidly before civilization. The presence of a few good terriers on the river banks will effectually clear them. On the rocky shores of the Derwent, between Risdon and Bridgewater, I have frequently tracked these animals to their shelter amongst loose stones by the peculiar and powerful scent from which they derive their name of musk-rats, and have sometimes killed three and four in a day; their muscular hind legs and webbed feet enable them to swim and dive with great rapidity. Since writing this account of the beaver-rat, Mr. Ramsbottom has shown me a letter from Mr. Henry Button, of Launceston, warning him to beware of the same creature, and giving a very conclusive instance of their piscivorous propensities. Mr. Button says that having a beaver-rat in confinement, he used to place in its cage a vessel full of water, containing a number of our small speckled fish, and then retire to a distance; the beast would raise itself upon its hind legs, look into the vessel, suddenly plunge in and almost instantly emerge with a fish wriggling in his jaws; in this manner he would sometimes take more than 20 small fish at a meal.

Of the birds likely to be injurious, little need be said. The Black Swan (*Cygnus atratus*) is now rarely seen on the rapid rivers and is almost entirely confined to a few of our shallower lakes and salt-water inlets from the sea. The common wild duck (*Anas superciliosa*) is another enemy both to ova and young fish, but these birds, like all our other wild ducks, have greatly decreased in numbers during the last few years.

The black cormorant (*Phalacrocorax carboides*) will, I apprehend, prove a far worse poacher than any other bird. Even in our lonely mountain lakes, and on the upper sources of the large rivers this bird is found watching, from the dead limb of some gigantic tree, the very shallows which will some day be the chosen spawning beds of salmon and trout, and woe to the shoal of young fish that he gets amongst, for he is insatiable. I once shot a specimen, from which I released three living eels, each close upon a foot long.

The graceful slate-colored heron (*Ardea Novæ Hollandiæ*) is sometimes, though rarely, seen on the fresh waters, his feeding grounds generally being salt swamps or quiet reedy backwaters.

I feel scarcely inclined to mention our charming little kingfisher (*Alcyone azurea*) for who would not willingly give up the few fish he ever takes in return for the brilliant contrast he exhibits, to the sombre foliage overhanging the rivers, where he dwells in such strict retirement that the fisherman or naturalist seldom sees more than one in a day.

As we fortunately possess no piscivorous reptiles, I now pass at once to the lowest of the Vertebrata, the fishes; and I can safely affirm that no fresh waters in the world, so well adapted for salmon or trout, are more free from voracious fish than ours. It is true that the little speckled fish, (*Galaxias sp. ?*) erroneously called trout and two allied species, are very numerous in our rapid streams, and that these and the indigenous grayling may prove destructive to ova and to the young fish, during the first ten weeks of their existence, but that period once passed, the fry will be free from further attack.

A small percentage of both ova and fish will doubtless be taken by eels, as though never plentiful in such situations, they are occasionally found in the rapid gravelly parts of our rivers.

The large fresh water fish called by colonists the "black fish" only inhabits those rivers which run towards our northern and western coasts; it frequently attains a weight of four or five pounds, and may certainly prove a formidable enemy, but from personal inspection of one or two rivers in which they live, and from the accounts of those who have watched them, I am inclined to believe that during their nocturnal excursions for food, the black fish never roam far from their daily hiding places, namely, holes in banks, and under roots and logs.

In several rivers, formerly tenanted by great numbers of black fish, and which have been much fished (such, for instance, as the North Esk and Piper) they have steadily decreased in number for several years past.

Of crustaceans, fresh water shrimps of several species, and the small crayfish (*Astacus sp. ?*) are, as far as is at present known, all we need fear in the southern portion of Tasmania; but in the north and west, the latter fellow is represented by a monster, attaining a weight of six or eight pounds, whose powerful claws will prove of great service in removing gravel from the spawning beds in the search for ova or embryo fish.

Amongst insects the larva of various dragon flies (*Libellulidæ*) are both numerous and destructive.

The large water beetle (*Dytiscus sp. ?*) and its larva (abundant in deep weedy holes) are occasionally found in running water, and, be it remembered, they are never there for any good. The rapacity of these insects is something astonishing. I have seen the larva dart upon a large tadpole, weighing far more than a salmon three weeks hatched, and kill it almost instantly. Upon examination, the victim is found pierced through by the aggressor's long sharp mandibles. Fish, in their very early stages, would stand a poor chance against these monsters, if present in large numbers at the spawning rids.

The larva of our largest dragon fly has all the inclination to be just as wicked as that of the beetle, but luckily he wants the speed, and has to approach his would-be victims in a sneaking, cat-like manner, which greatly adds to the chance of escape.

Having now, to the best of my ability, completed the list of our fresh water enemies, I would call attention to the fact that, with but one or two exceptions, the attacks of all the creatures yet mentioned would be directed only against the ova or the fish during their early and inactive stage, the lesson to be learnt from which is, that to ensure success we must never leave off protecting the ova and young fry by artificial propagation, and from the interest hitherto taken by the Fellows of the Royal Society in this great work, I feel certain that they will do their utmost to support the Salmon Commissioners in their determination to carry on the artificial rearing till all suitable Australian rivers swarm with the King of fish.

With regard to the creatures inhabiting our brackish and salt waters, the difficulty of estimating the degree of injury they may do to the salmon is very great, from two obvious causes, one is our ignorance of the habits of the salmon when he leaves the fresh water, the other I regret to say, is our want of reliable information concerning the creatures inhabiting our coasts and estuaries. With reference to this last cause, I would urge the Fellows, to communicate to this Society any observations they may have made upon the habits of our voracious fish or other animals. Such information would add greatly to the value of our published transactions, and might prove of very great service to those who are personally superintending the salmon experiment.

If we knew whether the smolts, on their way to the sea, swim near the surface or near the bottom, along the banks or in mid-stream, we might predict with more accuracy, what their foes would be, but in the absence of this knowledge, all I can do is to take care that none of our predaceous animals, with which I am acquainted, and which could possibly interfere with the salmon, are omitted.

One fact in the natural history of the salmon in salt water, is well established, and that is the rapidity of his growth and corresponding increase in strength and speed,—and this increase in size, strength and speed will effectually remove him from the attacks of a host of enemies to smaller and more sluggish fish.

To commence, as before, with the mammals, Seals; (*Stenorynchus leptonyx* and *Arctocephalus lobatus*) once common on our coast, are now all but extinct, two or three only having been seen in the Derwent during the last twenty years. It is not difficult to estimate this advantage, when we remember that amongst the worst enemies of the full-grown salmon of the Scotch and Irish rivers, are the troops of small seals which still periodically visit their rocky headlands.

I have already mentioned that the beaver-rat is found on the banks of rivers below the fresh water, but in these situations his nefarious practices are confined to rushgrown tidepools, and backwaters, rather than to the open river, and he is consequently little to be feared.

Of toothed cetacean the only one much to be dreaded is our common porpoise (*Phocœna sp.?*) A shoal of these is always to be found in some part of the Derwent and I greatly fear they will often levy a toll on each batch of salmon passing up or down the river. Yet porpoises are no more numerous here than on the British coasts, and it must be borne in mind, that vast shoals of our indigenous fish, far less active than salmon are periodically subjected to the attacks of this formidable enemy without becoming extinct; indeed, any one who has watched from the rocks at the confluence of the Rivers Jordan and Derwent, the myriads of bream, mullet, and other estuary fish, passing up and down with each tide, must be aware that the porpoises are amply supplied with the food to which they are accustomed, and that a large majority of the salmon will therefore certainly escape.

Outside the Derwent, in Storm Bay and on our coasts, another toothed whale, attaining a length of from 12 to 15 feet, and known to southern whalers as the "Black-fish" (*Globiocephalus macrorynchus*) occasionally makes its appearance in large shoals. Whether this "Black-fish" will prove an enemy or not will depend on how far the salmon proceed seawards. For my own part, I do not believe they will ever travel beyond the arm of the sea which forms the entrance to the Derwent, as the time occupied in the journey from the fresh water to the sea and back is so short, often not more than six weeks, and a large part of that time must necessarily be taken up in the search for food.

From sea-birds salmon would have little to fear. During a week or ten days of their first marine excursion, the smolts, if they swim near the surface, may be subjected to the attacks of gannets (*Sula Australis*), but after that time the increased size of the fish will render them safe. Herons, terns, sea-gulls, &c., are not powerful enough to interfere with the smolts, even when they first leave the fresh water; and pelicans, whose feeding grounds are shallow pools and mud flats, are now extremely rare.

All our sea fish (with two exceptions) are harmless; these exceptions are the Barracouta and Kingfish, closely allied forms, whose speed and ferocity are truly wonderful. They are both caught on our coasts in the autumn months, the barracouta in the daytime, the kingfish at night.

A short account of the means employed by fishermen to catch them will give some faint notion of their fierce disposition. When the boat is becalmed or going but slowly through the water in the neighborhood of a shoal, the fisherman arms himself with a light staff eight or ten feet long; attached to the end of this staff by a stout line two feet long is the jigger, a piece of cedar half an inch thick, one inch wide, and with a stout nail driven through it in such a manner as to form a rough hook without a barb. With this delicate tackle the fisherman (who stands up in his boat) next proceeds to create the greatest possible disturbance in the water close alongside by drawing the jigger rapidly along the surface with a waving or jerking motion; of a sudden the water becomes alive with long gleaming fish, and, if the fisherman is new to the sport, he will soon find himself engaged in a frantic struggle to remain in the boat, while a glittering monster of some 18 or 20 pounds weight is just as anxious to pull him out of it; however with a little practice the men engaged rapidly take an immense number of fish by this means, as they are just lifted over the side, shaken off, and the jigger again immersed. The visits of these fish to our coasts are, from unexplained causes, very irregular; the barracouta rarely comes far up the Derwent, and frequently a whole season passes in which they never come nearer than Storm Bay. Many years ago, I think in 1845 or 1846, barracouta came up the Derwent in great numbers, and were caught from the rocks in Sandy Bay; but even then they remained a very short time in the river. The visits of the king fish to the Derwent are more frequent than those of the barracouta. In the early part of 1854 king fish were caught in immense numbers, on both banks of the river, almost up to Bridgewater. On several occasions in different years they have been found left by the receding tide on the mud-flats at the mouth of the Jordan, 10 miles above Hobart Town. I believe they enter the creeks and rivers to deposit their spawn, as I have often come upon large shoals of young King fish in the nearly fresh water of creeks running into the Derwent near Bridgewater. On one occasion I caught a number of the fry, each about 8 inches long with spinning tackle baited with a small glittering fish. When the whole shoal darted in pursuit, I had a good opportunity of judging of their speed which, for short distances at all events, seems to be greater than that of salmon of the same size.

Is it not likely that the periodical visits of both Barracouta and King fish are regulated simply by the abundance or scarcity of their prey, always most numerous in our rivers after a long drought which causes the water to be salt farther from the sea than usual? I well remember that at the time the barracouta were caught in Sandy Bay, as I have mentioned, the whole river was alive with vast shoals of small fish such as I have never seen since—and at times of such abundance the salmon would probably be but little molested.

A gentleman asked me a few days ago, "How about your Conger eels?" My answer was, "depend upon it so long as a Conger eel can get a good fat rock-cod close to his own door, he will never waste half his valuable night in chasing a fish which he can never hope to catch!" And the same remark will apply to all our sharks and dog-fish, which are no more numerous here, than on the British coasts, where they are not looked upon as at all injurious to the salmon.

Having now completed the list of our marine foes we may fairly conclude that a large per-centage of salmon will escape to return to our fresh waters, as, with the single exception of the porpoise, all the creatures mentioned pay us only temporary visits, often at long intervals, and even when such visits do occur, the instinct of the salmon will probably induce a large proportion of them to keep out of harm's way.

METEOROLOGY FOR JULY, 1864.

PRIVATE OBSERVATORY, HOBART TOWN.

Year.	Barometer reduced to standard temperature, 32 degrees.	Mean Temperature of the Air.	Maxima Thermometer Readings.	Minima Thermometer Readings.	Mean daily range of temperature.	Degree of humidity, 100 complete saturation.	Extent of cloudy sky 10 for sky covered.	Mean amount of ozone 10 for maxima.	Total amount of Rain.
	In.	°	°	°	°				In.
1841	30.005	42.57	57.2	30.5	14.6	.84	4	—	1.01
1842	29.695	45.09	54.3	31.3	9.1	.81	5	—	3.46
1843	29.679	44.21	56.8	31.2	10.7	.91	6¼	—	2.97
1844	29.857	43.11	56.2	31.8	13.4	.91	4½	—	2.12
1845	29.866	45.44	61.6	31.5	14.0	.84	3¾	—	0.72
1846	29.887	42.82	59.4	30.7	10.2	.89	5¾	—	2.20
1847	29.488	43.94	56.4	32.3	13.8	.89	6	—	1.73
1848	30.003	42.84	54.3	31.3	13.0	.85	6	—	2.43
1849	29.877	43.51	53.8	32.2	8.7	.88	6⅓	—	5.99
1850	30.113	44.89	58.8	29.8	16.0	.84	4¾	—	0.30
1851	29.681	45.60	56.8	34.3	12.2	.86	5¾	—	1.17
1852	29.684	44.75	54.7	31.3	12.4	.86	5⅔	—	3.14
1853	29.719	45.54	59.8	30.3	13.1	.81	5½	—	0.67
1854	29.851	44.87	58.1	31.0	12.6	.86	5½	—	0.33
1855	29.605	49.00	67.0	31.0	13.24	.81	5.60	—	1.42
1856	29.726	46.60	69.0	31.0	20.77	.76	5.00	—	1.89
1857	29.998	47.27	70.0	34.0	20.35	.79	5.63	5.67	1.00
1858	29.913	48.45	67.0	30.0	19.67	.72	3.66	7.61	1.75
1859	29.985	46.29	65.0	32.0	17.32	.80	5.86	6.66	2.09
1860	30.193	46.93	67.0	30.0	18.48	.82	5.46	5.79	0.48
1861	29.868	47.83	65.0	34.0	16.41	.82	5.94	7.13	1.84
1862	29.818	48.26	68.0	34.0	17.87	.79	5.24	6.94	1.11
1863	29.787	47.01	70.0	32.0	17.38	.80	6.11	8.14	5.62
1864	29.856	49.15	63.0	34.0	17.32	.80	5.93	7.31	4.44

The means in all cases are taken from the sums of each column, and not from the maximum and minimum.

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.

1st Arbutus unedo commencing to flower.
4th Garrya elliptica commencing to flower.
8th White mulberry commencing to break.
9th Almond commencing to flower.
23rd Crocus commencing to flower.
30th Hyacinth (white) commencing to flower.

	In.
Barometer, highest, 2d. 7h. a.m.	30.369
,, lowest, 25 sunset	29.338
,, mean for the month	29.856

Being 0.002 above the average.

	°
Temperature, highest on the 2nd	63.00
,, lowest on the 28th	34.00
,, mean for the month	49.15

Being 3.33° above the average.

Rain fell on the 5th, 6th, 7th, 8th, 9th, 17th, 18th, 19th, 20th, 21st, 22nd, and 29th, to the amount of 4.44 inches, being 2.71 inches above the average.

Prevailing currents of wind N.W., N., and S.E.; greatest horizontal force S., N.W., and N.

Lightning on the 24th. Electricity below the average.

F. ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR JULY, 1864; IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. SWARBRECK HALL.

The general character of the weather this month was abnormal and more deaths took place than in any July of the previous seven years, except that of 1860 when so many old people were carried off by influenza.

Atmospheric pressure mean is, 29·856, and so nearly that of the 20 years' standard average, that it only differs by being below it two thousands of an inch. The maximum pressure was, 30.369, on the 2nd; and the minimum, 29.338, on the 25th, consequently the range of the month was, 1·031 inches. The greatest movement of the barometer on any day, was a fall of,—·447 of an inch on the 17th, with a strong south wind and heavy fall of rain. The greatest rise was + ·415 of an inch on the 27th. On eleven other days there were movements exceeding one-fifth of an inch. In July 1863, while the extreme range of the month and the daily perturbations were much the same as in the present month, the month's mean pressure was considerably less.

The total *wind-force* was 31·21 lbs., which is—7·42 lbs., less than the average of the previous seven years. July 1863 had 93 lbs.—*south* and *south east* winds were the only ones which had an excess both in frequency and force. This occurred with the heavy rains from the 16th to the 19th of the month. At the evening observation on the 17th, the wind pressure was 5·21 lbs., to the square foot, being the maximum of the month. At four other observations within this period, 2·60 lbs., pressure was recorded, and this amount was only once registered during any other day of the month. *North-west* winds were more than usually frequent, 48 out of the 93 observations, but they were so faint, that the whole pressure was less than the average. *North*, *North-east*, *East*, *South-west*, and *West*, were all below the average both in frequency and force. There were 47 calms noted, being + 7 more than the average for July. Last year's July had only 24 calms.

Temperature mean was, 49·15 degrees, being + 3.33 degrees above the 20 years' mean, and warmer than any July on record. By the self-registering maxima and minima thermometers, the mean was 49·82 degrees, being an unusually close approximation, to that by the three daily observations. The extremes of temperature recorded were, 63 on the 2nd, and 34 on the 28th. So small a range had not occurred for nine years previously. In July last year the extremes were 70 and 32.

The *daily-range* mean was, 17·32 degrees, being + 1·97 above the 20 years' mean, and yet almost identical with that of July 1863. The greatest range on any day was, 26 degrees on the 2nd; and the smallest was, 5 degrees on the 18th and 19th, during the heavy rains. The mild and equable temperature prevailing, while so much rain came with strong winds from southerly points of the compass, is most remarkable. From the evening of the 15th until the evening of the 20th every one of the three daily records noted the wind from some southerly point, yet the mean temperature of these six days, exceeded the mean temperature of the month, being nearly 51 degrees.

Solar-intensity ranged from 92 maximum on the 22nd, to 54 minimum on the 17th. The mean was, 77·74 degrees, being + 2·69 degrees higher than the average of the previous 8 years, and above any of them except 1855. In 1863 the mean was — 5·78 degrees less than the present month. The cloud mean being, moreover, above the 20 years' average, makes the sun's rays, while prevailing, so much the hotter.

Terrestial-radiation mean was, 37·35 degrees, which is + 2·22 degrees above the average of the previous eight years and higher than any one of them. The maximum was 49 degrees on the 19th; and the minimum 30 degrees on the 26th and 28th. The latter was higher than any minima of the previous eight years. The extremes in July 1863, were 45·4 and 27 degrees.

Rain-fall amounted to 4·44 inches, being + 2·71 inches more than the 20 years' mean. Two July's only in the previous 23 years had more than this, *i.e.*, last year:—5·62 inches, and 1849—5·99 inches. However, in the present month my rain gauge record is, 5·42 inches,—or nearly an inch more than fell in the centre of the city, as registered at Mr. Abbott's observatory. The rain was registered on 12 days, which is rather more than two less than the average of the previous nine years—1863 had 19; 1862—18, and 1861—20 days wet. Moreover the rain this month fell nearly altogether on five days, *i.e.*:—the 8th, 17th, 18th, 19th and 20th. For the other seven days altogether, only, ·19 of an inch is registered; mere sprinkles on any day. From 10 p.m. on the 16th, to 10 p.m. on the 17th, I measured from my rain-gauge 3·40 inches, and in the next twenty-fours ·90 of an inch. Floods prevailed throughout the island, and the Hobarton rivulet and drains had a thorough cleansing.

Snow was never absent from Mount Wellington during the month, undergoing both reductions and additions, and on the last day of the month, but one small patch was visible from the city.

Humidity mean, 80, is exactly the same that 1863 had, being—2½ below the 20 years' average for July.

Elastic-force of Vapor mean, 282, is + 23 above the 20 years' mean, and + 27 more than 1863 had. The maximum of the month was 4.03 at noon on the 20th, and the minimum 193 was recorded at 7 a.m. on the 3rd, 13th and 27th. The present month has the highest mean of 24 years. The next was the sickly July of 1855.

Spontaneous Evaporation. Though much less than rain-fall on the whole month, exceeded it greatly for every part of the month except the four days 17th to 20th.

Cloud mean, 5·93, is + ·66 above the 20 years' mean.

Ozone mean, 7·31, is + ·46 above the mean of the previous seven years.

Electricity had 6 positive indications with maximum tension of 5·5 ; Negative had 42, with maximum tension of 5.0;—and there were 14 observations when "nil" was recorded. Sheet lightning was very prevalent on the evening of the 24th.

70 *deaths* this month is a very high mortality, in fact, in the previous seven years, only July 1860 (when 44 deaths occurred, mostly from epidemic influenza and its sequences, in very aged and infirm persons) had a higher rate. In 1861 when measles carried off so many young children, the deaths were even 11 less than the present month :—

July, 1864.	Ages.	June, 1864.	Julys. 1863	Min. 1862.	1861	Max. 1860	1859	1858	1857	Avg. 7 yrs Julys 1857–1863.
16	Under 1	14	6	3	10	8	7	7	16	8 1-7
4	1 to 5	10	5	8	13	9	9	9	6	8 3-7
7	5 to 20	4	3	2	10	4	2	0	1	3 1-7
13	20 to 45	7	10	9	13	22	8	11	20	13 2-7
18	45 to 60	9	14	11	3	22	5	8	4	9 4-7
12	60 and above	10	10	3	10	49	8	6	5	13
70		54	48	36	59	114	39	41	52	55 4-7

Under one year of age the deaths were nearly double the average of the seven years, and were only equalled by 1857. At 1 to 5, however, the mortality was less than one-half the seven years' average, and not one of the seven had so few. At 5 to 20, again, there were nearly double the average number of deaths, and 1861 alone had a greater number—At 20 to 45 the numbers were a trifle less than the average, 1861 having the like number, three out of the seven years having less, and the other three more. At 45 to 60, the deaths were not much short of being twice as many as the seven years' average, only 1860 having a greater number. At all ages above 60, the deaths were one less than the average, but 1860 greatly exceeded it. Were that year's July excluded from the calculation, the present month's deaths would be very nearly double the six years' average, which is only 7. Moreover, all this year's deaths were above 65 years of age, the oldest, an invalid male at the Brickfields, being 92 years old.

July, 1864.	Classes of Disease.	June, 1864.	Julys. 1863	Min. 1862	1861	Max. 1860	1859	1858	1857	Avg. 7 yrs Julys 1857–1863.
0	1 Zymotic	5	3	8	19	38	4	6	6	12
13	2 Constitutional	6	7	7	6	10	8	7	9	7 5-7
42	3 Local	33	29	16	21	44	20	24	26	25 5-7
11	4 Developmental	6	9	1	5	11	3	2	5	5 1-7
4	5 Violent	4	0	4	8	11	4	2	6	5
70		54	48	36	59	114	39	41	52	55 4-7

The 19 *Zymotic* deaths in 1861 were, Measles 9, Croup 4, Diphtheria 2, Scarlatina 1, Diarrhœa 2, Rheumatic Fever 1.

The 38 *Zymotic* deaths in 1860 were :—Influenza 30, Croup 6, Diarrhœa 1, Fever 1.

Of the 44 *local* deaths in 1860, 18 were from Pneumonia.

Of the 11 *Developmental* deaths in 1860, 8 were from old age.

The *Zymotic* class of diseases had not one death this month, being the first time in eight years, this class has had a blank return. This alone would show, what a high degree of atmospheric purity prevailed in July, and the Ozone returns confirm the fact. The excess of the latter,however, has been injurious in the opposite direction, by its stimulating effects on the circulatory and respiratory organs. The *constitutional* class of disease, caused a very great number of deaths, comparatively, being not many short of double the seven years' average. All were diseases of long standing, 4 being cancerous affections in persons from 51 to 65 years of age—9 were cases of consumption, being the highest number ever recorded in any month during the previous seven and a half years. Four of the number were young Tasmanians. The *local* class of diseases had many deaths beyond the seven years' average. Of these the *Nervous system* had 9 ; the *Circulatory system* 5 ; the *Respiratory system* 22, mostly acute inflammations, consequent upon the prevailing *catarrh* ; the *Digestive system* 4; the *Urinary system* 1 ; the order of *bones, joints, &c.*, 1. The *Developmental* class of diseases had rather more than double the seven years' average, but six of the number were aged from 76 to 92 years. The class of *Accidental* and *Violent* deaths and diseases, had one less than the average. One was burnt to death in his hut ; one was found drowned ; the third was killed by a mass of stone falling upon him in a quarry ; the fourth died from the effects of a bite from a boar on the thigh. Though five months of the year in succession have had an excess of deaths, over the seven years' average ,yet the first two months, usually so fatal in Tasmania had so much below the average, that the first half of the year had actually five less deaths than the first half of 1863 had. It is gratifying to record, that while death has been rife in the community at large in this registration-district, the Queen's Asylum, with an average of nearly 550 children, has not had a single death. The last death recorded for this Institution was in June 1863 in the male division, a boy aged 11 years, whose death had long been expected as he had been a sufferer from Epilepsy for many years. In the infant division the last death took place in January 1863, in a child 4½ years old, who died from the mechanical rupture of air the cells of the lungs, while laboring under a paroxysm of Whooping-cough. In the girls' division the last death occurred nearly three years since.

The *Inquests* this month were 4, July 1863 had 3. The deaths in the public *Hospital* were 24, three being cases received from country districts, and one from a vessel in harbor. At the *Male Invalid Asylum* 2 deaths took place, 1863 had 4. Of the 70 deaths, 3 occurred in the Glenorchy, 2 in the Queenborough districts, the rest in the city—40 were males 30 females.

On the 8th, 14th, 19th, 20th, and 30th, no deaths took place. The greatest number on any two consecutive days was 10, on the 17th and 18th, when the barometer fell suddenly, with strong southerly winds and heavy rain ; but it is note-worthy, that on the two following days (rain and wind from the south still prevailing) no deaths took place, and only one each on the two succeeding days. The most fatal period of the month was the four days 15th to 18th, which ushered in and commenced the heavy rains, when 17 deaths occurred ; no other four days in the month had more than eleven. The weekly totals of deaths were pretty uniform; the first having 19 ; the second 15; the third, 18 ; the fourth, 16; and the last three days 2.

The registered *births* were 68, being + 3 more than July 1863 had.

ROYAL SOCIETY.

AUGUST, 1864.

The monthly evening meeting of the Society was held at the Museum, on Tuesday the 9th August. Captain F. R. Chesney, R.E., in the chair.

Among the Fellows present were Dr. Agnew, Hon. Secretary, Dr. Hall, Lieut. Seddon, R.E., Messrs. M. Allport, J. Allport, F. Abbott, sen., F. Abbott, jun., H. L. Roberts, J. G. Crouch, W. Johnston, C. Gould, G. P. Adams, R. Young, T. Johnston, &c. &c.

The following returns were laid on the table :—

1. Visitors to Museum during July, 466.
2. Ditto to Gardens do, 1,178.
3. Plants supplied during July :—

To J. J. Stutzer, Esq., Melbourne, 5,000 mulberry plants.

To Mr. C. Diehl, Dunedin, one bundle of scions, 24 plants and 21 papers of seeds.

For decoration of grounds of Queen's Orphan Asylum, 218 plants, and 1,000 white mulberry ditto.

To Colonial Hospital, 14 bulbs, 45 plants, and 20 papers of seeds.

4. Seeds received :—

From Mrs. H. Smith, 24 papers of seeds from Mauritius.

From Col. Crawford, 2 cones of cedar of Lebanon *(Cedrus Deodora)*, and seeds of a beech.

From W. Archer, Esq.,—Seeds of the "Waratah" *(Telopea truncata)*, and of the "Celery topped Pine" *(Phyllocladus rhomboidalis)*, grown in the garden at Cheshunt.

From Mr. T. J. Johnston—Twenty-two varieties of seeds collected by Capt. T. J. Brown on the coasts of Siam and Cochin China.

5. Tench supplied :—Mr. Wilson, 12.
6. Periodicals received :—The usual.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.
   a. Table for July.
   b. Summary and analysis of observations for July.
2. Swansea, from Dr. Story.
   a. Table for June.

The SECRETARY read the usual monthly analysis of the Meteorological Observations, together with a health report by E. S. Hall, Esq.

The presentations to the Museum were as follows :—

1. Specimen of "Soap Wood," from Peaked Island, Gulf of Siam. Presented by Capt. Browne.
2. A collection of Geological specimens from Swanport. Presented by Miss M. Amos.
3. A necklace made (in imitation of coral) with seeds of *Pittosporum bicolor*, or "Waddie Wood," collected by Mrs. John Sherwin, at Caverswall, near Bothwell. Presented by I. Sherwin, Esq., M.H.A.
4. Specimen of Sphœria sp. from New Zealand. Presented by Captain Chesney, R.E.
5. Prussian copper coin. Presented by H. M. Hull, Esq.
6. A sixpence of George III. Presented by Miss Nicholas.
7. Minute of Home Government on Colonial Hospitals and Lunatic Asylums. Presented by the Hon. the Colonial Secretary.
8. A white opossum. Presented by Mr. W. H. Coe.
9. A small jade axe from New Zealand. Presented by Mr. Pitt.

Mr. M. ALLPORT having reported that the salmon and trout in the breeding ponds were progressing in a perfectly satisfactory manner read a paper on the "Food of the Salmon in Tasmanian Seas and Rivers."

Mr. Gould exhibited a map, geologically colored, of a part of the County of Dorset, and gave a brief description of the distribution and extent of the more important formations. He commented on the absence of the carboniferous formation, and the abundance of Granitic and older Palœozoic rocks. In speaking of the expansions of semi-waste low land bordering the coast, he referred to a tufaceous limestone which crops out in thin ledges along the sand banks which form part of the tertiary deposits, and may be anticipated to hold fossils; he contrasted these with the deposits at Table Cape and Macquarie Harbor, and cited them as showing that the recent general elevation of the island had been greater upon the northern than on the southern side. After pointing out the courses of more important ranges, he gave a short account of the fertile basaltic areas of Scott's new country, &c.; he also alluded to the efforts that had been made to discover gold in the neighborhood of Nine Mile Springs, and the Devil's Den, referring more especially to the latter locality as exhibiting gullies of some promise, and pointing out that the work hitherto performed had been perfectly insufficient to afford any test as to the existence of gold, only a few men having been employed, and the work performed by them having been, in part, ineffective, from an injudicious selection of the spot tried.

A vote of thanks having been accorded to Mr. M. Allport, and Mr. Gould, and also to the donors of the various presentations, the meeting broke up.

ON THE FOOD OF THE SALMON IN TASMANIAN RIVERS AND SEAS.

[BY MORTON ALLPORT.]

Before leaving the fresh water, in other words, during their parr and smolt stages, the food of the salmon is known to consist of minute molluscs, crustaceary insects, and their larvæ, and other small insects of still lower organisms.

I have heard it gravely asserted, by good observers, that our rivers do not furnish as ample a supply of these various creatures as do the rivers of Great Britain, and in proof of such assertion it was further stated, that our rivers were but poorly stocked with fish. It is quite true that our fresh water fish, with few exceptions, are very worthless, either as food or for sport, but with regard to their quantity, I have been long convinced that this has been much under-estimated, and will give my reasons.

The Grayling (our only conspicuous fresh water fish) are gregarious, and, to a certain extent, migratory; in our large rivers, such as the Derwent, the shoals, containing many thousands of fish in each, are often miles apart, and during summer, lie for weeks together in sharp ripples, unseen except by those who look closely for them, while during winter they rarely leave the deep quiet holes.

The little speckled fish, miscalled trout (*Galaxias sp.* ?), and some allied species, are found in almost every Tasmanian river I have examined, in incalculable numbers, even up to their very sources. Some of our high midland marshes, more than 3,000 feet above the sea, send their waters by tiny brooks into Lake Echo, these brooks are alive with the speckled trout and the grey mountain trout.

On a hot bright day in December or January a stranger wandering on the banks of the Ouse, Shannon, Nive, or other large tributary of the Derwent, would (if he had ever thrown a fly in his life) be as much charmed with the aspect of the stream as disgusted by the apparent absence of fish, an absence so marked that I feel no surprise at the erroneous estimate which many people make of the fish-producing capabilities of our rivers. But let this stranger stand anywhere on the bank of the same river, just after sundown, and throw worms or gentles into the shallow water, a few at a time, at first one or two small fish will make a dart from somewhere, and in ten minutes dozens may be counted coming from under stones, logs, and banks, till the water is dark with them, let him repeat the experiment twenty yards or twenty miles further on, and precisely the same thing will take place. I have many times caught from ten to twenty dozen of these fish in an evening, averaging in weight about 18 to the pound, that is to say, from six to twelve pounds' weight of fish in an evening to a rod, and this may be repeated three or four times a week through the summer, say from 18 to 36 lbs. weight of fish per rod per week.

Having fished in England, Wales, and Scotland, I have quite made up my mind that though there are many rivers in Great Britain in which this could be done, there are many more in which it could not.

The extreme difficulty of judging accurately the fish feeding capabilities of our streams was forcibly impressed upon me on one occasion during the present autumn. All my hearers may remember that at the point where the Sandy Bay Road first reaches the salt water a little brook finds its way into the Derwent after passing down one of the gullies between here and Mount Nelson; in April last my father and I were crossing this brook, close to a hole in its course, which hole was two feet long, 18 inches wide, and contained water to the depth of three or four inches, the bottom was formed of water-worn stones and pebbles, the largest weighing some six or eight pounds, the stream through was so small as to cause no disturbance, in fact, a mere trickle, and I was therefore surprised to notice a sudden curl in the water as I passed. I stooped down to learn the cause, and on turning over the stones at the bottom found to my amazement that the place was alive with fish. I caught with my hands 18 fish, weighing from two to three ounces each, and still left some behind which eluded my grasp; these fish were well fed and healthy. When I reflect that this little brook, not more than a mile long in its whole course, and infested by the most implacable enemy yet known to small fish (I allude to the town boy) is thus stocked, and that hundreds of other brooks are equally well supplied, I am forced to the conclusion that the quantity of food consumed must be enormous, and here is the true answer to those who say our rivers are not so well supplied with insect life as those of Great Britain; *if the fish were fewer the insects would be more numerous.* The same reasoning will, of course, apply to molluscs, small crustaceans, &c. A curious illustration of this may be found in the fact that where small fish are met with in our rivulets few shrimps, if any, will be found, but trace the rivulet upwards till the shrimps become numerous and you may rest assured that you are above the fish, and that no more will be caught. With respect to those flies, grasshoppers, beetles, moths, &c., which only tumble into the water, surely I need not say much, except that the individual who wants more of them than I can show him in a warm summer's day and evening must, indeed, be greedy and insensible to the attacks of march-flies, mosquitoes, &c.

Mr. Frank Buckland in his book on fish-hatching says that there is a great difference in the size of the smolts of the same age in the salmon ponds at Stormontfield on the Tay, and that three, of various sizes, having been sent to him for examination, he ascertained that the food contained in their stomachs differed in each. That in the largest consisted entirely of small shell-fish (*limneæ*). Our indigenous fresh water univalves, though numerous in places, are small, and I have, therefore, introduced from England two species of Limnea and one of Planorbis, the two former are now thoroughly established. I have turned out thousands, and shall be glad to supply either shells or spawn to any Fellows of the Society who have ponds. The quantity of food produced by these shells may be imagined when I tell you that the progeny of one pair, if protected, weighs pounds in the second year, and tons in the third.

It has been over and over again argued that many of the grilse and salmon do not feed at all in the fresh water, but this notion is fast losing favor, and I have little doubt that, though their principal feeding is done in the salt water, still a large quantity of food is consumed in the fresh. Both grilse and salmon are often taken in fresh water, with the minnow, when nothing else will stir them. May we not hope, therefore, that the hosts of small fish, poured into our large rivers by every freshet down the brooks, will prove highly acceptable to generations of salmon yet unborn.

Of the food of the grilse and salmon in brackish and salt water, little was known till recently, partly owing to the difficulty of reconciling conflicting statements, and still more to the absence of scientific research in this direction. If analogy, based upon the comparative anatomy of the salmon, is of any avail, it must lead every thinking man to the conclusion that this handsome swift fish, with his powerful toothed jaws and muscular stomach, feeds principally on smaller fish and crustaceans. The salmon (like many of our sea fish) frequently disgorges the contents of the stomach the instant it finds itself in danger from nets or otherwise; and this habit has induced the popular belief that nothing has ever been found in them to lead to a knowledge of their food. Many theories on the subject have been started, one (for which high authority is quoted) is, that they feed almost entirely on the spawn of certain echinodermata (such as sea-urchins, &c.), and this theory was based on the fact, that though the salmon caught in salt water rarely contained food in the stomach, this food, when present, consisted of minute quantities of the small eggs of echini, remaining tangled in the mucus which invariably lines the stomach. Is it not most probable that the salmon in these instances had bolted echinus and spawn altogether, but that when the shell and other parts of the sea urchin were disgorged, some few ova remained behind?

In an able article on the food of the salmon, written by Dr. W. C. McIntosh, and recently published in the Journal of the Proceedings of the Linnean Society, incontestible proof is given that the vertebræ and other solid portions of fish, of sizes, varying from mere fry to seven or eight inches in length, were taken out of many fresh run salmon.

Believing, as I do, that small fish and crustaceans will form the chief requisites, it only remains for me to show that our brackish and salt waters are well supplied with them.

Everyone who has visited New Norfolk must remember the wide reaches of the Derwent above and below Bridgewater, and that at low tide large patches of a grass-like water weed are there seen covering shallow portions of the river. A considerable part of the river bottom is covered with that same weed, and I once had an admirable opportunity of judging of the vast quantity of animal life bred under its friendly shelter. A small rivulet runs from the hills on South Bruni into Adventure Bay. The sands at its outlet are silted up by northerly gales, and its waters, thus backed up, generally form, throughout the summer, a large brackish lagoon, abounding in bream, mullet, and other estuary fish common at Bridgewater; the bottom of this lagoon is covered with the grass-like weed of which I have spoken, and it is therefore a fair inference that it is inhabited by the same forms of animal life.

When, owing to continued rains, the water in this lagoon rises sufficiently to flow over the sandy bar, a broad channel is soon cut through, and at low tide a great portion of the bottom of the lagoon is left dry. I was once fortunate enough to be at Adventure Bay when the lagoon burst over the bar, and that which had been a mere trickle in the morning, was, at noon, a river 20 yards across and 4 feet deep, running at a great pace into the bay ; such an opportunity for examining the bottom of the lagoon was not to be lost, and though the majority of small fish, crabs, shrimps, and other crustaceans, resembling long woodlice, had no doubt followed the falling water, still so many were left, tangled in the weeds, that it would have been an easy matter to collect bushels of them ; that these creatures, numerous as they were, had something to contend with in the shape of natural enemies, may be gathered from the fact, that my three companions and myself caught, with the rod, over 30 dozen of bream in the lagoon in one day, of weights varying from half a pound up to three pounds.

From what I saw at Adventure Bay, I feel certain that there are many hundreds of acres of the bed of the Derwent which can and will keep, in good condition, hundreds of full-grown salmon to the acre.

Lower down the Derwent, the character of the weeds changes greatly, and as might be expected, the animals change with them ; the variety of crustaceans (including myriads that are miscroscopic and phosphorescent) being very great. Naked molluscs and estuary shells both univalves and bivalves are found in great quantity though not numerous in species, and, for the comfort of those who believe in the theory of the spawn of the Echinodermata, I would add that the dredge reveals,from Pavilion Point downwards, vast numbers of a species of spatangus which, in December, are mere boxes of ova, contained in a paper-like shell. Small fish abound in the shallow waters, especially at the mouths of the various rivulets. Still lower down the kelp beds begin, and these, on every part of our coasts, form harbors of refuge for the rearing of untold millions of creatures. Each stem of kelp is anchored either to a rock or stone, by pulling at these stems one may occasionally be found which will bring up its anchor with it. Upon examination, the root proves to be a wide net-work of fine fibres, each firmly fixed on to the stone. If the whole thing be quickly transferred from the water to the bottom of the boat, its wonderful inhabitants will continue to struggle out, from the interstices of the fibrous roots, for hours, although many will have escaped in the passage upwards. I cannot imagine a more interesting subject for a paper than would be furnished by one of these same kelp roots, as representatives of most of the great divisions of the animal kingdom are found there, from the lowest forms of microscopic infusoria up to the vertebrata represented by small eel-like fish.

Amongst all this profusion of animal life, it cannot be doubted that much will prove admirably suited to the wants of the salmon.

METEOROLOGY FOR AUGUST, 1864.

Private Observatory, Hobart Town.

Year.	Barometer reduced to standard temperature, 32 degrees.	Mean Temperature of the Air.	Maxima Thermometer Readings.	Minima Termometer Readings.	Mean daily range of temperature.	Degree of humidity, 100 complete saturation.	Extent of cloudy sky 10 for sky covered.	Mean amount of ozone 10 for maxima.	Total amount of Rain.
	In.	°	°	°	°				In.
1841	29.882	46.67	62.0	30.0	15.6	.80	5	—	1.32
1842	29.839	46.17	57.8	35.3	12.7	.84	5	—	0.99
1843	29.811	47.25	61.8	33.2	12.5	.83	$5\frac{1}{4}$	—	1.09
1844	29.689	44.33	57.8	34.8	13.9	.86	5	—	1.16
1845	29.542	46.48	61.3	34.5	16.1	.78	$4\frac{1}{2}$	—	0.63
1846	29.999	44.28	59.6	30.2	14.6	.88	6	—	1.53
1847	29.774	47.94	65.7	34.8	15.9	.79	$5\frac{1}{2}$	—	0.60
1848	29.724	45.34	57.8	35.3	14.1	.84	6	—	2.66
1849	29.756	46.32	62.2	31.0	15.5	.83	5	—	2.74
1850	30.015	49.01	—	—	—	.80	$6\frac{1}{2}$	—	1.31
1851	29.604	46.65	62.3	33.8	14.7	.81	$5\frac{3}{4}$	—	1.10
1852	29.734	45.17	57.7	32.5	11.0	.90	$6\frac{3}{4}$	—	3.47
1853	29.789	46.33	65.1	30.5	14.3	.83	$6\frac{1}{3}$	—	0.87
1854	29.745	48.00	60.8	33.3	13.0	.81	7	—	0.23
1855	29.683	53.00	73.0	33.0	15.28	.78	6.20	—	0.69
1856	29.211	51.40	66.0	32.0	20.25	.72	5.23	—	1.70
1857	30.047	51.60	64 0	33.0	20.87	.73	5.22	7.12	1.02
1858	29.749	50.29	72 0	33.0	18.03	.79	5.23	7.96	1016
1859	29.875	50.18	72 0	34.0	17.87	.76	6.12	7.00	1.70
1860	30.160	49.45	68.0	32.0	19.87	.76	5.09	6.62	1.11
1861	30.057	49.95	72.0	34.0	22.41	.75	4.76	6.77	0.61
1862	29.925	50.64	82.0	32.0	21.71	.73	4.48	7.30	0.97
1863	29.808	47.90	66.0	34.0	16.90	.77	6.16	8.62	3.29
1864	29.854	48.22	65.0	34.0	16.45	.79	6.80	8.54	3.68

The mean in all cases is taken from the sums of each column, and not from the maximum and minimum.

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.—Sambucus Niger commencing to leaf.
13th.—Horsechesnut buds commencing to break.
15th.—Salix Babylonica (weeping willow) commencing to leaf.
17th.—Gooseberry bushes commencing to break.
22nd.—Elm commencing to flower.
28th.—Poplar commencing to break.
30th.—Apricots commencing to flower.

Barometer—Highest, 7th, 7 a.m., 30·307 in.
Lowest, 17th, 1 p.m., 29·283 in.
Mean for the month, 29·854 in.
Being ·071 in. above the average.

Temperature—Highest, on the 7th, 65·00°.
Lowest, on the 26th, 34·00°.
Mean for the month, 48·22°.
Being 0·48° below the average.

Rain fell on the 1st, 3rd, 4th, 5th, 12th, 13th, 15th, 16th, 17th, 18th, 19th, 20th, 22nd, 23rd, 24th, 25th, 28th, 30th, and 31st, to the amount of 3·68in., being 1·62 in. above the average.

An unusual fall of snow on the 18th, lying on the ground and house tops.

Lightning on the 2nd and 14th.

Electricity active on the 5th, 6th, 7th, 27th, 29th, 30th, and 31st; nil on the 3rd, 12th, 22nd, and 23rd.

At 9 a.m., on the 4th, was observed, at Swansea, about 30° west of the sun, and apparently in the clouds, a large luminous spot, or mock sun, much larger than the real sun, and of a yellowish color, sufficiently bright to be painful to the eye.*

FRANCIS ABBOTT.

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* Communicated by Dr. Story.

ANALYSIS OF THE OBSERVATORY RECORDS FOR AUGUST, 1864; IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. SWARBRECK HALL.

Most of the meteorological phenomena of the month were propitious to health, and the long continued excessive deaths have at length given way to a mortality below the August average of the previous seven years.

Atmospheric pressure underwent frequent, sudden, and excessive fluctuations, though the month's mean, 29·854, is only + ·071 more than the average of the 20 years' standard. The extremes of pressure were:—Maximum, 30·307 on the 7th, minimum, 29·283 on the 17th; consequently the range of the month was 1·024 inches. The extremes and the range were much greater than this in 1863. The greatest movement of the barometer in any twenty-four hours, was,—a rise of + ·669 of an inch on the 18th, preceded by a fall in the previous twenty-four hours of — ·538 of an inch. There was also the large rise of + ·592 of an inch on the 5th, and + ·217 more on the following day, on which day the greatest number of deaths occurred (5) of any day in the month. Altogether there were movements exceeding one-fifth of an inch, on eleven days of the month.

Wind force had a total of 47·09 lbs. being + 1·24lbs. more than the average of the previous seven years, though but little more than half of what August 1863 had. North, north-east, south-east, south-west, and north-west, all prevailed more than usual, but the first and the last by much the most so. South-west had the greatest excess above the average in force, then north-west followed by west, and lastly east, by a few decimals; all the others were below the average. The directions, however, indicated by the vane in Hobart city, by no means corresponded with those on Mount Nelson, Fortescue Bay, and Low Heads. From other conditions of these winds, moreover, it was certain that the currents from the south-west generally preponderated. The strongest winds recorded, 5·21 lbs., were noted three times, at 7 a.m. on the 5th, and at noon and sunset of the 15th. The calms were 39, which is + 3 above the four years' average.

Temperature, unlike the preceding five months of the year, had a mean below the 20 years' average by nearly half a degree (— ·48) being only 48·22 degrees. In the previous nine years, only 1863 had a lower mean temperature, *i.e.*, 47·90 degrees. The mean temperature of the previous month (July) was warmer by nearly one degree. The self-registering maxima and minima thermometers for this month, gave a mean of 49·61 degrees. The extremes of temperature were unusually small for August; the maximum was only 65 degrees on the 7th, and the minimum 34 degrees on the 26th. A lower maximum (64) has only occurred once in the previous nine years (1857). Last year had the same minimum; but one degree higher maximum—1861 had also as high a minimum, but a maximum 7 degrees higher—1859 had, too, a minimum of 34, but with a maximum of 72—all the rest of the nine years had lower minima by one and two degrees. The extreme range of 31 degrees for this month, is much below any of the previous nine years, except 1857, which had precisely the same. This equable cold temperature, combined with free aerial movements, great atmospheric purity, and abundant moisture, was highly conducive to health and life, as the mortuary tables show.

The mean *daily range* of temperature was 16·45 degrees, only differing from the 20 years' average, by + ·06 of a degree. At the same time it was from half to six degrees less than any of the previous eight years. The greatest range on any day, 28 degrees, took place on the 7th; the smallest, 7 degrees, occurred on the 23rd.

Solar intensity mean 79·40 degrees, was — 2·37 below that of the previous 8 years. With so many cloudy and rainy days, such a result might be expected. The maximum heat was 93 degrees on the 7th. Five out of the eight years had higher maxima, the highest being 103·5 in 1862. The minimum solar temperature was 60, and noted on the 3rd and 17th.

Terrestrial radiation mean was, 37·53 degrees, being + 1·05 above the mean of the previous eight years. The maximum was 44 degrees on the 13th; the minimum was 30·50 on the 26th, and higher than any of the previous eight years had.

Rain fell on 19 days, to the aggregate amount of 3·68 inches, the former being + 6·34 days above the average of the previous nine years, and the latter + 1·62 inches above the August mean of the 20 years' standard—only 1858, out of the previous 23 years, had a greater amount of rain, *i.e.*, 10·16 inches, but that is also the maximum of all the months in all the years recorded. Moreover, it fell mostly within five successive days, while the downfall of the present month, was very fairly distributed throughout the month. The largest quantity recorded for any day was ·73 of an inch, and noted on the 24th August, 1857, had nearly as much rain registered (3·47) inches) as the present month—last year had 3·29 inches, but all other years were much below. *Snow* showers were frequent and copious in the city on the 17th, and the unusual spectacle of streets, housetops, &c., mantled with it, was a rich treat to the young Tasmanians. Indeed the beautiful moonlight scene was one redolent with old associations of the home of their youth to many of the citizens too. Snow was never absent from Mount Wellington during the month, and additions thereon, were noted on the 4th, 5th, 16th, 17th, 18th, 24th, 27th, and 31st.

Humidity mean, 79, was nearly that of the 20 years' standard, being only half a degree less.

Elastic force of Vapor mean was 266, being — 11 less than the 20 years' mean, and — 16 less than the previous month of July had, a fact worthy of remembrance in connection with the very different amount of deaths in each month.

Spontaneous Evaporation amounted to much less than rain-fall being only 2·93 inches.

Cloud mean was 6·80. being + 1·21 above the 20 years' mean ; indeed, with the exception of 1854, which had a mean of 7, it was the cloudiest August of 23 years.

Ozone, as might be expected, with the meteorological conditions previously detailed, was unusually abundant. The mean, 8·54, is + 1·20 above the seven years' average. Only August, last year, and September, 1857, slightly exceeded this amount, in any month since ozonometrical records have been kept. Saturation (10), was registered 13 times. The minimum was 5·5 on the 22nd at 7 a.m., the wind noted calm. The hygrometric condition of the air accompanying this copious supply of ozone, disarmed it of that tendency to produce inflammatory diseases of the air passages, which was alluded to in the July report.

Electricity was abundant, but with a greater proportion of positive to negative indications, than was noted in July. The former was recorded 13 times with maximum tension of 5·5; the latter, 37, with 5 "nil" was registered 12 times. *Lightning* was observed on the evening of the 2nd and 14th.

41 *deaths* occurred this month, the August average of the previous seven years, being + 8 5-7ths more. The previous month of July had 29 more. August last year had exactly 41 also, but 1860 had only 40, being the smallest mortality of any of the seven. The past eight months of 1864, contrasted with the same period of 1863, is now only one death in excess. The table following shows the relative proportion in ages of all :—

Aug., 1864.	Ages.	July, 1864.	Augusts. 1863	1862	1861	Min. 1860.	1859	Max. 1858	1857	Avg. 7 yrs Augusts 1857–1863.
4	Under 1	16	7	7	9	11	6	28	11	11 2-7
3	1 to 5	4	4	7	3	4	8	16	2	6 2-7
4	5 to 20	7	5	3	10	1	4	4	3	4 2-7
9	20 to 45	13	7	7	14	7	8	12	14	9 6-7
11	45 to 60	18	8	7	1	6	14	6	16	8 2-7
10	60 and above	12	10	12	11	11	8	8	8	9 5-7
41		70	41	43	48	40	48	74	54	49 5-7

The present month, contrasted with the previous one of July, exhibits a considerable reduction of deaths in every group of ages, though most so in infants under one year old, the number in August being only one-fourth of those in July. This group, moreover, is little more than one-third of the seven years' average, and less in number than any year of the whole. From "1 to 5 years," the deaths are less than half of the seven years' average, 1861, however, had as small a mortality, and 1857 one less. But both of these years exceeded the present one in the total of all under 5 years old, and this is the test applied by the ablest sanitarians, as to the comparative rate of mortality of any season or place. August, 1864, therefore, under this aspect, was undoubtedly the healthiest August in the table given. In the group of ages, "5 to 20," the mortality was—two-sevenths below the seven years' average. Three years of the seven, however, had less, and two more exactly the same number. It is the large number in 1861 which raises the average so much, and it arose in that year from the epidemic of measles, six of the ten deaths being from that disease, and five of the six at the Queen's Asylum for Destitute Children. At "20 to 45" years of age, the deaths were — 6-7ths below the seven years' average, though four of the seven had fewer deaths than this month. From "45 to 60" the deaths were + 3 2-7 above the seven years' average; two of the seven, however, considerably exceeded the present month. At "all ages above 60" the deaths were + 2-7ths in excess of the seven years' average. Two were between 60-65;—two 65-70;—four 70-75;—two respectively 87 and 88 years old.

Aug. 1864.	Classes of Disease.	July, 1864.	Augusts. 1863	1862	1861	Min. 1860	1859	Max. 1858	1857	Avg. 7 yrs 1857–1863.
9	1 Zymotic	0	4	3	15	10	9	7	7	7 6-7
4	2 Constitutional	13	6	8	6	4	7	9	15	7 6-7
21	3 Local	42	23	24	21	19	28	49	29	27 4-7
6	4 Developmental	11	3	4	6	6	3	4	2	4
1	5 Violent	4	5	4	0	1	1	5	1	2 3-7
41		70	41	43	48	40	48	74	54	49 5-7

The *Zymotic class of diseases* had × ·1 1-7 more deaths than the seven years' average. The diseases were *Croup*, 3; *Fever*, 2; *Metritis*, 1; *Diarrhœa*, 1; *Syph. Consec.*, 1; *Worms*, 1. Both of the fever cases were from local nuisances, which good scavenging and drainage would have averted. The *Constitutional class of diseases* had but little more than half the average mortality. Two of the number only were from *Consumption*, and neither of the individuals were natives of Tasmania. The *Local class of diseases*—had 6 4-7 less than the seven years average. But the most marked contrast is between it and the previous month of July, and August, 1858. Of the forty-nine deaths in this class in August, 1858, twenty-one were diseases of the organs of respiration, mostly inflammatory; 17 were convulsious in children, from which affection not one death was recorded in the present month. The *Developmental class of diseases*, had + ·2 more than the average. The *Accidental and Violent class*, had less than half the average, there being only a death from the machinery in a steam boat tearing a man's leg off. The only inquest for the month was on the case last named. August, 1863, had 5. In the hospital ten deaths took place, inclusive of the inquest case; another of the cases was brought there from a country district. August, 1863, had only 7 deaths in Hospital. At the Brickfields Male Asylum for Invalids 4 died, aged respectively 52, 64, 73, 73. August, 1863, had 3. A female invalid, aged 71 years, died at the Cascade Factory. Of the 41 deaths, 3 died in the Glenorchy district, the rest in the city. 26 were males, 15 females. On the 4th, 5th, 10th, 18th, 21st, 24th, 25th, no deaths took place. On the 6th, 5 deaths occurred, being the largest number for any day of the month. The greatest number of deaths on any two consecutive days, was 6, on the 6th and 7th. The next in number, was 5, on the 1st and 2nd, and 2nd and 3rd. The first week of the month being by far the most fatal period of the month, in part a continuation of the effects of the unfavorable weather in July, and to some extent owing to the rapid and extensive fluctuations of atmospheric pressure, before alluded to, and always so injurious to people laboring under chronic diseases. The first week of the month had 14 deaths; the second 10; the third 6; the fourth 8; the last three days 3.

The registered births were 74, being 20 less than August, 1863, had.

ROYAL SOCIETY.

SEPTEMBER, 1864.

The monthly evening meeting of the Fellows was held at the Museum on Tuesday, the 13th September. F. Abbott, Esq., in the chair.

The following gentlemen (having been previously nominated by the Council) were, after a ballot, declared to be duly elected as corresponding members of the Society :—Dr. Bennett, of Sydney, and Gerald Krefft, Esq., Curator of Museum, Sydney.

The usual returns were laid on the table, viz. :—

1. Visitors to Museum during August, 624.
2. Ditto to Gardens, ditto, 1,319.
3. Plants, &c., supplied from Gardens,—

To the Salmon Commissioners, for planting round the ponds at the River Plenty, 270 plants, and 2,600 common thorn ditto.

To J. J. Stutzer, Esq., Melbourne, 5,000 white mulberry plants.

To Messrs. Handyside and McMillan, Melbourne, one bundle conifer cuttings, and 24 papers of Tasmanian seeds.

4. Plants received,—

From Messrs. Handyside and McMillan, Melbourne, 101 plants, 5 varieties of cuttings, scions of two varieties of plum, and 28 papers of seeds.

From His Excellency Colonel T. Gore Browne, 5 olives from South Australia.

From Askin Morrison, Esq., a collection of New Zealand plants.

From Dr. Mueller, Botanic Gardens, Melbourne, 338 papers of seeds, about 150 of which are newto the Society's Gardens.

From Mr. C. Diehl, Dunedin, 36 plants.

5. Periodicals received (the usual).

Meteorological Returns,—

1. Hobart Town, from F. Abbott, Esq.
   (*a*) Table for August.
   (*b*) Summary and Analysis of Observations for ditto.
2. Port Arthur, from J. Boyd. Esq.
   (*a*) Table for July.
   (*b*) Reading of government schooner's barometer for ditto.
3. Swansea, from Dr. Storey.
   (*a*) Table for July.

The SECRETARY read an analysis of the Hobart Town Meteorological Table, with a Health Report for the month, by E. S. Hall, Esq.

The presentations to the Museum were as follows :—

1. A bronze cap ornament, picked up on the field of Waterloo shortly after the engagement. From Miss Nicholas.
2. A press copy of a copy of one of the early manuscript newspapers of Port Philip. From Mr. A. B. Willis.
3. Jade ornament and a Spanish coin. From Miss Nicholas.
4. Specimen of native copper, from Adelaide, and 2 Cochin China coins. From Miss Edgar.
5. A pearl, from an oyster, from New Town Bay. From Mr. Sievewright.
6. Journals of House of Assembly, vol. x. From H. M. Hull, Esq.
7. Sparrow-hawk *(Accipiter torquatus)*. From Mr. M. Allport.
8. Specimen of wood, with a letter. From Isaac Sherwin, Esq., M.H.A.

The wood was carefully examined by the Fellows present, and was very much admired. In grain and general appearance it much resembles cedar, and would evidently be of great value if readily procurable. From Mr. Sherwin's letter it appears to have been obtainedfrom a log which had been floated down one of the northern rivers, and it is supposed the district whence it came must be about fifteen or twenty miles from Deloraine.

The SECRETARY, at the request of Mr. M. Allport, who was unable to be present, mentioned that the young salmon were going on as well as possible. Many of them were now about three inches in length, and exhibited all the characteristic markings of parr.

Mr. Allport wished to have it reported that on his visit yesterday to the Plenty he had, for the first time, seenthe *Bernicla jubata*, or Maned Goose, a bird so very rare in Tasmania that Mr. Gould states "it seldom, if ever, visits

Van Diemen's Land." It is beautifully portrayed in Plate 3, Vol. VII., of the "Birds of Australia."

The SECRETARY observed, although as a community we might perhaps effect more than we do, it was well to be aware of what it would be useless to attempt Knowing that the indigo plant was indigenous in the colony, and grew abundantly in various localities, he had thought it possible a manufacture for the production of the dye might be established, and had written to a friend (Mr. Cockburn) in Calcutta for information on the subject. Mr. Cockburn had sent him a pamphlet containing full information on every point, including expenses, from the growth of the plant to the completion of the manufacture. On making calculations, however, and allowingfor the enormous difference in the value of labor between this colony and India, he (Dr. Agnew) found that the dye could only be made at a price so very far beyond its market value, as at once to set at rest the question of its production in Tasmania.

Conversation on various subjects ensued, and the meeting, after passing the usual vote of thanks to the donors of presentations, broke up about 9 o'clock.

METEOROLOGY FOR SEPTEMBER, 1864.

PRIVATE OBSERVATORY, HOBART TOWN.

Year.	Barometer reduced to standard temperature, 32 degrees.	Mean Temperature of the Air.	Maxima Thermometer Readings.	Minima Thermometer Readings.	Mean daily range of temperature.	Degree of humidity, 100 complete saturation.	Extent of cloudy sky 10 for sky covered.	Mean amount of ozone 10 for maxima.	Total amount of Rain.
	In.	°	°	°	°				In.
1841	29.795	49.32	76.0	30.0	19.9	.71	6	—	0.82
1842	29.615	52.14	67.0	36.2	15.4	.80	5	—	1.08
1843	29.501	49.19	69.5	36.0	17.1	.75	5¾	—	0.99
1844	29.749	48.11	67.2	35.2	15.5	.83	5¼	—	7.14
1845	29.907	51.92	73.6	38.8	17.6	.73	4½	—	0.73
1846	29.974	49.52	69.5	35.2	17.9	.77	6	—	0.82
1847	29.897	51.38	71.6	35.4	18.4	.73	6	—	0.39
1848	29.627	48.63	67.0	36.2	14.8	.83	7	—	1.84
1849	29.631	45.96	63.6	34.2	14.5	.82	5	—	1.91
1850	29.843	49.84	—	—	—	.81	6¼	—	1.67
1851	29.425	49.08	69.3	39.0	14.4	.79	6	—	2.16
1852	29.790	49.10	69.2	36.0	15.7	.79	5½	—	3.19
1853	29.555	47.19	61.0	34.0	15.0	.84	6½	—	2.91
1854	29.754	48.26	66.0	35.9	14.1	.82	7⅓	—	1.91
1855	29.888	55.00	77.0	33.0	15.13	.85	6.12	—	2.60
1856	29.583	53.37	80.0	33.0	23.90	.70	5.56	—	1.79
1857	30.040	50.28	76.0	34.0	20.60	.71	6.63	8.85	2.15
1858	29.638	52.26	69.0	34.0	19.43	.71	5.10	8.01	1.47
1859	29.968	57.23	70.0	32.0	19.26	.76	5.26	7.50	1.39
1860	29.915	53.34	73.0	33.0	20.80	.72	5.76	6.97	1.25
1861	29.929	54.15	72.0	36.0	21.00	.69	5.14	7.29	2.02
1862	29.675	52.88	71.0	36.0	17.96	.76	6.16	8.10	6.26
1863	29.778	51.30	72.0	35.0	17.53	.72	5.66	8.45	1.63
1864	29.859	53.34	73.0	38.0	17.83	.74	5.86	8.74	1.25

The mean in all cases is taken from the sums of each column, and not from the maximum and minimum.

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, for the month :—

10th Common Ash commencing to flower.
15th Grape Vines commencing to leaf.
18th Common Oak commencing to leaf.
20th First flower of the Moutan Peony expanded.
26th Horse Chesnut commencing to flower.
29th Robinia Pseudo Acacia commencing to leaf.

		In.
Barometer,	highest, 1st, 7 a.m.	30.373
,,	lowest, 15th, 1 p.m.	29.172
,,	mean for the month.	29.859

Being 0.081 in. above the average.

		°
Temperature,	highest on the 21st	73.00
,,	lowest on the 12th and 30th	38.00
,,	mean for the month	53.34

Being 2.42° above the average.

Rain fell on the 1st, 10th, 11th, 14th, 15th, 22nd, 23rd, 24th, 26th, 27th, and 29th, to the amount of 1.25in., being 0.62 below the average.

Electricity active on the 1st, 5th, 8th, 19th, 20th, 28th, 29th, and 30th.

Prevailing currents of wind N.W., S.E., and S.W, Greatest force from N.W., S.W,, and S.E.

Snow never absent from Mount Wellington.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR SEPTEMBER, 1864, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. BY E. SWARBRECK HALL.

So mild and equable a month for the vernal equinox, as the present September has proved, is of rare occurrence. It has been so propitious to health and life, that the mortuary records are very considerably below the average number of the previous seven years' Septembers.

Atmospheric pressure mean, 29·859, is +·081 above the twenty years standard average, but much higher than either September 1863 or 1862 had. The maximum, 30·373, was noted on the first day of the month; the minimum, 29·172, was recorded on the 15th. The extreme range of the month, therefore, was 1·201 inches. September 1863 had a higher maximum and minimum, and a slightly more extensive range. The greatest movement of the barometer from 1 p.m. to 1 p.m., of any twenty-four hours in the month, was a rise of +·484 on the 30th, but one of +·483 occurred on the 16th. A fall of —·488 was noted on the 10th, and one of +·407 on the 26th. Perturbations of one-fifth of an inch to ·400, were recorded seven times.

The total force of all the *winds* of the month was 43·16 lbs., which is only slightly more than one-third of that of last years' September. It is —36 93 lbs. below the average of the previous seven years. East winds alone, were above the average both in frequency and force; south-east, south-west, and north-west, prevailed more frequently than usual, but all were below the average force. North, north-east, and south, were below the average both in frequency and force. *Calms* were noted 36 times out of the 90 observations, and this is no less than +·16 above the average. No September, of the previous seven years, had so many calms, though 1859 had a much smaller wind-force, and 1860 also a little less. No wind during the month attained a pressure to the square foot exceeding 2·60 lbs.

Temperature mean was 53·34 degrees, being + 2·42 above the 20 years mean, and a little more than two degrees warmer than September 1863. The mean by the self-registering maxima and minima thermometers, was nearly the same as the foregoing, only exceeding it by ·21 of a degree; while the usual variation is from one to two degrees. The maximum was 73 degrees, and occurred on the 21st, with a light wind at 1 p.m. recorded south-east, though the morning was noted north-west, and the evening north-east, but calm at both observations. In no September since 1857 has so high a maximum been registered. The minimum record was 38 degrees, which is higher than that of any September of the previous 23 years, except 1845, which had 38·8; and 1851, which had 39 degrees. The extreme range of 35 degrees in this month, is less than that of any September of the previous nine years, except 1862, which had the same, though with both maximum and minimum each two degrees less than the present month. The mean of all the maxima for this monthwas the genial temperature of 62·46 degrees, while that of all the minima was as high as 44 63 degrees. Modern research proves that too near a correspondence between day and night temperature, is not the most propitious to health. Such a variation as that recorded for the present month, seems, as far as our Hobarton records can establish the fact, the most favorable to health and life. The months of November and May are those in which this conformity most usually occurs.

The mean *daily range of temperature* was, 17·83 degrees, which is only —·19 less than the 20 years average. The extreme range for any day occurred on the 21st, and was 29 degrees; the smallest was 8 degrees on the 14th.

Solar-intensity had the high mean of 90·70 degrees, being +2·75 degrees above the average of the previous eight years. The maximum was 105 degrees, and recorded both on the 6th and 21st. Out of the previous eight years, only 1860 had so high a maximum.

Terrestrial-radiation mean was, 40·73 degrees, which is +2·83 degrees higher than the mean of the previous eight years, and warmer than any one of them. The extremes were, maximum 49 on the 26th; minimum 31·5, on the 12th.

The total rain-fall of the month was only 1.25 inches being—·62 below the September average; but then the soil was so well saturated by the excessive deposits in the three previous months, that this quantity, under the influence of such hot sunshine, warm temperature of the soil, and genial air-temperature, promoted vegetation in so great a degree, that never did our gardens and fields exhibit a more luxuriant and brilliant vegetation, in the month of September. At the same time the vernal influences on health were equally as remarkably favorable; a concurrence by no means usual. The number of days on which rain is registered, were 11; which is—4·55 below the September average. On the 14th and 24th, the rain fell smartly enough to cleanse the gutters and drains. *Snow* was never absent from Mount Wellington during the month, and received an addition on the 14th, but none fell in the city or low hills around it.

Humidity mean, 74, was — 2½ below the 20 years' average.

Elastic force of Vapor, had a mean of, + 21 above the 20 years' standard, being 301.

Cloud mean 5·86 is + ·11 above the 20 years' average.

Ozone never had so high a mean, 8·74, for any month since records have been kept in this city. The previous maximum was 8·62 in August, 1863. The present month's mean, is + ·90 above the September average of the previous seven years. Saturation (10) was recorded nine times. The minimum 5 was only registered once—on the day of maximum temperature, 21st. With so small an amount of ærial movement, and few rainy days, it is surprising that ozone should be so unusually abundant, but probably the electrical condition of the air generated it in great quantities.

Electricity had the unusually high number of 23 positive records, with the high maximum tension of 6—negative had 35 indications, with maximum tension of 6·5. "Nil" was only registered at the two observations on the 14th, when calms were recorded at all the three wind observations of the day, with mizzling rain in the morning and smart showers in the afternoon; barometer very low and falling; and the lowest maximum temperature (55) of the month. *Lightning* was observed on the evening of the 21st, and, accompanied with *thunder,* on the 23rd

The *deaths* were 37, being — 10 5-7ths below the average of the previous seven years. 1861, however, had two less than this, but the next in number, 1863 and 1858, had five more, and all the others considerably more, as will be seen in the following table :—

Sept., 1864.	Ages.	Aug., 1864.	Septembers.							Avg. 7 yrs. Septs. 1857–1863.
			1863	1862	Min. 1861	Max. 1860	1859	1858	1857	
6	Under 1	4	5	12	5	8	15	8	7	8 4-7
1	1 to 5	3	4	5	2	12	4	4	4	5
4	5 to 20	4	4	3	2	8	4	0	1	3 1-7
14	20 to 45	9	8	17	7	12	8	12	10	10 4-7
6	45 to 60	11	13	10	8	10	8	10	13	10 2-7
6	60 and above	!0	8	9	11	15	11	8	9	10 1-7
37		41	42	56	35	65	50	42	44	47 -5.7

Under one year of age, the deaths were —2 4-7ths below the seven years' average; though one more than last year's September, and that of 1861 had. At "1 to 5" years old, the deaths were less than any year of the seven, and only one-fifth of the seven years' average. Altogether, the mortality under five years old, was less than one-fifth of the whole. From "5 to 20" the deaths were + 0·6-7ths above the average. Between "20 and 45" the deaths were considerably (+ 3 3-7ths) above the seven years' mean; six out of the seven having less, and only 1862 more. At "45 to 60" the deaths were much below the average, *i.e.*, —4 2-7ths, and less than any one year of the seven. At all ages "above 60", the deaths were —4 1-7ths below the seven years' mean, and less than any one of them. The deaths above 60, constituting exactly the same proportion of those at all ages, as those below 5 years of age

The "classes of disease" into which the mortality of the month was distributed, and the relative proportion they bore to those in the previous month, and the seven years' Septembers preceding the present one, is shown in the following table .

Sept., 1864.	Classes of Disease.	Aug., 1864.	Septembers.							Avg. 7 yrs. Septs. 1857–1863.
			1863	1862	Min. 1861	Max. 1860	1859	1858	1857	
5	1 Zymotic	9	4	4	5	11	12	3	3	6
9	2 Constitutional	4	9	15	3	18	12	10	5	10 2-7
20	3 Local	21	23	26	17	32	16	25	25	23 3-7
3	4 Developmental	6	2	2	9	2	7	1	8	4 3-7
0	5 Violent, &c.	1	4	9	1	2	3	3	3	3 4-7
37		41	42	56	35	65	50	42	44	47 5-7

Zymotic diseases were below the average, there only being 5 deaths instead of 6. Three were from *dysentery ;* one from *diarrhœa ;* and one from *pyœmia,* the result of disease of the hip-joint of evident long standing, but which did not incapacitate the boy from ordinary avocations, until about ten days before his death. After death it was found that extensive ulceration of the cartilage around the neck of the thigh bone existed, but did not extend to its summit. This is a fact of great medical interest, and explains how locomotion was possible so shortly before death. The subject was aged 12 years, and an inmate of the Queen's Asylum. This is the only death which has occurred in that institution this year, or, in fact, since June, 1863; a wonderfully small mortality, out of a daily strength of upwards of 500 children, from three to fourteen years of age. The rate is now much below that out of an equal number of children of corresponding ages, even in the healthiest rural districts of the island.

The class of *constitutional diseases* was—1 2-7ths less than the seven years' average. Two were from *cancer*, and seven from *consumption*, Of the latter, two females 20 and 25 years of age respectively, were born Tasmanians. In one of the families the disease is strongly hereditary, three others of the family having within a few years died from the same disease.

The *local* class of diseases had —3 3-7ths less than the seven years' average Six, out of the 20 deaths, were from diseases of the *brain and nervous system ;* five from *diseases of the heart ;* eight from affections of the *organs of respiration,* mostly acute inflammations. In a former report I alluded to the prevalence of this type of disease when ozone was in great abundance. Though September 1863, had altogether three more deaths in this class, only two out of the 23 were from inflammatory diseases of the organs of respiration. The remaining death in this class, for the present month, was from *liver disease.* In September, 1863, the order, of which this is one of the sub-divisions, had eight deaths,—and the next order three, in which no deaths are tabled for this month.

The *developmental* class had—1 3-7ths less than the seven years' mean. Two of the three deaths were from old age, respectively 77 and 87 years of age. The third was a child only one month and three days old, which died from wasting and debility in the female prison.

In the class of *violent and accidental deaths* there was not a single death, which had not before occurred in the month of September of the previous seven years, the average for the seven being—3 4-7ths. September, 1863, had four deaths in this class.

Two *inquests* were held during the month, being only half the number of September last year. The deaths in the *General Hospital* were 9 ; September, 1863, had double the number. One death only, a man aged 84, occurred at the *Male Invalid Asylum* at the Brickfields. Of the 37 total deaths for this month, 2 occurred in the Glenorchy, and 1 in the Queenborough, suburban districts, the rest in the city. 19 were males, 18 females, being a remarkable equality of the sexes. On nine days of the month not a single death took place. The greatest number on any day was four, on the 15th and 30th. The greatest number on any two consecutive days was 6, on the 15th and 16th. The first four days of the month had the largest number of deaths, 9, and the first week was the highest, having 11. This week had the highest atmospheric pressure and the least rain. In the second week there were only 4 deaths ; in the third, 10 ; in the fourth, 7 ; in the last two days, 5.

The registered *births* were 77, being + 5 more than September, 1863, had.

SOME OBSERVATIONS ON TABLE-MOVING.

By William Archer, F.L.S.

The mystery which appears to surround the experiments connected with Table-Moving, has prevented many intelligent persons from arriving at a satisfactory conclusion as to the true cause of such singular results; and the celebrated Faraday has failed to convey to other than scientific minds that precise information upon the subject which he himself may be presumed to possess,—while others have involved the question in technical language, quite unintelligible to the public. The real nature of the case appears to me to be capable of a simple elucidation, which I will endeavor to place clearly before the Royal Society, in the hope that it will, at the least, create a discussion upon this curious and interestion subject.

It must be premised that whenever the will is exercised, and is unobstructed in its operation, that operation is immediate. Contemplated corporeal exertion is no sooner willed than it is attempted by the obedient muscles. When the will is weak, or enfeebled by disease, or confused by intoxication, its servants the muscles, cease to operate with the same exact and instantaneous obedience; and thus the man "sick of the palsy," fails to impart motion to his paralysed limbs,—the sufferer from ague vainly endeavors to compose and quiet his agitated body,—and the drunken man strives unsuccessfully to move his perplexed members with their natural strength and regularity. Moreover, it is evident that, when the mind wills a certain result, it not only constrains the muscles to act, but to act in the manner and direction most likely to produce that result.

Now, when a person proceeds to try the experiment of "Table-Moving," he is instructed to keep his whole body perfectly quiescent, and to will at the same time, that a certain effect should be produced upon the table.

It is clear, then, in such a case that the mind is influencing the will with respect to two operations utterly opposed to one another: the one, that the muscles should act, the other, that they should remain quiescent; and the immediate result is in accordance with the idea which is impressed most strongly on the mind,—which idea at the outset, is invariably that the muscles should remain quiescent; consequently, no immediate movement of the table occurs. After some time, however, the idea that the muscles should remain quiescent becomes fainter, while the idea of the projected movement, which is being continually impressed upon the mind, becomes more and more deeply implanted, until it is completely dominant, and the movement accordingly, takes place; but the idea of quiescence, which at first influenced the will almost entirely, still retains much of its force, and causes such confusion in the mind as to prevent it from realizing the fact that the movement in question is the direct consequence of volition.

Thus, when it is intended by persons seated round a table, with their hands placed upon its margin, that one side of the table should be elevated, the person whose hands are placed at that side pushes the table, the person opposite presses downwards and pulls, while those who occupy the other sides force the table, by a lateral pressure, in the direction in which it is pushed—all these movements being such as are best calculated to effect the object in view, when the hands are so placed as above stated. The result is that the side of the table is raised where the legs are situated near its centre (so that the centre of gravity is easily displaced)—or that the table is moved along the floor where the legs are situated near the table's margin, especially if the floor is smooth.

The conclusion, therefore, at which I have arrived is, that the motion of the table is caused by the muscular action of the persons who place their hands upon it; which action appears to them to be involuntary, on account of its not taking place in immediate consequence of volition.

It follows, then, that the effect is produced independently of direct electrical, or electro-biological, influence, engendered by the usual contact of hands completing the circle. This is demonstrated by the fact that the motion takes place without such contact of the hands. In fact, similar effects are produced, within the ordinary period of time, by the hands of one operator only.

In order to demonstrate that the result is effected by muscular action alone, I threw a light cloth over a polished round table. The persons who placed their hands upon it,—not in contact—willed that the table should turn towards the left. In a short time the cloth began to move in front of one person only, becoming tight on the right, and wrinkled on the left of his position; then the same effect was produced in the case of another. But it was only when the hands of all the operators were in decided motion from right to left that the whole cloth was moved round equally—the table remaining quite stationary all the time.

The next experiment was to raise the table entirely from the floor by placing the palms of the hands on the margin of the table, and the thumbs underneath—the operators willing that the table should rise—which was successfully performed within the usual space of time.

The succeeding experiment was to raise the table by placing the whole hand flat upon the margin,—the operators willing, as before, that the table should rise; but the hands alone were elevated—the table remaining unmoved, as might have been expected.

My next deduction was, that this peculiar operation of the will might be applied to any kind of muscular exertion, the truth of which was demonstrated by the following experiments:—In the first, two persons took one end each of a piece of twine, and willed that the twine should break. Accordingly, their hands began shortly to move in opposite directions, and the movement increased in force until the twine gave way. Then, two persons stood up together, and willed themselves to walk. After a short time one felt the weight of his body thrown on his right leg, and, by degrees, the right leg moved forwards; but it did not appear inclined to plant itself on the floor,—so that the operator was obliged to resort to direct volition, in order to save himself from falling backwards. The other operator experienced similar sensations, excepting that his right leg moved.

Being anxious to discover whether there were any tendency in these operations to bring the mind under electro-biological influence, I placed half-a-crown in the hand of one of the operators, and told him to regard it earnestly for ten minutes, —the usual time being twenty minutes. After he had done so I bade him raise his head and shut his eyes. Then, drawing the point of my finger downwards over the lids after they were closed,—in order to convey to his mind the idea of my power to keep them shut,—I told him that he could not open them; and he only succeeded in doing so after many and violent efforts. I tried one or two more experiments which satisfactorily proved his susceptibility of the influence. He had never tried the experiment before, nor had I. It is, however, possible that he may be at all times very susceptible of electro-biological influence.

The whole of the foregoing experiments were performed in immediate succession.

With respect to the declaration of numbers by the successive movements, up and down, of the side of a table, I cannot but wonder at the superstitious feelings with which many persons regard such experiments; for a little reflection would, I think, convince them that the results, when accurate, deserve to be considered as no more than good guesses, produced by the influence of the majority; that is to say, if "the table is to tell" the number of keys in a certain bunch—there being six operators,—the first of whom thinks of the number 4, the second of 5, the third of 7, the fourth of 6, the fifth of 6, and the sixth of 8,—the result would probably be the average of those numbers, namely, 6,—which, if correct, could only be regarded as a good guess. There is no doubt that some correct, and, therefore, apparently supernatural guesses have been made; but the failures have been far more numerous;—the memory of them, however, being soon obliterated by a very few instances of notable success. It is only those who are too superstitiously credulous to believe that the motion of the table is caused by muscular action, resulting from embarrassed volition, who will imagine that the minds of men sitting round a table, under circumstances of peculiar restraint, are more nearly omniscient than they are found to be when in the enjoyment of perfect freedom,—or that they are then capable of infusing into, or evoking from, inanimate matter the sensibility and power which belong to creatures endued with life.

Shakspeare makes Hamlet well say "There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy;" but such a sentiment does not justify, respecting certain effects, conclusions which are opposed to reason,—especially when a reasonable explanation can be given of those effects, and a reasonable cause of them assigned.

The safest rule for our guidance, with respect to matters which appear to be mysterious and unaccountable, is to believe what is beyond our reason only upon reasonable testimony, and to reject at once what is evidently contrary to reason. Acting upon this rule I have been led to make such an investigation of the subject of table-moving as to warrant conclusions which seem reasonable to myself, and which will, I trust, appear satisfactory to others, at least to those who bring to the consideration of the subject minds free from prejudice or superstition.

ROYAL SOCIETY.

OCTOBER, 1864.

The monthly evening meeting of the Society was held at the Museum on Tuesday, the 11th October, A. Kennerley, Esq., in the chair.

Among the Fellows present, were Dr. Agnew (Hon. Secretary), Dr. Hall, Rev. J. Storie, Messrs. F. Abbott, sen., F. Abbott, jun., G. P. Adams, W. Johnston, H. Hinsby, G. Salier, L. Susman, E. Marwedel, &c.

W. B. Gellibrand, Esq., having been previously nominated by the Council, was, after a ballot, declared to be duly elected a Fellow of the Society.

The usual monthly returns were laid on the table, viz. :—

1. Visitors to Museum during September, 563.
2. Ditto to Gardens ditto, 1,978.
3. Tench supplied to C. M. Maxwell, Esq., 12 (to be forwarded to New Zealand).
4. Plants received from Mr. H. Low, London: total 78 (of which 48 were dead on arrival).

Meteorological Returns, —

1. Hobart Town, from F. Abbott, Esq.
   (*a*) Table for September.
   (*b*) Summary and Analysis of Observations for ditto.
2. Port Arthur, from J. Boyd, Esq.
   (*a*) Table for August.
   (*b*) Readings of Government Schooner's Barometer for ditto.
   (*c*) Table for September.
   (*d*) Readings of Schooner's Barometer for ditto.
3. Swansea, from Dr. Story.
   (*a*) Table for August.

The usual abstract of the meteorological observations by E. S. Hall, Esq., was read. Amongst other points of interest, it was noticed that the number of deaths during the last month (September) were fewer than had ever taken place in the same month for the last seven years, except 1861, and that the mean of the ozone register was 8.74, being higher than it had ever been since the beginning of these observations in April, 1857.

The following presentations to the Museum were brought under the notice of the meeting :—

1. Sennotype Portraits of Aborigines of Tasmania. From the Hon. the Colonial Secretary, on the part of the Government.
2. A Pheasant. From J. Maclanachan, Esq., Ballochmyle.
3. A Human Skull, from Matahana, New Zealand. From Mr. Hissey.
4. Two War Clubs, the Beak of a Saw-fish (*Pristis*), a Cocoanut-shell Flask or Bottle, three mineral specimens, a Fungus from a Sheoak Tree. From Mrs. Darley.
5. Album Portraits of Professor Owen, and Sir Chas. Lyell. From Mr. F. Abbott.
6. Dried Pouch of a Wallaby.
7. Packet of dried Plants from Western Australia. From Mr. M. Seal.
8. Fish found at Sandy Bay. From Mr. Owen Meredith.

With reference to this presentation, Mr. Morton Allport remarks :—

" Owing to the absence of any standard modern work on fish, it was impossible to give the scientific name of the curious specimen presented by Mr. Meredith, but it is probably allied to the anglers, or frog-fish (*Lophius, sp. ?*)

" I have taken several specimens of two distinct species in the shallow tide-pools on Bruni Island, and had, therefore, good opportunities of observing the curious use made of the paw-like ventral fins. The fish inhabits shallow sandy bays, and is constantly exposed to the risk of being left dry by the ebbing tide, and then resorts at once to the use of its ventral fins to overtake the receding water. On wet sand the fish travels at such a good pace, that it is difficult for a minute or two to lay hold of it—the motion reminding one forcibly of that of a seal in miniature. As even with this aid the fish might be left exposed till the return tide, the operculum, or gill-cover, exhibits an arrangement common to several of the fresh water perch of warm climates, by which the gills are kept moist during their temporary absence from the water. The apparatus by which this is effected consists of a labyrinth of small cells, which are supplied with water, and closed by the action of the gill-cover as by a valve, and from this supply a small quantity is from time to time allowed to trickle through the gills."

A mass of dried and pressed tobacco leaves from the Society's Gardens was exhibited, and inspected by most of the Fellows present. The following memorandum in reference to it from the Superintendent of the Gardens (Mr. F. Abbott) was read.

Tobacco Grown in the Royal Society's Garden during 1863-4.

"I have forwarded to the Museum a portion of the tobacco grown in these Gardens last season.

"It may be remembered that Mr. Marwedel brought under the notice of the Society the desirability of trying the cultivation of tobacco in this colony, and at the same time presented the Society with six varieties of seeds. From the fact, however, of the season being too far advanced before the ground could be prepared, the plants raised from those seeds never properly matured their leaves, and consequently I have not been able to gather from them.

"The tobacco sent, was gathered from plants of the variety known as the Virginian, which was previously growing in these Gardens. I have always found this variety to grow luxuriantly, attaining the height of from five to seven feet, the lower leaves measuring 2ft. in length, and about 1ft. in breadth. The leaves were gathered separately as they became ripe, and laid out to dry, during which process they were thrown together two or three times to sweat. When sufficiently dry they were put into a box and pressed.

"As far as my own observation goes, I believe that tobacco will be found to grow freely enough in this colony, but whether the quality will be equal to that grown in the neighbouring colonies, remains to be decided."

Mr. MARWEDEL after examination of the tobacco, pronounced it to be extremely fine in flavor; and such was the general opinion of those present. Mr. Marwedel proposed that it should be forwarded to a friend of his in Melbourne, who was largely interested in the tobacco trade, and who would at once assign to the sample its commercial value. The proposal was agreed to.

Mr. KENNERLEY hoped tobacco would be found profitable for growth in this colony, as its culture would afford large employment for labor.

[Whatever information may be received on the question shall be laid before the public as soon as possible, but there can be no doubt that large tracts of country, especially on the northern shores of the island, are admirably adapted for the cultivation of this valuable plant, and that the climate would also be most suitable for its growth.]

A communication from J. B. Cotton, Esq., of Swanport, was read, giving a detailed description of the manner in which two trees (gum) and a flag staff (pine) had been shattered by lightning in the vicinity of his residence (Kelvedon). A peculiar atmospheric phenomenon was also described; and an account given of a singular displacement of a large stone, weighing about a ton and a half, from its bed at Sandspit. A sketch, which accompanied the letter, shewing the present position of the stone, and its original position, was exhibited.

The SECRETARY read some remarks from M. Allport, Esq., (who was unable to be present) "On the mortality amongst the Trout at the Breeding Ponds of the Plenty."

The SECRETARY also read a paper entitled "Observations upon the Plants which are characteristic of Agricultural, Pasturable, and bad lands respectively," by W. Archer, Esq., F.L.S. (Cheshunt).

In the discussion which ensued, several of the Fellows expressed their sense of the great practical value of Mr. Archer's observations, as it was evident a minute knowledge of the soils affected by particular plants, &c., could not fail in many instances to be of the greatest importance. Mr. Kennerley remarked, in New South Wales he had been struck by the circumstance that land which in the first instance exhibited the usual indications of poverty, and was in every way disheartening to the new settler, was frequently found, after having been cleared, and the subsoil brought to the surface by deep ploughing, to produce crops which not only gratified but astonished the owner. This, of course, was due to the great fact of the soil being virgin, and he mentioned it only to show that when this is the case, even though the land may appear indifferent, the farmer need not always despair before giving it a trial.

Mr. SALIER enquired if the Royal Society intended to take any action in reference to the Intercolonial Exhibition at Dunedin.

The SECRETARY replied that no communication on the subject had yet been received by the Society.

The usual vote of thanks, moved by Mr. JOHNSTON, and seconded by Mr. SALIER, was accorded to the authors of the papers read, and to the donors of the various presentations, when the proceedings terminated.

METEOROLOGY FOR OCTOBER, 1864.

PRIVATE OBSERVATORY, HOBART TOWN.

Year.	Barometer reduced to standard temperature, 32 degrees.	Mean Temperature of the Air.	Maxima Thermometer Readings.	Minima Thermometer Readings.	Mean daily range of temperature.	Degree of humidity, 100 complete saturation.	Extent of cloudy sky 10 for sky covered.	Mean amount of ozone 10 for maxima.	Total amount of Rain.
	In.	°	°	°	°				In.
1841	29.835	54.08	80.5	36.6	17.1	.70	4	—	2.78
1842	29.526	50.36	72.0	39.0	17.1	.74	5	—	1.41
1843	29.618	54.04	75.6	38.2	21.3	.67	5	—	1.47
1844	29.776	52.75	72.2	36.5	18.6	.71	4½	—	2.57
1845	29.924	54.66	91.5	35.5	16.8	.76	5¾	—	1.19
1846	29.831	53.77	79.6	35.2	19.0	.72	6	—	1.61
1847	29.852	52.51	80.0	37.6	20.3	.76	6½	—	1.74
1848	29.699	50.41	72.0	39.0	16.9	.79	6½	—	1.27
1849	29.744	51.35	73.3	35.8	19.6	.76	5¼	—	1.41
1850	29.896	53.16	78.8	35.9	21.2	.74	5¼	—	0.26
1851	29.788	51.85	80.0	38.0	18.2	.76	5	—	0.79
1852	29.654	51.93	78.2	36.3	16.4	.73	5¾	—	1.77
1853	29.877	51.31	72.3	35.2	14.8	.84	6⅔	—	2.59
1854	29.682	54.06	85.9	35.0	17.4	.80	6¾	—	1.74
1855	29.772	60.00	85.0	36.0	17.00	.72	4.75	—	1.51
1856	29.609	55.19	74.0	35.0	22.00	.68	5.46	—	2.22
1857	29.835	54.20	72.0	36.0	20.22	.72	6.60	7.87	2.20
1858	29.934	58.09	84.0	38.0	23.35	.69	4.39	6.41	0.75
1859	29.715	55.37	82.0	36.0	18.06	.71	6.16	7.80	1.91
1860	29.919	55.11	75.0	40.0	17.41	.76	7.12	7.72	3.09
1861	29.747	56.25	87.0	39.0	20.54	.72	5.81	7.42	5.04
1862	29.966	57.33	81.0	37.0	21.12	.71	4.77	7.96	1.72
1863	29.667	53.58	76.0	39.0	16.84	.74	6.53	8.41	3.11
1864	29.887	53.64	68.0	38.0	16.32	.74	6.49	8.79	2.63

The mean in all cases is taken from the sums of each column, and not from the maximum and minimum.

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

Leafing, flowering, and fruiting of a few standard plants, in the Roya Society's Gardens during the month.

3rd. Carpinus Betulus, Hornbean, commencing to leaf.
10th. Ailantus glandulosa, commencing to leaf.
13th. Morus Niger, Black Mulberry, commencing to leaf.
15th. Lilia rubra, Lime Tree, commencing to leaf.
18th. Maclaura aurantiaca, Osage Orange, commencing to leaf.
20th. Ulmus campestris, Elm, seeds commencing to fall.
25th. Melia azederach commencing to leaf.

	In.
Barometer, highest, 1st, 7h. a.m.	30·321
,, lowest, 11th, sunset	29·234
,, mean for the month	29·887

Being 0·107 above the average.

	°
Temperature, highest on the 24th and 25th	68·00
,, lowest on the 28th	38·00
,, mean for the month...	53·64

Being 0·81 below the average.

Rain fell on the 4th, 5th, 6th, 7th, 8th, 11th, 16th, 19th, 27th, 28th, and

31st, to the amount of 2·63 in., being 0·86 in. above the average. Spontaneous evaporation, 2·87 in.

Electricity active on the 1st, 2nd, 15th, 19th, 20th, 21st, 24th, 25th, 26th, 27th, and 28th.

Snow was never absent from Mount Wellington, and had a fresh deposit on the 26th.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR OCTOBER, 1864; IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS &c. By E. Swarbreck Hall.

Most of the meteorological phenomena this month were highly conducive to health, and the deaths were somewhat below the average of the previous seven years' Octobers, and would have been much more so, but for the extensive and frequent alterations of atmospheric pressure, and the remarkably inclement weather on the 26th, 27th, and 28th days of the month, within which period 12 out of the 41 deaths in the month occurred.

Atmospheric-pressure mean was, 29·887, which is +·107 above the 20 years' adopted standard for October, and +·220 higher than October 1863. The maximum pressure, 30·321, occurred on the 1st, and the minimum, 29.234, was recorded on the 11th. The extreme range in the month, consequently, was only 1·087 inches. In the previous nine years seven Octobers had a much more extensive range, 1863, especially, exceeded the present month by ×·724 of an inch, being marked by a somewhat higher maximum and a very much lower minimum. In the daily variations of atmospheric pressure, however, the present October was most inimical to life. Between the 10th and 11th, observations at 1 p.m., the barometer fell ·741, or nearly three fourths of an inch; but from the evening observations of the 9th and 11th, that is in 48 hours; the depression was—·946 of an inch. No October of the previous nine years, except 1863, which had —·820, had nearly so extensive a movement in the pressure in any 24 hours. On 12 other days mutations, exceeding one-fifth of an inch, were noted, one of them being a rise of upwards of half an inch—the 17th.

The *Winds* this month were favorable to health, for though the total force 109.01 lbs., is +10·84 above the average of the previous seven years, yet the predominant winds were from the healthy ocean quarters, and well laden with moisture, and ozone. Three of the seven years had a greater amount of wind force, but then north and north-west had a larger proportion of the whole than in the present month. *Calms* were recorded at 17 observations, being +1¾ more than the average. The strongest winds noted had a pressure of 5·21 lbs. to the square foot and were registered 6 times.

Temperature mean was - ·081 below the 20 years' average, being 53·64 degrees, and nearly the same as 1863, but very much less than any other October of the previous ten years, and only .30 of a degree warmer than the previous month of September—by the self-registering thermometers, the mean temperature was only 53·59 degrees. Never before have I seen those thermometers give a mean below the others. The maximum record was 68 degrees on the 24th and 25th, and the minimum was 38 in the night of the 27th. Though this is an unusually small range for the whole month, yet occurring within three days, it told heavily on aged persons and weakly invalids, as alluded to before. The previous month of September with no lower minimum temperature, had a maximum of five degrees more; October 1863 had the extremes of 76 and 39—the widest extremes in October in 24 years' records is 91·5 maximum in 1845, and 35 minimum, in 1854 and 1856. With the exception of the three days commented upon, temperature was favorable to health and life, being cool and equable. All the previous nine years' Octobers had a wider range of temperature by five to nineteen degrees.

The mean *daily range of temperature* was only 16·32 degrees, being — 2·70 less than the 20 years' mean, and below any October of the previous 23 years, except 1853, which was only 14·80 degrees. Last year's October, however, did not exceed the present much, being only about half a degree higher. The greatest range on any day was 27 degrees on the 2nd, which is the lowest recorded in the previous ten years.

Solar intensity had a mean — 1·24 degrees less than the average of the previous eight years, being only 94·32 degrees. 1863, however, was about half a degree less. The extremes were 113 degrees maximum on the 26th (which is noteworthy in connection with the previous remarks as to the air, temperature, and deaths on this day and the two succeeding). The minimum was 59 degrees on the 8th.

The *Terrestrial radiation* thermometer gave a mean of 43·08 degrees, which is +1·37 degrees above the mean of the previous eight years, though both 1860 and 1862 had a still warmer mean. The maximum was 48 on the 26th; the minimum 35 on the 27th. That the extremes, in the opposite directions, should be on adjoining days is curious, and gives another datum for the high mortality at this period.

Rain fell on 11 days out of the month, to the aggregate amount of 2·63 inches, being + ·86 of an inch above the standard average of the month, though neither in amount, or in the number of rainy days equal to October last year. The number of wet days moreover for the present month is —4·44 below the average of the previous nine years, showing that the quantity precipitated fell more heavily than usual. On the 5th the fall, estimated from 10 p.m. to 10 p.m., was more than an inch, and thoroughly scoured the city rivulet and all its subsidiary drains and feeders. At this period of the month, 4th to 8th inclusive, rain was registered every day, amounting altogether to one and a half inches. On the 11th, again, half an inch of rain fell. On the 27th there were frequent strong cold squalls from south east to west with snow, hail, and rain. The snow remained even in the streets, for some time, and Mount Wellington was beautifully mantled with it. This inclement winter-like day excited much surprise in many persons, yet the meteorological records of Hobarton, show that such like weather, in varying degree, is not unusual from about the 11th to the 23rd of October. At the latter date, in October 1859, the low hills about the city were covered with snow. *Snow* was never absent from Mount Wellington during the month. In 1863 it did not disappear until the 7th December.

Humidity mean was 74 being +1 above the 20 years' average.

Elastic force of vapour had a mean of 306 being +5 above the 20 years' standard, though —1 less than 1863 had.

Cloud mean was 6·49, which is + ·87 above the 20 years' mean, but much the same as October 1863.

Ozone in September was more abundant than ever before recorded, yet the present month has exceeded it by + ·05 being 8·79, and is +1·14 more than the average of the previous seven years. Its superabundance was so modified, however, by the moist state of the atmosphere, that inflammatory affections of the organs of respiration were few. Only three deaths from the diseases of these organs having taken place, the youngest of the three being 56 years old. In the previous month there were eight, and in October 1863 seven.

Electricity had 22 positive indications with maximum tension of 9, in the latter respect by far the highest ever known, though in the former one less numerous than in September. Negative had 38 records with maximum tension of 8, exceeding, therefore, September's registry, both numerically and potentially. "Nil" was registered twice, at the 1 p.m. observation of the 5th and 11th. *Lightning* was never observed during the month.

The *Deaths* in this October were 41, being —3 less than the average of the previous seven years, and —8 less than 1863 had; 1859 had the same in number, but 1861 had only 29, and 1862 only 30; 1857 and 1858, however, had each 57, which is the maximum. In the tabular analyses of "Ages" and "Diseases," the comparative proportions for each year, for the different groups of ages, and the different classes of diseases are detailed:—

Oct., 1864.	Ages.	Sept., 1864.	Octobers.							Avg. 7 yrs. Octs. 1857–1863.
			1863	1862	Min. 1861	1860	1859	Max. 1858	1857	
8	Under 1	6	4	2	8	6	9	9	10	6 6-7
3	1 to 5	1	6	3	3	10	3	15	7	6 5-7
4	5 to 20	4	2	2	0	4	6	4	3	3
8	20 to 45	14	8	9	12	10	7	12	10	9 5-7
8	45 to 60	6	13	4	2	8	9	6	22	9 1-7
10	60 and above	6	16	10	4	7	7	11	5	8 4-7
41		37	49	30	29	45	41	57	57	44

"Under one year of age" (or in fact under five months old) the deaths were 8, being +1 1-7 above the seven years' average, though four of the seven had more. At "1 to 5" the deaths were less than half the average. Altogether the deaths under 5 years old were considerably below the average, and constituted a very small portion (little more than one-fourth) of the total mortality at all ages. From "5 to 20" the deaths were one-third above the average. At "20 to 45" the deaths were —1 5-7 less than the average, only 1859, having fewer, 1863 the same number, and all the other years more. From "45 to 60" the deaths were also below the average by —1 1-7. At "60 and above," the deaths were +1 3-7 above the average. This month, therefore, has been unfavorable to very young and very old persons. Two of the old persons were each aged 80 years, and three others had passed beyond the "three score and ten."

Oct., 1864.	Classes of Disease.	Sept., 1864.	Octobers.							Avg. 7 yrs. Octs. 1857–1863.
			1863	1862	Min. 1861	1860	1859	Max. 1858	1859	
2	1 Zymotic	5	6	3	1	12	4	11	6	6 1-7
6	2 Constitutional	9	10	9	2	9	5	13	9	8 1-7
22	3 Local	20	26	12	17	22	28	23	30	22 4-7
6	4 Developmental	3	2	5	7	1	3	7	4	4 1-7
5	5 Violent, &c.	0	5	1	2	1	1	3	8	3
41		37	49	30	29	45	41	57	57	44

The small number of two deaths from *Zymotic diseases*, shows how great was the atmospheric purity of the month, the average being more than three times as much. *Constitutional diseases* were nearly one-fourth less fatal than usual. Two of the deaths were from *cancerous affections*, one was 75 years old, and died at the Male Invalid Asylum. Four were deaths from *consumption*, one of them being a native of Tasmania. *Local diseases* were slightly below the average, on the whole class. 12 of the number were from diseases of the *Brain and Nervous System*. This order usually furnishes a large proportion of the deaths when atmospheric pressure has undergone numerous and extensive perturbations. The *Heart and organs of circulation* had only three deaths. The *Lungs and other organs of respiration* had few (3) deaths, as before noticed. The *Digestive organs* had four deaths. In the other orders of this class there were not any deaths. The *Developmental class* had more than the average of deaths, owing principally to deaths from *old age*. The class of *violent and accidental* deaths was also above the average. Of the five, one was from *burns*, one from *drowning*, two from suffocation, of which one was a child overlaid by its mother, the other an old man by the inhalation of carburetted hydrogen gas, which had escaped into his bedroom, and from the danger of which he rejected all warning; the last was suicide by cutting the throat. There were seven *inquests* during the month, being precisely the same in number as October 1863 had. Ten died in the *Hospital* being —6 less than in 1863. In the *Male Invalid Asylum* there were 4 deaths, aged respectively 65, 73, 75, 80. In 1863 there were 5. Of the 41 deaths, 4 died in the Glenorchy district, the rest in the city; 24 were males, 17 females. On the 1st, 9th, 10th, 15th, 22nd, 31st, no deaths took place. The greatest number that died on any day was 6 on the 26th, and the next 4 on the 28th. The most fatal period of the month was the three days, 26th to 28th inclusive, when 12 deaths took place, which has been previously commented upon. In the first week of the month the deaths were 8, in the second 6, in the third 9, in the fourth 16, in the last three days 2.

The registered *Births* were 70, being +3 more than in October 1863.

SOME OBSERVATIONS UPON THE PLANTS WHICH ARE CHARACTERISTIC OF AGRICULTURAL, PASTURABLE, AND BAD LANDS, RESPECTIVELY, IN TASMANIA. By W. Archer, F.L.S.

It is well known by gardeners that different kinds of plants must have different kinds of soil provided for them, in order that they may grow to the best advantage. It ought to be well known to agriculturists too, but they generally seem to pursue their operations without reflecting upon the matter,—as though they regarded, for the most part, all kinds of soil as being capable of nourishing whatever sorts of plants are inserted in them. Thus, potatoes, for example, will be found planted in soil deficient of lime, which they require in abundance, and abounding in silica, of which they need comparatively little; and wheat may be seen growing with difficulty on soil unnecessarily calcareous, and greatly wanting in the requisite quantity of silica. Barley is sown in the kind of soil that wheat is expected to flourish in; and yet it requires one-third more silica, more than twice as much lime, nine times as much potash, and three times as much sulphuric acid. And flax would certainly be expected, by most agriculturists, to grow luxuriantly in good wheat land; whereas it needs twenty-five times as much soda and potash, fifteen times as much magnesia, and only the one-hundred-and-fortieth part of as much silica as wheat does.

Seeing, therefore, that cultivated plants grow best in soils which contain the largest proportion of the food which they require, it may be inferred, as a matter of course, that different soils will produce naturally, in greatest abundance, those wild plants for which they furnish the largest proportion of their peculiar food.

Some kinds of soil yield abundantly certain kinds of wild plants, and yet are found by experience to be quite unsuited to the growth of agricultural produce; and we may infer that the soil upon which such wild plants thrive is always more or less of a similar character. The same may be said of the richest agricultural lands, and of land which is adapted for the growth of grasses fit for pasture; for upon each kind of land, wherever it occurs in an island like Tasmania, will be found growing naturally wild plants of the same or a similar description,—which wild plants may be regarded as characteristic of such soils.

Therefore, we may be able to tell, by inspection merely of the plants—or of specimens of the plants—growing upon any particular land, whether such land is fit for pasture or agriculture.

Now, it is this conclusion that I wish to turn to a profitable use as regards the exploration of new localities, with the view of preventing the great disappointment and loss which sometimes follow private, as well as public, expenditure, in connection with them.

Of course, it may be said that examination of the actual soil is better than the inspection of plants growing upon it. This may be, however, a very fallacious method of ascertaining the capability of any soil,—unless, indeed, you actually analyse it,—which it would be a difficult and troublesome thing to do during the exploration of new country; and I should, therefore, strongly advise the adoption of the plan which I am recommending,—for this reason, among others, that the growth of certain wild plants upon any soil is equivalent, for practical purposes, to an analysis of such soil. It would, nevertheless, be most interesting and useful to obtain a thorough analysis of the most common and widely-diffused soils, together with a collection of specimens of the characteristic plants of each soil; for the conclusions drawn from experience could thus be corrected or confirmed, and we should have an excellent means of ascertaining the value of our lands.

The first thing to be done is to find out, as correctly as possible, what wild plants are characteristic of land fit for agriculture or pasture, or worthless for such purposes.

Of course, it does not follow that land is entirely worthless which is unfit for pasture or agriculture; for excellent timber both for splitting and sawing, is often found on such lands; and it may turn out that other plants which flourish upon it possess a value, for the arts or for manufacturing purposes, with which we are at present unacquainted.

It will be found, in practice, most easy to predicate of land that it is fit for agriculture or pasture, by the absence of plants peculiar to land of an inferior description. I will, therefore, point out, in the first place, the plants which appear to me to be characteristic of land which is unfit for agriculture or pasture, taking the better kinds of land afterwards.

BAD LAND.

NATIVE HOP OR BITTERLEAF *(Daviesia latifolia,* Br.*)* A dark-green shrub, 3 to 6 feet high, with rather wide, pointed, very bitter leaves, 1 to 3 inches long, and racemes of small reddish-orange pea-flowers.

DWARF CHERRY TREE (*Exocarpus stricta*, Br.) With leaves like those of the Native Cherry Tree, but never growing larger than a shrub. The fruit is usually white, or of a light color.

WIRE SCRUB (*Bauera rubioides*, Andr.) A shrub 6 to 12 feet high, with wiry entangled branches, small leaves, and white or pink flowers, growing singly on stalks springing from the axils of the branchlets.

EPACRIS OR HEATH (*Epacris impressa*, Lab.) The varieties with red, white, or pink flowers, are well known.

HEATHY WHITEBEARD (*Leucopogon ericoides*, Br.) A small plant, with leaves about half an inch long, rounded at the top, with a projecting sharp point, and a profusion of spikes of small, white, feathery flowers.

MYRTLE-LEAVED ACACIA (*Acacia myrtifolia*, Willd.) A small Acacia, 2 to 3 feet high, with leaves (*phyllodia*) 1 to 2 inches long, in form like those of the Myrtle.

Daisy Tree (*Eurybia lirata*, D.C.) A shrub 8 to 12 feet high, with rather narrow leaves 3 to 6 inches long, and a profusion of clustered, daisy-like flowers.

Hairy Tetratheca (*Tetratheca pilosa*, Lab.) A hairy little plant, with pale or dark lilac cruciform flowers, growing from the axils of the leaves, on the upper part of the stems.

Button Grass (*Gymnoschœnus sphœrocephalus*, Hook. fil.)

There are other plants which might be enumerated, and which may be much more characteristic of bad land, in some localities, than those I have named.

INFERIOR PASTURE LANDS.

Native Lily (*Diplarrhena Morœa*, Br.)

She Oak (*Casuarina quadrivalvis*, Lab.)

He Oak (*Casuarina suberosa*, Otto et Dietr.)

Native Cherry Tree (*Exocarpus cupressiformis*, Lab.)

Peppermint Tree (*Eucalyptus amygdalina*, Lab.)

White Gum Tree (*Eucalyptus viminalis*, Lab.).

Black Wattle Tree (*Acacia mollissima*, Willd.)

Indigo Plant (*Indigofera Australis*, Willd.)

Clover Tree (*Goodia lotifolia*, Lab.).—A shrub 5 to 8 feet high, with pinnated leaves and yellow flowers—similar in appearance, especially when in flower, to a small Laburnum.

Epacris or Heath (*Epacris impressa*, Lab.)—Stunted and scattered plants.

Lomatia (*Lomatia tinctoria*, Br.)—A yellowish-green shrub 2 to 4 feet high, with deeply-cut leaves, often crowded at the top of the stems, and rather large racemes of cream-colored flowers, followed by pods which turn black after bursting and remain thus a long time on their stalks.

GOOD PASTURE LAND.

Honeysuckle Tree (*Banksia Australis* Br.)

Silver Wattle Tree (*Acacia dealbata*, Lind.)

Curly White Gum Tree (*Eucalyptus radiata*, Sieb.).—Known among sawyers, I believe, as a "bastard white gum." The trunk is often twisted, the timber curly, and the branches weeping. It may be distinguished from small specimens of the White Gum-tree—such as the Manna Gum-tree in the Domain, Hobart Town—by the number of seed vessels being 5 to 8, with the valves not projecting.

Wild Raspberry (*Rubus macropodus*, Ser.)

Prickly Beauty (*Pultenœia juniperina*, Lab.). A juniper-like plant, 3 to 7 feet high, with small, prickly leaves, and small yellow pea-flowers.

Common Buttercup (*Ranunculus lappaceus*, Sm.)

Common Burr *Acœna Sanguisorbœ*, Vahl.)

Common Daisy (*Brachycome decipiens*, Hook. fil.)

Bachelor's Button (*Craspedia Richea*. Cass.)

Native Rib Grass (*Plantago varia*, Br.) This is the species with long, narrow, sometimes toothed leaves, and long spikes of flowers.

Xerotes (*Xerotes longifolia*, Br.) Commonly but erroneously called "Sedges," *vulgo* "Sags," and sometimes

"Cutting Grass." Very like the Native Lily, when out of flower,—but the leaves are tipped with two unequal brown points, and the flowers are extremely small, straw colored,and clustered in flat spikes.

KANGAROO GRASS (*Anthistiria Australis*, Br.)

TUSSOCKS (*Poa Australis*, Br.). The common well-known tussocky grass.

COMMON FERN (*Pteris aquilina L. var esculenta).*—When growing to the height of 2 to 3 feet.

AGRICULTURAL LAND.

DOGWOOD (*Pomaderris apetala*, Lab.)—When growing to the height of 20 to 30 feet. This species is the largest of the plants called "Dogwood." It has leaves 3 to 5 inches long, and panicles of insignificant buffish flowers, destitute of petals.

BLACKWOOD *(Acacia melanoxylon*, Br.)—When growing to the size of trees with a diameter of 9 to 18 inches. A small stunted variety grows in very poor soil.

MUSK TREE (*Eurybia argophylla*, Cass.)

COMMON NETTLE (*Urtica incisa*, Poir.)

TUSSOCKS (*Poa Australis*, Br.)—When growing very large

COMMON FERN (*Pteris aquilina L. var. esculenta*).—When growing to the height of 5 to 7 feet.

SWAMPY LAND.

SWAMP TEA TREE (*Melaleuca ericæfolia* Sm.)

HAIRY TEA TREE (*Leptospermum lanigerum*, Sm.)

SWAMP EURYBIA (*Eurybia glandulosa*, D.C.)—A shrub 3 to 5 feet high, with sticky, needle-shaped leaves, 1 to 1½ inch long, and daisy-like flowers.

SWAMP DAISY (*Brachycome linearifolia*, D.C.)—A large daisy, with long, leek-like leaves.

SMOOTH-LEAVED BUTTERCUP) *Ranunculus glabrifolius*,Hook). —A bright yellow buttercup, with 7 to 10 petals, and deeply-cut leaves.

CRESS (*Cardamine, &c., species).*—All the plants of the Cress tribe in Tasmania indicate, more or less distinctly, the presence or proximity of water.

PRICKFOOT (*Eryngium vesiculosum*, Lab.)—A very small, trailing plant, with inconspicuous flowers, and leaves with toothed spiny margins.

PATERSONIA (*Patersonia glauca*, Br.)—A small plant, somewhat like a diminutive Native Lily,with extremely fragile, bluish flowers, on scapes 1 to 3 inches long.

SELF HEAL (*Prunella vulgaris*, L.).—A small plant, common in England, with several mint-like blue flowers at the end of the erect stems, and leaves 1 to 2 inches long.

RUSHES (*Juncus, &c., species*). Plants like those of the Lily tribe, but with dry, brownish flowers. Their seed vessels contain small seeds.

SEDGES (*Cyperus, Carex, &c., species*). Plants often resembling grasses, but easily distinguished from them by being stiffer and less succulent. and having solid stems,—and by their seed-like, flat or three-sided nuts, each containing a single seed.

PLANTS OFTEN GROWING NEAR RUNNING WATER.

SASSAFRAS (*Atherosperma moschata*, Lab.).

NATIVE MYRTLE (*Fagus Cunninghamii*, Hook.) When growing to a large size.

EUCRYPHIA (*Eucryphia Billardieri*, Spach.) A beautiful tree, 20 to 60 feet high, or more, with shining oblong leaves, $1\frac{1}{2}$ to 2 inches long, and large, white flowers, like those of the Pear Tree.

CELERY-TOPPED PINE (*Phyllocladus rhomboidalis*, Rich.)

HAIRY TEA TREE, (*Leptospermun lanigerum*, Sm.)

PRICKLY ACACIA (*Acacia verticillata*, Willd.)—This Acacia, sometimes erroneously called "Prickly Mimosa," has pungent leaves (*phyllodia*) arranged in whorls round the branches, and is 8 to 16 feet high.

WARATAH (*Telopea truncata*, Br.)

FERN TREE (*Dicksonia antarctica*, Br.)—This differs from the "Prickly Fern Tree" (*Alsophila Australis*, Br.) in having the trunk covered with matted rootlets, instead of the bases of the fallen fronds.

It may be stated, as a general rule, that the absence of rich agricultural land is denoted by the luxuriant growth of plants (with few exceptions) belonging to the following tribes, &c. :—

The Pea flower tribe (*Leguminosæ*).
Tea Tree (*Leptospermum Melaleuca, &c.*)
The Epacris tribe (*Epacrideæ.*)
Daisy-flowered shrubs (*Eurybia, &c.*)
Sedges (*Cyperaceæ.*)

It will be seen that I have added to the list of plants characteristic, respectively, of agricultural, pasturable, and bad lands, a list of those found on swampy land, and of those found often near running water. My object, in making the enumeration more complete, is to call the attention of surveyors and explorers to the subjects touched upon, and to point out to them plants that would probably disclose the existence of streams which, otherwise they might overlook, or would enable them to fix stations for water-holes in tracts of country where streams do not occur.

I do not, by any means, intend to assume that I have noted the most characteristic plants under each head in every part of the colony. I have only made a beginning. It will now be the duty of those who are specially interested in this investigation, to verify or correct and enlarge my lists. If I have succeeded in giving prominence and interest to the subject of the foregoing observations, so as to induce others to follow in my track, or to strike out more important views in connection with it, I shall consider myself amply repaid for the trouble which I have taken.

MORTALITY AMONGST THE TROUT IN THE BREEDING PONDS OF THE PLENTY.

IN the early part of last month (September), several trout were found dead in the box to which they were confined. These fish were apparently subjected to the same circumstances as the young salmon, yet no deaths occurred amongst the latter, if we except those very few which exhibited some malformation when first hatched.

It may be remembered that the trout ova were all placed in a separate wooden trough about eight feet long and one foot wide, through which a gentle stream of water was made to flow; and up to the first week in September the young fish (about 120, as was supposed) were left in the same trough. The salmon, on the contrary, were long since allowed to escape from their breeding boxes into a series of shallow pools, thus getting increased room and a larger supply of water. A few deformed salmon were found dead at various times, and it is therefore reasonable to suppose that had any of the others died we must (with the careful supervision that has always been kept up) have found them also.

Upon examination, white patches were seen on the pectoral fins of the trout in the trough, varying in size in different individuals, those which exhibited the largest patches being evidently sickly. Mr. Read (one of the Salmon Commissioners), after several days close observation, came to the conclusion that when once a fish exhibited the white spot on the fin he never recovered, the disease increasing so rapidly as to kill the fish in three or four days. Twenty fish died in two days when the disease was at its worst.

The number of trout had been greatly under estimated, and want of room appeared to be the cause of the mischief, a small pond was hastily constructed, and one hundred fish, including all that could be found exhibiting the white spots, were at once removed from the trough and placed in the pond. The result shewed that the conclusions arrived at were correct, as the number of fish with the white spots decreased, and the percentage of deaths fell rapidly.

The entrances to and exits from the clearing pond were then covered with perforated zinc, and 180 trout were moved into it, leaving about 40 still in the trough. The fish evidently enjoyed the change, and for several weeks past no deaths have occurred. There were between 30 and 40 lost in all.

Upon microscopic examination, the white spots were resolved into aggregated masses of filaments, each filament attached by one end to the skin; in two instances a number of the filaments extended on to the gills of the fish. When detached, the filaments exhibited none of the sucking or hooked apparatus with which the epizoa are invariably furnished, and under a power of 200 diameters each filament was found to consist of a vast number of minute cells, there being no trace of an alimentary canal. I therefore believe them to be of vegetable origin, and it is probable that they were rather the result than the cause of disease.

The health of the young salmon is all that can be desired.

ROYAL SOCIETY.

NOVEMBER, 1864.

The monthly evening meeting of the Fellows was held on Tuesday, the 8th November, J. Barnard, Esq., in the chair.

W. R. Giblin, Esq., who had been previously nominated by the Council, was after a ballot declared to be duly elected a Fellow of the Society.

The following returns were laid on the table :—

1. Visitors to Museum during October, 437.
2. Ditto to Gardens during October, 2,961.
3. Periodicals &c., received (the usual).
4. Plants &c., received at Gardens :—From Messrs. Handyside and McMillan, Melbourne, 30 papers of flower seeds. From Dr. Moore, New Norfolk, 12 varieties of potatoes imported from Scotland. From His Excellency Colonel Gore Browne, 100 seedling olives, and truncheons of three varieties of ditto, from Adelaide.

In reference to the olive plants, the Secretary (Dr. Agnew) remarked that His Excellency, from his knowledge of the soil and climate required by the olive, had formed the opinion that it should grow and mature its fruit well in this locality. He had consequently written to the Governor of South Australia, Sir Dominick Daly, to request him to obtain for us such cuttings, &c., as might be required to enable us to test its growth. Sir Dominick in the kindest manner promptly complied with the request, and in sending the plants, forwarded also the following letter from the gentleman who had furnished them.

" Rundle-street,
" July 28th, 1864.

" Dear Sir Dominick,—I feel quite at a loss to offer any observations upon the culture of the olive, which could present anything new to so learned a body as the Royal Society of Tasmania. The only thing which it strikes me that they are desirous of knowing is the mode which is adopted here in the propagation of the plants, and perhaps they would likewise wish to ascertain the kinds, or varieties of olives at present cultivated or introduced into this province.

" As to the first I believe it is generally admitted that seedlings, or wild plants are the best when worked with approved varieties, and it is with the view of establishing in Tasmania well grown trees, that I have the honor of placing at your disposal the few seedlings which you intend for the Royal Society of Tasmania. Of course it will be understood that when these are established, grafts will be supplied. The mode of grafting most recommended here, is underground grafting, with two-year old wood—and the time selected for the operation is in September.

" Another mode of propagating the olive in this province, is by planting truncheons horizontally in the ground at a depth of 11 or 16 inches, at the end of the summer ; these are to be attended to so as to ensure single stalks from the cuttings, as in this mode of culture many are apt to stool.

" The varieties of olive known to be cultivated here are at least five, viz. :— Saliven, Blanquet, Verdale, Gros Redonnaou, Olivier d'Espagne.

" I regret that I cannot obtain plants of these varieties at present, but I shall make arrangements to have some seedlings worked for the Royal Society of Tasmania, and when they are fit I shall have much pleasure in placing them at your Excellency's disposal for transmission to them.

" In this or any other matter in which anything can be done for the benefit of Tasmania, I think I may freely state that the Acclimatisation Society here will only be too glad to have the opportunity of being of service to their fellow-subjects in that lovely island.

" I remain,
" My dear Sir Dominick,
" Yours faithfully,
" B. W. Moore."

The Secretary further observed that the introduction of the olive (if our climate proved suitable) would be a matter of importance to the colony. The oil could be extracted at a very trifling expense, it would furnish a most valuable export, and the market for it was illimitable.

Mr. Abbott (Superintendent of the Botanic Gardens) was certain the tree would grow, but doubted if its fruit would ever arrive at sufficient maturity to furnish the oil. In the mean time the trees and truncheons had all been planted, and although many of them from being packed in wet grass had become much heated on the voyage from Adelaide, he hoped the greater portion of them would live. The new varieties of potatoes lately received from Scotland by Dr. Moore had also been planted in the Society's Gardens.

Meteorological Returns,—

1. Hobart Town, from F. Abbott, Esq.
   (*a*) Table for October.
   (*b*) Summary and Analysis of Observations for ditto.
2. Swansea, from Dr. Story.
   (*a*) Table for September.
3. Tamar Heads, from R. Henry Esq.
   (*a*) Table for August.
   (*b*) Ditto for September.
4. Port Arthur, from J. Boyd, Esq.
   (*a*) Table for October.
   (*b*) Reading of Government Schooner's Barometer for ditto.

The SECRETARY read the usual monthly analysis of the Hobart Town Meteorological Table, with a Health Report by E. S. Hall, Esq.

Mr. ABBOTT read some "notes on the half-yearly abstract of the Meteorological Registers kept at Hobart Town, and at the Coast stations."

Dr. HALL observed that the longer these returns were made, the more apparent would their value become. He might adduce a simple example from the abstract just read. It has been generally supposed that the climate on our eastern seaboard was drier than elsewhere, but it was evident from the documents laid before them that there were few localities in the colony where the rain fall was so heavy. It was not safe, however, to draw conclusions from a few half-yearly returns, it would be necessary to have careful observations carried out for a very considerable period before trustworthy averages could be deduced from them.

The presentations were as follows :—

1. Two large Maps of Tasmania. From the Colonial Secretary on the part of the Government.
2. Stuffed skin of Guinea Pig (*Cavia Cobaya*). From Mr. Hissey.
3. Stuffed skin of a Mouse of a remarkably elongated form, and light brown colour, although not a true Albino. From the Rev. Mr. Simpson, O'Brien's Bridge.
4 Fish (*Clinus Sp.?*) From T. Giblin, Esq. A well executed water colour drawing by Mrs. Allport of a fish of the same genus (*Clinus*) was exhibited.
5. Acts of Council, and of Parliament of Tasmania, from 7th George IV. to 26th Victoria, 4 volumes, bound. Also index. From J. Barnard, Esq., the part of the government.
6. An excellent and very accurate water colour drawing by Mrs. Meredith, of the fish presented by Mr. Owen Meredith at last meeting.
7. A halfpenny and farthing of George II. From Mrs. Boardman.

Mr. W. JOHNSTONE laid on the table a leaf of cabbage presenting a somewhat singular formation. Its free margin had so far grown together that the leaf assumed the form of a hollow cone, similar to the flower of the trumpet plant.

Mr. F. ABBOTT read a report from the Physical Section on the cause of the twist in the trunks of our trees, and of the very eccentric arrangement which is so frequently observed in their rings of woody fibre, as shewn in several transverse sections of timber which were exhibited, Letters from several correspondents on the subject (Dr. Vallentine, Mr. Watson, Mr. Weber, &c.) were laid before the meeting.

The enquiry was originated by a correspondent in London, who had written to ask did our trees twist in a manner differing from that which obtained in England, where it took place in a direction from *left* to *right*. After careful and repeated observations by some members of the Society, and others practically acquainted with the growth of timber, it was found that our trees do not keep to any particular twist, and that as far as could be determined they are not influenced by any general laws having reference to the sun, wind, slope of ground, &c. The subject is, therefore, still open for further investigation.

After discussion on various points raised by the correspondence, the usual vote of thanks to the authors of papers, and donors of presentations, closed the proceedings.

METEOROLOGY FOR NOVEMBER, 1864.

Private Observatory, Hobart Town.

Year.	Barometer reduced to standard temperature, 32 degrees.	Mean Temperature of the Air.	Maxima Thermometer Readings.	Minima Thermometer Readings.	Mean daily range of temperature.	Degree of humidity, 100 complete saturation.	Extent of cloudy sky 10 for sky covered.	Mean amount of ozone 80 for maxima.	Total amount of Rain.
	In.	°	°	°	°				In.
1841	29.627	59.02	83.5	43.8	20.8	.62	6	—	1.75
1842	29.550	57.12	—	—	17.7	.68	5	—	5.84
1843	29.670	56.87	94.5	45.3	22.4	.63	5¾	—	1.70
1844	29.724	54.56	79.5	41.0	19.6	.72	5	—	1.56
1845	29.621	58.31	86.5	41.7	19.3	.73	4¾	—	3.75
1846	29.853	58.83	90.9	42.3	20.0	.79	6½	—	2.87
1847	29.632	54.88	84.8	41.0	21.3	.67	5¾	—	2.21
1848	29.449	53.30	-	—	18.6	.75	7	—	4.04
1849	29.716	53.57	76.0	38.3	16.5	.80	6⅓	—	8.94
1850	29.707	57.36	87.3	42.3	17.3	.72	6	—	4.31
1851	29.611	53.00	80.3	40.3	13.7	.83	7	—	4.19
1852	29.683	55.93	81.3	39.2	17.2	.71	6½	—	1.41
1853	29.853	55.53	75.0	38.3	15.4	.74	6½	—	0.53
1854	29.754	54.05	85.4	39.0	16.4	.77	7	—	3.15
1855	29.392	62.00	85.0	39.0	17.10	.76	7.20	—	1.49
1856	29.692	58.00	80.0	38.0	21.76	.70	6.38	—	1.31
1857	29.801	59.00	82.0	41.0	21.00	.65	5.60	7.46	2.17
1858	29.909	59.33	82.0	41.0	18.20	.71	6.27	6.50	4.03
1859	29.970	58.95	90.0	41.0	20.20	.68	5.15	7.48	1.70
1860	29.887	59.21	85.0	44.0	18.00	.69	6.52	7.40	2.76
1861	29.879	59.14	82.0	42.0	19.53	.68	5.47	6.79	0.89
1862	29.746	61.32	92.0	46.0	22.93	.64	5.65	7.35	2.03
1863	29.663	55.50	78.0	41.0	18.13	.71	6.00	8.20	4.23
1864	29.846	58.07	85.0	41.0	21.23	.68	6.55	8.41	2.06

The mean in all cases is taken from the sums of each column, and not from the maximum and minimum.

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.*

12th. First ripe Strawberry gathered.
15th. First ripe Cherry gathered.
17th. Black Mulberry in full flower.
25th. Pomegranate commencing to flower.
30th. First ripe Raspberry gathered (Red Antwerp).

	In.
Barometer, highest, 18th, 7 a.m.	30·277
,, lowest, 3rd, 1 p.m.	29·172
,, mean for the month	29·846
Being 0·121 above the average.	
	°
Temperature, highest on the 2nd	85.00
,, lowest on the 26th	41.00
,, mean for the month	58·07

Being 00·28 above the average.

Rain fell on the 2nd, 3rd, 4th, 5th, 12th, 14th, 20th, 21st, 22nd, 23rd, 25th, 26th, and 27th, to the amount of 2.06 in., being 0·70 below the average.

Lightning on the 2nd and 4th.

A fresh deposit of snow, low down on Mount Wellington, on the 26th, which remained in patches to the end of the month.

Electricity active on the 1st, 2nd, 4th, 6th, 7th, 8th, 9th, 10th, 11th, 17th, 18th, 19th, 29th, and 30th.

Prevailing currents of wind N.W. and S.E., greatest force S.W., N.W., and S.E.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR NOVEMBER, 1864, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. SWARBRECK HALL.

The character of the weather this month was quite abnormal, and from its frequent and extensive fluctuations, was very fatal to diseased persons, and feeble old people. To the young and healthy the variable atmospheric conditions, from being accompanied with a high degree of ærial purity, was the reverse of injurious. Nevertheless, the mortality of the month somewhat exceeded the November average of the previous seven years. At all ages beyond five years old, there was an excess of deaths. From birth to five years of age, the deaths were little beyond half the average.

Atmospheric pressure mean, 29·846, was + ·121 above the 20 years' adopted standard mean, while November 1863 was below it by,—·062. The minimum pressure was on the 3rd, 29·172; ; the maximum 30·277, on the 18th. The month's extreme range was consequently 1·105 inches, which is greater than that of any November since 1856. The greatest movement of the barometer in any twenty-four hours, was a rise of + ·606 on the 4th; but on the 4th, also, there was one nearly as great, *i. e.* + ·582. The greatest fall,—·565, was on the 12th. Other fluctuations of atmospheric pressure, exceeding one-fifth of an inch, occurred eleven times. The influence of these extensive perturbations, is clearly marked in the mortuary records.

This was a very *windy* November, the total force, 124·86 lbs, being, +17·83 lbs, more than the mean of the previous seven years. The calms noted were only 3, which is without parallel in any previous November recorded. *North-west* winds were the most frequent in number, but *south-west* had the greatest amount of force. The strongest wind of the month had 10·42 lbs pressure to the square foot, and came from the south-west, with squalls of rain, hail and snow, and a great depression of temperature.

Temperature mean, 58·07, differs little from that of the 20 years, being only +00·28 above; but erroneous conclusions might be drawn were the influence of the extreme variations in the month not duly weighed. The maximum shade temperature by the self-registering thermometer, was 85 on the 2nd, and the mean of all the maxima attained the high proportion of 70·13 degrees; while the minimum night temperature was 41 degrees, and the mean of all the minima so low as 48·76 degrees. The mean from both being about one degree more than that of the ordinary thermometers. The extreme range of temperature, 44 degrees, exceeded that of November 1863 by seven degrees.

The mean *daily range of temperature* was 21.23 degrees, being + 2·39 degrees more than the 20 years' average, only four Novembers in the previous 23 years have been higher. Last year's was—3·12 less. The greatest range on any day was, 37 degrees on the 19th. Only 1862, 1846, 1843, exceeded this. The least range on any day was 9 degrees on the 23rd.

Solar intensity attained the highest maximum of 125, twice in the month, on the 2nd and the 19th, 1862 had one degree less, but no other November on record was ever before so high by ten degrees. Last year's maximum was only, 114 degrees. The mean for the present month was 103·86 degrees, being higher than any November recorded (8 years) and + 3·05 above the mean of the whole. Last year's November was three and a half degrees less. As it will be shown, hereafter, that cloud mean was also above the average, it will be evident that the sun's rays this month were unusually powerful, while prevailing. The minimum of the solar-thermometer was 56 on the 21st.

Terrestrial radiation mean, 46·03, was —·51 below the average of the previous eight years. The maximum was 55 on the 7th; minimum 31 on the 10th.

The *rain* precipitated, amounted in the aggregate to 2·06 inches, which is —·70 below the 20 years' average; November, by that standard, being much the wettest month of the twelve. 1863 had rather more than double the rainfall of that of the present month. The number of days on which rain fell, was 13, which is + 0·22 above the average of wet days in November on nine year's records. For the first three weeks of the month, no day's rain was sufficient to make the channels run, the rain deposited being merely sprinkling showers. Vegetation suffered much during this period for want of a more copious supply. On the 21st, however, nearly an inch of rain fell, and thoroughly saturated the soil, and flushed all drains. Again on the 26th rather more than half an inch was guaged, and the channels were well cleansed. *Snow* and *hail* were mixed with the rain on the latter day, as it fell in the city; while Mount Wellington exhibited as hoary and ample a mantle as it ever had done during the winter. *Snow* was never altogether absent from Mount Wellington during the month, though at times only a few patches could be discerned from the city. Muttering of thunder was heard on the evening of the 2nd, together with lightning, and the latter alone on the evening of the 4th.

Spontaneous Evaporation did not much exceed rainfall notwithstanding the windy character of the month. It only amounted to 2·59 inches.

Humidity had a mean of 68, which is —3 below the 20 years' average.

Elastic force of Vapor mean was 328, being only +1 higher than the average of the 20 years. The very unusually high force of 633 was recorded at 1 p.m. on the 12th, and 407 at 7 a.m. on the 23rd and at the three observations on the 30th, respectively were 310, 405, and 492. These conditions were adverse to health.

Cloud mean was 6·55, being +·46 above the 20 years' average, and notwithstanding the more liberal fall of rain and greater number of wet days in November, 1863, was also +·55 more than the cloud mean in that month.

Ozone mean was 8·41 being +1·11 more than the November average of the previous seven years, and higher than any of them. Acute inflammation of the air passages did not prevail much, and but four deaths from Bronchitis and Pneumonia were recorded. Had the hygrometrical state of the air been less favorable, a different result would have, no doubt, occurred, as the temperature and pressure of the air were both so variable.

Electricity exhibited a strength and activity for the whole month, without parallel, since records have been kept. The positive indications were 15 with a maximum tension of 9. Negative was recorded 42 times, with a maximum tension of 8·5. "Nil" was registered at 7 a.m. on the 21st, and at both observations on the 22nd. This is a noteworthy fact in association with the cases of lockjaw about and after this period, which will be commented upon hereafter.

Forty-three *deaths* occurred during the month, being +3 3-7 more than the average of the previous seven years' Novembers, which as the table following shows, is ·39 4-7 :—

Nov., 1864.	Ages.	Oct., 1864.	Novembers. 1863	1862	1861	Max. 1860	Min. 1859	1858	1857	Avg. 7 yrs. Novs. 1857–1863.
4	Under 1	8	7	12	9	7	4	3	6	6 6-7
2	1 to 5	3	1	6	3	8	3	7	6	4 6-7
6	5 to 20	4	4	3	2	5	2	3	4	3 2-7
12	20 to 45	8	6	9	11	9	11	12	14	10 2-7
9	45 to 60	8	5	6	7	11	4	7	5	6 3-7
10	60 and above	10	7	9	7	11	5	6	10	7 6-7
43		41	30	45	39	51	29	38	45	39 4-7

The deaths *under one year of age* were all under six months old, and the number is very considerably below the seven years' average. At 1 *to* 5 *years old* the rate was less than half the seven years' mean. Altogether the deaths *under* 5 *years of age* (6) were less than one-seventh of the total deaths at all ages (43). No previous November had so small an infantile mortality, and this is considered the nicest test of salubrity. At *from* 5 *to* 20, the deaths were nearly double the average, a very unusual occurrence. In the three groups of ages, from 20 upwards, all were above the average. Of the ten above 60 years of age, four were above 80 years old, *i.e.* two at 82, one at 84, and one at 102, all inmates of the Male Invalid Asylum at the Brickfields. The centenarian up to a few months ago, was an active man, and in full posses sion of his ordinary mental faculties.

Nov., 1864.	Classes of Disease.	Oct., 1864.	Novembers. 1863	1862	1861	Max. 1860	Min. 1859	1858	1857	Avg. 7 yrs. Novs. 1857–1863.
1	1 Zymotic	2	3	8	3	4	4	6	4	4 4-7
11	2 Constitutional	6	6	7	4	5	6	6	4	5 3-7
20	3 Local	22	16	22	18	36	13	22	26	21 6-7
6	4 Developmental	6	2	5	8	2	3	1	4	3 4-7
5	5 Violent, &c.	5	3	3	6	4	3	3	7	4 1-7
43		41	30	45	39	51	29	38	45	39 4-7

Only one death occurred from *zymotic disease*, a babe less than five months old, suddenly from congestion of the heart and lungs, arising from undeveloped chicken-pox. The average for November is above four times as many, and no one month of the seven had less than three times more than that of the present month. In this class of diseases November has the smallest average of any of the twelve months in a year, though May takes precedence in having the smallest average—38 4-7—from all causes. October 1861 had likewise only one death in this class, but July of 1864, had not even one. These are the only months in the last seven years that can compare favorably with the present month on this score. In the *Constitutional Class* the deaths were more than double the average. Of the 11 deaths, the youngest was from *Hydrocephalus* aged 6½ years, the next at 15¼ years old from *Scrofula*, 6 were from *Consumption*, the youngest aged 22, being the only one born in Tasmania. 3 were from *Cancerous Affections*, aged 48, 49, 53. The *Local Class* had a mortality on the whole, somewhat below the average, but two of its eight *orders* had 15 out of the 20 deaths, being a very unusually large share of the whole. Diseases of the *Organs of Circulation*, had 7 from *Disease of the Heart*, 2 from *Aneurism of the Aorta*, and 1 from *Phlebitis* (inflammation of the veins.) Many of these were sudden deaths. Diseases of the *Organs of Respiration* had 5 deaths; four of the five acute affections, and from four months to 20 years old; the other was from *Asthma*, in a man aged 60. All but one of the remainder of the deaths in this class, were chronic affections and with the foregoing, succumbed to the rapid atmospheric variations. The class of *Developmental diseases*, is so much above the average owing to the number of deaths from *old age* before alluded to. Of the two infants, one only survived its birth, a quarter of an hour, and the other died at five months old, from *Congenital disease* transmitted by its mother. The *Violent and Accidental Class* of diseases had a little more than the average. A woman of 37 died in Hospital from *burns* inflicted in a country district, beyond the Hobarton Registry. A child under two years old died from a *scald*. The other three deaths in this class were from *Traumatic-Tetanus* (Lockjaw from injuries) aged respectively 10½, 31, 33 years. All occurred between the 23rd and 28th inclusive, being the fourth and most fatal week of the month. Deaths from Traumatic-Tetanus occurred in June and March (one each) also of this year. In 1863 there were no deaths from this disease, but there was one from Idiopathic-tetanus in November. In 1862 there were one from each variety, in January and February respectively. There were not any from either cause in 1861, 1860, 1859. In February 1858 there was one. In 1857 there were 3, June, August, and November respectively one each. It is, therefore, of deep interest to ascertain whether the unusually large mortality from this cause in the present month, was associated with any peculiar atmospheric conditions prevailing at the time. The wound in the thigh from a small stone discharged from a pistol, in the boy, was not in itself a dangerous wound. The two men had previously had a simple operation performed upon them in hospital (hœmorrhoids excised by ligature.) From the elaborate examination of all the meteorological phenomena of the period, I can answer the enquiry proposed affirmatively, but the details are too prolix to publish in this report.

The *inquests* during the month were 5, including one that died in the hospital, but received from a rural district. In 1863 the inquests were only 3. In *hospital* the deaths were 14, including the case on which an inquest was held. Four of these individuals were received from districts, beyond the boundaries of the Hobart Town Registration District. In November, 1863, the hospital deaths were only 8. At the *Male Invalid Asylum* 5 deaths took place. Four of them have been alluded to before, the fifth, and youngest, was 68 years old. In 1863 only 2 deaths took place in that establishment. In the *Queen's Asylum for Destitute Children*, two boys aged respectively 7¼, and 6½ years, died. The first died from *heart-disease*. He had congenital malformation of the chest. The other died in *convulsions*, how induced is unknown. The day preceding his death, the solar thermometer was at its maximum of intensity for the month—125. Whether he had been exposed to its influence on that day, I do not know, but on the 2nd, the sun was equally powerful, and on many other days its rays were sufficiently intense to produce *insolation* (sun-stroke) to those exposed to it with bare heads or with such ill-adapted coverings as the boys there have to wear. The deaths in this Institution during 1864, now nearly expired, have been altogether 3, and the daily average strength of the children, aged from 3 to 14 years, has been above 500. The rate of mortality therefore was little more (6 per 1,000 instead of 5) than that existing amongst the country children in Tasmania of corresponding ages, being a rate few countries in the world have exhibited. But in 1863, there were only two deaths in the Queen's Asylum and none at all in 1862—so that in the last three years there have only been five deaths altogether—a rate of mortality considerably less than that of the country districts. From an average of the 19 years previous to this charity being handed over to the Colonial Government, the annual death-rate was about six times as much as that of the present year. In two years of the nineteen, (lately most incorrectly eulogised in a communication to the press, for the perfect management the Institution then exhibited),—1853-1854—the deaths were respectively 10 and 53, while the daily strength averaged only about 476 and 424 respectively. In 1853 all the ten deaths were above four years old, but in 1854, fifteen out of the fifty-three deaths were under three years of age. In 1843, when the maximum of deaths in this Institution (54) took place, out of an average daily strength of about 492 1-7; only six of them were below three years old, that is between two and three. The saving of life, therefore, in the five years since the improvements introduced into this establishemnt at the close of 1859—principally in the dietary—has been about 65, a large number indeed, but not so many as there might have been had the deaths in the first two of the five years been as low as the last three have been.

Of the 43 deaths this month, 4 died in the Glenorchy division of the district, the rest in the city. Twenty-nine were males, 14 females, being an undue proportion of the former. No deaths took place on the 12th and 30th, and the greatest number on any day was 4 on the 28th. The most fatal period of the month was the three days 26th to 28th inclusive, when eight deaths took place. The next in number was 6 from 20th to 22nd. In the first week of the month the deaths were 10, in the second 7, in the third 12, in the fourth 13, in the last two days 1.

The registered *births* were 77, being 33 more than were registered in November, 1863

ROYAL SOCIETY.

DECEMBER, 1864.

In order that the transactions of the Royal Society should present as complete a narrative as possible of the various attempts to introduce Salmon into the colony, the Council deem it advisable to print the following paper, which was read by Mr. M. Allport, on 5th August, 1862:—

The apparatus in which the Salmon Ova were deposited was placed between decks and was of two kinds—one hung on gimbals in the same manner as a mariner's compass, the other suspended on the principle of an ordinary swinging tray. Both were of wood,—the gimbal apparatus consisted of three shallow square boxes, one resting on the other, that on the top being the smallest and was fitted with trays, the bottoms of which were formed of parallel glass rods upon which the Ova were placed. The suspended apparatus consisted of a pyramid formed by three shallow square boxes placed one above the other in such a manner as to leave spaces between them, the lowest being four feet square, the bottoms of the trays in this being formed of perforated pure tin, on which rested one inch of gravel and in and upon the gravel the Ova were deposited. The suspended apparatus was varnished under the superintendence of Professor Pepper, Chemical Lecturer at the Polytechnic, the other by the Carpenter with common shell-lac varnish.

The water was admitted at the top of each apparatus and flowed from one tray to the other in such a manner that it entered at the bottom of one, gradually filled it, passed over the top to the next and out of the bottom of the second into a third, and so on, the object being that a stream of water might pass not only over the Spawn but under the glass rods in the one case, and through the gravel in the other; after passing out of the lowest trays the water flowed into receiving tanks and was again pumped up for use.

Two kinds of water tanks were used—one of wood lined with pure tin, the other of iron. For the purpose of cooling the water, 25 tons of Wenham Lake ice were packed in an ice-house, lined with lead, between decks. Above the ice-house, and partly on deck, was a wooden tank, lined with tin. This tank, like the ice-house, consisted of a double framework of timber filled in with charcoal. From this deck tank a pipe passed into and through the ice-house, thence into an iron tank, the top of which came through the bottom of the ice-house, and from the last-mentioned tank another pipe led to each apparatus.

The Ova placed in the trays (50,000 in number) was of various ages, the last having been taken from the parent fish on the 22nd of February, 14 days before the vessel sailed. In the ice-house a deal box was embedded (at the suggestion of a friend of Mr. Youl's), containing wet moss and Ova; and Mr. Ramsbottom also placed in one of the trays in the suspended apparatus one fish just hatched.

On the 4th of March last the "Beautiful Star" left London, and on the 8th was compelled through stress of weather to put back to the Downs. The gimbal apparatus worked so badly that in this short period from six to seven thousand of the Ova died. The motion caused the Ova to roll backwards and forwards on the glass rods, bruising them against the sides of the trays and against each other. In addition to this, Mr. Ramsbottom perceived that the Ova were getting coated with a deposit from the shellac varnish, which was rapidly leaving the wood. The gimbal apparatus being clearly a failure, Mr. Ramsbottom carefully transferred the Ova from it into the suspended apparatus with a large spoon, in such a manner as never to leave it exposed to the air for an instant. On the 13th March the "Beautiful Star" left the Downs, and on the 16th the filler-in of the screw propeller was carried away, which compelled her to put back to Scilly for repairs. And here a new difficulty arose, the water from the iron tanks was found so impregnated with rust as to be coating both gravel and Ova with sediment. Mr. Ramsbottom had a rough filter made at Scilly which in a great measure remedied this evil. The vessel left Scilly on the 24th March, and encountered a furious gale in the Bay of Biscay on the 27th. Up to this time the suspended apparatus had worked well, but owing to the rapid pitching and rolling of the vessel and the weight of the apparatus it now became dangerous to approach it, and many times knocked against the beams of the deck overhead. This displaced the gravel in the trays destroying the Ova in large numbers and killing the one young Fish, which up to this time (23 days) had been in good health. To prevent this Mr. Ramsbottom fixed portions of an elastic india-rubber pipe, extending from the suspended apparatus to a weight on the deck below, and thus gradually checked the motion.

During the gale the bilge-water was dashed violently up the sides of the vessel between decks sprinkling the apparatus. This of itself would soon have destroyed the remaining Ova had not Mr. Ramsbottom's assistant covered the apparatus with blankets, and a recurrence of the same evil was prevented by lining the sides of the vessel with blankets and tarpaulins. Fine weather succeeded the gale, but it was manifest from the delays already experienced and the bad sailing qualities of the vessel that the ice could not hold out even to get through the tropics. At the end of April and beginning of May the temperature of the water began to rise and many of the Ova died on the point of hatching, a large number with the head of the fish protruding. On the 8th of May Mr. Ramsbottom, much against his will, was compelled to enter the ice-house to procure blocks of ice which he placed in the deck tank thus reducing the temperature of the water. After using a considerable quantity of the ice, Mr. Ramsbottom came upon the deal box which had been placed in the ice-house, the lid being broken by the rolling about amongst the ice. Lifting out some of the moss Mr. Ramsbottom thought the Ova looked healthy, procured a vessel of clean water and placed Ova and moss together in it; to his utter astonishment he found 19 living and healthy Ova, which he carefully transferred to the trays in the suspended apparatus.

On the 17th May the ice was finished; on the same day the temperature of the water rose to 65°, and the last of the Ova died 74 days from the commencement of the voyage, and 88 days from the taking of the spawn from the fish. Towards the end of April from three to six of the Ova were hatched per day, and thirty of those hatched appeared in perfect health—one lived ten days. The Ova taken from the deal box in the ice-house lived nine hours longer than any of the others, and withstood a higher temperature. Before closing this short account of the voyage, I desire to express my conviction that no man could more earnestly have endeavored to carry the experiment to a successful issue than Mr. Ramsbottom, and I am personally indebted to him for the courtesy with which he has afforded me every information as to the cause of failure.

From the foregoing details, it is clear that however perfect the apparatus might have been the placing it in a vessel so unsuited for the purpose as the "Beautiful Star" was a fatal mistake. It was, in fact, consigning the Ova to utter destruction, and it would have been far better to have delayed the experiment till a suitable vessel could be found, even if we had waited five years.

The suspended apparatus is susceptible of very great improvement. It is so cumbrous and complicated as to be dangerous in a heavy sea.

The water had to flow over so large a surface in its passage through the trays from the top shallow box to the lowest that it rose 3° in temperature, a serious objection when we consider that every rise in temperature tends to hasten the hatching of the Ova. The two uppermost boxes of the suspended apparatus with a wider space between them, would have been far more manageable, as it would then have ridden clear of the beams; but I would suggest that even smaller and lighter boxes than these should be used, and that two or more sets might be hung in the space employed on any future occasion —the water being conducted to each by separate pipes from the ice-house.

Mr. Ramsbottom's father having observed that healthy Salmon Ova in their native rivers are frequently buried to a depth of eighteen inches in loose gravel, but that in such case there is always a current of water through the gravel, he arranged the trays and gravel in the suspended apparatus in such a manner as to imitate as nearly as possible their native beds in which spawn are deposited, and distributed the Ova amongst them and upon the gravel. Had it been possible to keep the apparatus steady, so as to communicate no other motion to the water than that acquired by its own gravity, this plan would have no doubt succeeded admirably; but the rapid motion of the vessel caused such a disturbance in the water, and consequent rolling about of the gravel, as to bruise and kill most of those Ova buried in it, and to injure a large proportion of those resting upon it. An additional evil was, that the Ova so killed could not be removed without disturbing those on the surface; they gradually decomposed, and by tainting the water no doubt accelerated the death of the hatched fish, if not of the Ova.

To remedy all this Mr. Ramsbottom proposes to do away with the undercurrent altogether, to have only one layer of gravel, and to keep this layer fixed in its place by the very ingenious and simple contrivance of covering the bottom of the tray with wire loops between and amongst which the gravel rests securely packed. This wire should be of pure tin.

The arrangements for cooling the water were quite inefficient and caused great waste of ice. The water was led immediately from the deck tank by an iron pipe wrapped round with flannel into and through the ice-house and into the iron tank, the top of which protruded through the bottom of the ice-house. The water from the deck tank being comparatively warm soon melted the ice in the neighborhood of the conducting pipe, after which its temperature could not be materially altered in its passage through the ice-house. There was then a stream of comparatively warm water pouring into the iron tank at the bottom of the ice-house. The ice resting on this iron tank rapidly melted, letting down more ice to be melted as it came into contact with the tank till all above it was gone. That this action took place was fully proved, for Mr. Ramsbottom, on first entering the ice-house, found a vacant space extending from the top of the iron tank to the roof with the conducting pipe clear of ice.

This ought to have been foreseen and guarded against. No portion of the upper tank should be above the deck, as this must tend to increase the temperature of the water greatly. In the "Beautiful Star" it was impossible to avoid this as sufficient fall could not otherwise be obtained, but this is only an additional proof of her total unfitness. The pipe leading from the upper tank should be of small bore, several feet long and covered with some material, such as woollen cloth, which in the tropics could be constantly wet and from time to time powdered with some cheap deliquiescent salt, the effect of which would be to reduce the temperature of the water materially before it entered the ice-house. The pipe upon entering the ice-house should first pass two or three times round the top of it on the principle of a worm in a still, and lastly once round the bottom, and thence directly, without the intervention of any tank, to the apparatus. I believe the upper tank might also be cheaply kept at a low temperature by the use of a moderate supply of deliquiescent salt, even damping and the consequent evaporation would lower the temperature of the water a degree or two.

The water tanks should be of wood, lined with pure tin or with slates. The water from the iron tanks was filled with rust in a week, and, although filtered, is very likely to have held in minute suspension a considerable quantity of sediment. I strongly suspect that the slime so much complained of by Mr. Black in the former experiment was nothing but this deposit of rust, and not due to the presence of confervæ as supposed by him.

The water in the wooden tank lined with tin on board the "Beautiful Star" is as bright and well-tasted as on the day on which it was put on board.

Taking into consideration the pertinacity with which a portion of the Ova retained life for 74 days, in spite of the disastrous circumstances to which they were subjected on the recent voyage, I cannot doubt that salmon can and will be introduced into this colony. But to effect this no pains should be spared to obtain the services ot a large clipper ship, and if the funds now remaining in the hands of the Commissioners are insufficient an appeal should be made to the Government of this and the neighboring colonies to supplement them. The Governments of Victoria and New Zealand have already borne a share in the undertaking, but the older colony of New South Wales has determined on trying the experiment for herself. I think it is to be regretted that the resources which might be made available for certain success should be thus divided, as success in this colony would at once ensure it in all others whose rivers are adapted for salmon.

METEOROLOGY FOR DECEMBER, 1864.

Private Observatory, Hobart Town.

Year.	Barometer reduced to standard temperature, 32 degrees.	Mean Temperature of the Air.	Maxima Thermometer Readings.	Minima Thermometer Readings.	Mean daily range of temperature.	Degree of humidity, 100 complete saturation.	Extent of cloudy sky 10 for sky covered.	Mean amount of ozone 10 for maxima.	Total amount of Rain.
	In.	°	°	°	°				In.
1841	29.739	60.07	88.8	41.5	20.1	.56	5	—	0.31
1842	29.807	58.82	—	—	20.1	.65	5	—	0.11
1843	29.741	61.03	84.8	43.0	22.5	.60	5½	—	0.56
1844	29.835	60.86	78.0	40.3	21.1	.65	4	—	0.23
1845	29.668	61.69	84.0	47.5	19.6	.67	4¾	—	0.39
1846	29.709	62.88	90.6	46.0	22.6	.70	6	—	1.14
1847	29.725	62.88	103.0	41.7	22.1	.69	5	—	0.53
1848	29.550	56.68	—	—	21.8	.71	6½	—	2.36
1849	29.666	58.41	85.0	43.3	20.8	.71	5½	—	0.90
1850	29.631	62.39	89.3	42.2	19.9	.65	5¾	—	0.61
1851	29.678	59.59	89.4	44.0	19.2	.71	5⅔	—	1.66
1852	29.697	58.13	92.5	42.0	11.1	.73	5½	—	2.01
1853	29.693	61.41	94.0	43.0	20.0	.66	5⅔	—	0.48
1854	29.682	59.76	83.0	44.0	18.6	.77	6⅓	—	1.62
1855	30.037	67.00	96.0	38.0	15.11	.76	4.70	—	2.73
1856	29.689	60.60	85.0	39.0	23.03	.65	6.23	—	1.94
1857	29.846	65.26	94.0	39.0	25.50	.61	4.50	6.71	0.21
1858	29.775	62.10	84.0	42.0	20.19	.68	5.40	6.94	1.98
1859	29.841	64.48	102.0	41.0	22.90	.62	5.83	6.91	1.25
1860	29.846	63.45	89.0	44.0	19.93	.67	5.92	6.80	2.27
1861	29.707	60.63	80.0	41.0	18.09	.69	6.40	6.35	3.29
1862	29.773	61.07	78.0	45.0	19.35	.66	5.90	7.21	1.73
1863	29.798	60.25	91.0	45.0	17.16	.74	6.01	7.37	7.60
1864	29.839	59.29	78.0	40.0	16.67	.74	6.90	8.12	3.92

The means in all cases are taken from the sums of each column, and not from the maximum and minimum.

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

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

8th. First bunch Red Currants ripe.
10th. Common Privet commencing to flower.
15th. First bunch Black Currants ripe.
17th. Melia Azederach commencing to flower.
24th. Doyenne d'Ete Pear commencing to ripen.
27th. June-eating Apple commencing to ripen.

	In.
Barometer, highest, 5th, 7 a.m.	30·291
,, lowest, 9th, sunset	29·329
,, mean for the month	29·839

Being 0·069 in. above the average.

	°
Temperature, highest on the 9th	78·00
,, lowest on the 4th	40·00
,, mean for the month	59·29

Being 2·78° below the average.

Rain fell on the 2nd, 3rd, 4th, 11th, 12th, 13th, 15th. 18th, 19th, 20th, 23rd, 25th, 26th, 27th, 28th, 29th, and 30th, to the amount of 3·92 in. being 1·60 in. above the average.

Thunder and lightning on the 1st, 19th, 23rd, and on the 25th, from 4.20 to 6.20 p.m., a heavy electrical storm passed over the city from W. by S. to the N.E. part of the horizon, vivid flashes of lightning were succeeded by loud reports of thunder, with heavy rain. No circumstance of the kind has called for special notice since the memorable thunder storm of February 16th, 1857.

FRANCIS ABBOTT.

ANALYSIS OF THE OBERVATORY RECORDS FOR DECEMBER 1864, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

The year 1864 closed with weather less fatal to life than any December of the previous seven years, 1860 had previously the minimum mortality, though December 1863 had only one more death than it had.

Atmospheric pressure had a much smaller range and fewer perturbations than in either the preceding month of November or in December 1863. The mean was 29·839, being +·069 above the 20 years' adopted standard mean, and higher than any December since 1860. The extremes were 30 291 maximum on the 6th; 29·329 minimum on the 9th. The month's range ·962, being —·317 less than December, 1863, had. The greatest movement of the barometer on any day of the month was a rise of + 466 of an inch on the 4th. The greatest fall was —·454 on the 9th. Besides these there were only eight other days having a movement exceeding one-fifth of an inch, and none of them extending beyond one quarter of an inch. Atmospheric pressure, therefore, was not adverse to life, as it was in November.

Wind pressure amounted to 94·44 lbs., being +6·20 lbs. more than the December average of the previous seven years. December 1863, however, was still more windy. The three southerly points of the compass had 48 out of the 93 observations, and 53·03 lbs. of the total strength. Of the other five points north-west had 20 out of the 45 winds, and 28 37 lbs. out of the 41·38 lbs. of force. The strongest wind noted had 10·42 lbs. pressure to the square foot, and occurred on the 10th; being a north-west gale but not a hot wind. It is a remarkable and unusual fact that there was not a single hot wind in all 1864. Calms were recorded 11 times, being —3·33 less than the average of the previous seven years' Decembers. Aerial movement, therefore, was much more propitious to health than in November, for though having a less total force, the predominant winds were from the purest quarters.

Temperature mean, 59·29 degrees, is —2·78 degrees below the 20 years' average, and colder than any December since 1852, when the mean was 58·13 degrees. Though the present month has little more than one degree higher mean than November had, it differed widely in the distribution of its heat. November had wide extremes, and a great daily range. December was much below it in both respects. The maximum temperature was only 78 degrees on the 9th and 23rd, and the mean of all its maxima, only 68·58 degrees; while November's maximum was 85, and the mean of its maxima 70·13 degrees. The December minimum was 40 degrees, recorded on the 4th; and the mean of all its minima 51·90 degrees. November was respectively 41 and 48·76 degrees. Cold and wet Decembers have always had fewer deaths than warm and dry ones. December 1863 came under the former category. The mean temperature by the self-registering thermometers differed less than one degree from that of the three daily records, being 60·24 degrees.

The mean *daily range of temperature* was only 16·67 degrees, being—3·88 degrees below the 20 years' average for December. It was also about half a degree less than that of December 1863, being another more favorable meteorological condition to account for the smaller mortality of the present month. The greatest range on any day was only 24 degrees, on the 7th and 14th; and the smallest 4 degrees on the 28th. December 1863 had as low a minimum, but 12 degrees higher maximum. None of the twenty-three Decembers on record had so small a maximum as the month under review, the range being from 28 degrees in 1862 to 42½ in 1847. The preceding month of November had a maximum range13 degrees higher than that of the present month.

Solar intensity mean was only 100·51 degrees, being—4·10 degrees less than the average of the previous eight years, and —3·35 less than the previous month had. December 1863, however, had a few decimals less, and 1861 was only 99 degrees. The unusually cloudy character of the present month in great part accounts for so small a mean. At the same time the maximum only attained 121 degrees, on the 17th, being 4 degress less than November had, and less than six out of the eight years had. 1863 had the maximum 136 degrees, and 1861-2 had the minima, being respectively 117-116. The minimum record of the solar-thermometer was 61 degrees on the 29th, being a cloudy wet day with a cold south wind.

Terrestrial radiation mean was 49·19 degrees, being +1·01 above the average of the previous eight years, though −·78 of a degree less than December 1863 had. The maximum was 56 degrees on the 9th; the minimum was 39·5 on the 4th and 14th; the range being 16·5 degrees, while November had a range of 24 degrees.

Rain-fall amounted to 3·92 inches, being +2·60 inches above the December average, or nearly three times as much. Nevertheless December 1863 had very nearly twice as much rain as the present month, but then it had the maximum rain-fall of 23 years. The rain-falls of the last five years' Decembers have been all exceptionally high The rain fell on 17 days of the month, being +5·12 days above the average of the previous nine years, and more numerous than any one of the nine. The greatest fall on any one day was 1·26 inches on the 27th, but from the 25th to the 30th inclusive, all wet days, the aggregate amount was 2·38 inches. This period was remarkably cold with boisterous southerly winds, and it is noteworthy that Saxby had noted the days, preceding and succeeding this period, that is, the 24th and 31st, as his bad days, both being fine, and the intervening days just the reverse. In December 1863 the period from the 13th to the 18th inclusive, was very wet, the rain-fall being 7·27 inches with a consequent flood. Because some of these days fell within the ample marge of his predictions, Lieutenant Saxby has plumed himself largely on the accuracy of his system,—the present month, however, ought to abate somewhat his self-gratulation. The water-courses and drains got a thorough cleansing this month. No snow was visible on Mount Wellington during the whole month. In 1863 it was observable until the 13th, when the summit became obscured, and continued so until the 20th, after which no snow could be seen.

Humidity mean was 74, being +7 above the 20 years' average.

Elastic force of vapor had a mean of 376, being +22 above the 20 years' average, but the maximum was not so high as in November by 73.

Spontaneous evaporation, notwithstanding so much windy weather, did not equal precipitation, being 3·17 inches.

Cloud mean was 6·90, being +1·44 above the 20 years' average, and higher than any one of the 23 years on record. It is also +·89 more than December 1863 had, though the rain-fall then was so much greater.

Ozone had the highest December mean on record, 8·12, as might be expected from the quarters from which the winds generally came, and the abundance of rain. Saturation was noted four times, and the lowest amount registered was 6 on the 9th and the 19th. Not a single death from any acute form of disease of the organs of respiration was registered.

Electricity was abundant, though far from equalling the previous month of November, either in the number or strength of its indications. Positive was recorded 13 times with maximum tension of 6; negative 37 times with the same maximum tension, both being one-third less strength than November had. *Nil* was recorded 13 times, but in November only thrice

The 36 deaths for this December is a smaller mortality than for any December of the previous seven years, and —11 1-7 less than the average of the whole, as the following table shows:—

Dec., 1864.	Ages.	Nov., 1864.	Decembers. 1863	1862	1861	Min. 1860	Max. 1859	1858	1857	Avg. 7 yrs. Decs. 1857–1863.
11	Under 1	4	3	13	9	10	14	7	15	10 1-7
1	1 to 5	2	4	5	4	3	12	7	7	5 5-7
4	5 to 20	6	4	3	3	4	2	3	3	3 1-7
7	20 to 45	12	6	15	10	7	15	14	6	10 6-7
8	45 to 60	9	11	8	9	8	13	5	7	8 4-7
5	60 and above	10	11	8	11	6	6	9	10	8 5-7
36		43	39	52	46	38	62	45	48	47 1-7

Under one year old, the deaths were a trifle above the seven years' average. Four out of the 11, however, were under 18 days old; and of the remainder, but one was above six months old. From 1 to 5 the deaths were not one-fifth of the average. All under 5 years of age were but one-third of the total deaths; the average for the seven years being considerably more than that proportion

At 5 to 20 years the deaths were also slightly above the average. In all the remaining groups the mortality was greatly below the average.

Dec., 1864.	Classes of Disease.	Nov., 1864.	Decembers. 1863	1862	1861	Min. 1860	Max. 1859	1858	1857	Avg. 7 yrs. Decs. 1857–1863.
9	1 Zymotic	1	9	9	7	8	12	9	11	9 2-7
7	2 Constitutional	11	6	9	8	3	7	6	8	6 5-7
15	3 Local	20	18	25	20	19	32	21	23	22 4-7
3	4 Developmental	6	4	4	7	4	4	3	5	4 3-7
2	5 Violent, &c.	5	2	5	4	4	7	6	1	4 1-7
36		43	39	52	46	38	62	45	48	47 1-7

Zymotic deaths were a trifle above the December average, though precisely the same in number that December 1863 had. Two were cases of *Croup* in children, aged 3 and 6 years respectively; one was a case of *Continued Fever* in a girl of 8 years old; the fourth was a case of *Pyæmia* in a man aged 51, brought to the hospital from a rural district in the interior of the island; the fifth was a case of *Diarrhœa* in a child eleven months old; the remaining four were registered as *Dysentery*, aged respectively nine weeks, four months, forty years, and fifty-six years.

Constitutional diseases caused a slight excess of deaths above the average. *Cancer* and *Scrofula* each caused one death, at the ages of 53 and 39 respectively. *Consumption* caused five deaths, two of the number of 16 and 17 years of age were born in Tasmania. December 1863 had only three deaths from consumption, none of them natives of the island. The deaths from *Local* diseases were nearly one-third less than the seven years' average, principally owing to the unusually small proportion of deaths from diseases of the organs of respiration (one only). December 1863 had three more in the total in this class. *Developmental* diseases caused a much smaller share of deaths than usual. Of the three, one was a *malformed* child, which only survived its birth eighteen days; both the others were from old age, 68 and 89 years old respectively. *Violent and accidental* deaths were less than half the average, though exactly the same in number as December 1863; one was the result of injuries caused by a cart running over him; the other was found drowned in a pond in the Queen's Park.

Inquests during the month were only 2, being one-half the number of December 1863. The deaths in *Hospital*, inclusive of one of the inquest cases, were 10. December 1863 had only 8. Only one death occurred at the Male Invalid Asylum, aged 65, and from chronic bronchitis, being the single case before alluded to from diseases of the organs of respiration. A death from disease of the brain was the only one in that establishment in December 1863 also. Of the 36 deaths this month, 23 were males, 13 females. Five died in the Glenorchy, and 1 in the Queenborough rural divisions of the Hobarton Registration District; 30 in the city. In the first week there died 8; in the second 7; in the third 12; in the fourth 7; in the last three days 2. The most fatal period of the month was the three days 18th to 20th inclusive, when 8 deaths took place. The meteorological peculiarities of these three days were:—The smallest wind movement of any three consecutive days in the month, the least amount of ozone and electricity, and a storm of rain, with thunder and lightning.

The *Births* registered were 66 being 14 more than were registered in December, 1863.

In the registration district of Hobart Town, having a total population of about 25,000 persons, there were altogether in the year 1864 568 deaths, being 19 4-7 less than the average of the previous seven years, though 21 more than 1863 had. Of these 124 were under one year of age, being 14 6-7 below the seven years' average; 67 were from 1 to 6 years old, being 20 5-7 less than the seven years' average; 44 were between 5 and 20 years of age, being 8 2-7 more than the average of the seven years; 113 were between 20 and 45 years old, being less than the average; 113 were between 45 and 60 years of age, being 15 3-7 more than the average; 107 were above 60 years old, (the oldest 102) being 5 2-7 more than the mean.

110 died from diseases in the *zymotic* class, being 17 4-7 less than the average of the seven years, 95 died from diseases in the *constitutional* class, being 4 1-7

more than the average; of these, 53 were registered as *pulmonary consumption*, being 2 less than in 1863, but 4 4-2 more than the average of the seven years. Less than one-fourth of these deaths in 1864 were Tasmanian born, *i.e.*, 13 out of the 53. The deaths in the *local class* were 266, being 6 1-7 less than the average. The *developmental* class had 69 deaths, being 13 3-7 more than the average. The greatest part of these deaths were from old age, 60 years and upwards to 102. In the fifth class, *violent* and *accidental*, the deaths were only 27, being 12 6-7 less than the average.

The total of registered *births* was 837, being 16 more than 1863 had.

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ERRATA.

Page 7.—Fifth line of last paragraph. For "exemption of Tasmanian youths," read "comparative exemption," &c.

Page 11.—Sixteenth line of third paragraph. Add an * after "impunity."

Page 14.—Meteorological Table for February, Minima Thermometer reading 1864. For "41.0," read "44.0."

Page 16.—First line, third paragraph. For "the deaths were 6," read "the deaths were 8."

Page 27.—First line of third paragraph. For "·75," read "75."

,, ,, —Table. For "Maximum March 1859," read "Maximum March 1858."

,, ,, —Third line, eighth paragraph. For "on five," read "on six."

Page 35.—First table. Omit dividing line between "Maximum" and "Aprils" and insert 1864 under "Maximum."

Page 55.—Time of Leafing, &c., of Plants, first line. For "aurautiaca," read "aurantiaca."

Page 65.—Third line of fifth paragraph. For "valuable night," read "valuable time."

Page 67.—First line of eighth paragraph. For "terestrial," read "terrestrial."

Page 68.—Second line of last paragraph. For "44 deaths," read "114 deaths,"

Page 72.—Line two and three of first paragraph. For crustacery insects and their larvæ, and other small insects," read crustaceans, insects and their larvæ, and other small species."

Page 98.—Under heading, "Good Pasture Lands," line 11. For "Pultenæia juniperina" read "Pultenæa juniperina."

Page 118.—Fifth line of sixth paragraph. For "1 to 6," read "1 to 5."

Page 119.—Second line. For "2 more," read "7 more."

MONTHLY NOTICES

OF

PAPERS AND PROCEEDINGS

OF THE

ROYAL SOCIETY

OF

TASMANIA.

1865.

HOBART TOWN:
PRINTED AT THE "MERCURY" STEAM PRESS OFFICE.

Contents.

ROYAL SOCIETY.

METEOROLOGY FOR JANUARY, 1865.

Private Observatory, Hobart Town.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced — Highest.	Bar. — Lowest.	Self-registering Thermometers — Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind — Direction from three daily registers.	Wind — Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	29·706	29·679	68	53	70	50·0	SE S	1·04	·18
2	29·991	29·845	64	47	105	43·0	SW	10·41	·22
3	30.175	30·158	64	48	101	47·0	W SE E	·52	
4	30·034	29·739	76	52	118	49·0	NW SW	1·04	
5	29·755	29·684	72	50	110	53·0	W NW SW	2.86	
6	29·882	29·837	74	50	112	49·0	NW	5·73	
7	29·987	29·976	69	55	98	50·0	E SE	1·04	
8	29 776	29·506	69	54	84	50 0	NW SE W	·78	
9	29·801	29·690	66	49	105	45·0	SW NE NW	3·38	.02
10	29·797	29·740	72	48	115	47·0	NW	10·41	
11	29·822	29·764	72	56	106	50·5	N SE W	·78	
12	30·015	29·970	67	49	107	45·0	NE SE SW	·78	
13	30·118	30·100	63	50	107	43·0	S SE E	1·04	·02
14	30·160	30·113	64	46	89	42·0	W E SE	·78	
15	30·079	29·992	70	51	115	48·0	SW SE	1·04	
16	29·930	29·606	73	46	122	43·0	W SE N	·52	
17	29·604	29·464	71	58	110	48·5	W N SW	3·38	
18	29·813	29·793	67	49	110	47·0	S E SE	1·04	
19	29·921	29·834	67	52	110	49·0	SW S	1·30	·02
20	30·008	29·960	68	43	112	40·5	NW SE	1·04	
21	29·803	29·585	72	43	112	45·5	NW SE SW	5·46	
22	29·660	29·590	67	51	81	48·0	SW W N	1·04	
23	29·744	29·558	71	55	99	51·0	N NW	3·38	
24	29·802	29·732	69	50	111	40·5	NW	1·30	·04
25	29·779	29·757	70	46	100	49·0	NW S	3.38	
26	30·086	30·029	65	52	78	50 0	SW S E	.26	
27	30·129	30·091	73	52	110	50·0	NE	·78	·06
28	29·949	29·846	76	57	115	53·0	NW SW	5·46	
29	30·049	30·030	72	52	107	50.0	S SE	·52	
30	30·008	29·747	78	53	120	48·5	NW E S	·78	
31	29·839	29·691	65	56	99.	48·0.	NE SW SE	·52	·07
								Total force 71·79 ·	

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 Guage. 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 sun-down.

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.

12th Veronica augustifolia in full flower.
16th First ripe Apricot gathered (Turkey).
19th Grevillea robusta in full flower.
20th First ripe Jargonelle Pear gathered.
24th Mulberries commencing to ripen.
25th Catalpa syringæfolia in flower.

Barometer mean, 29·855 inches, being 0·140 inches above the average.
Temperature mean, 59·53°, being 4·04° below the average.
Solar intensity mean, 104·45°, being 6·55° ditto.
Dew point mean, 49·5°, being 1·19° ditto.
Humidity mean, ·67, being ·01° ditto.
Elastic force of vapor 347°, being 033° ditto.
Total amount of rain, ·63 inches, being 0·87 inches below the average.
Mean amount of ozone 8·05, being 1·50 above theaverage.
Increase of spontaneous evaporation on condensation, 2·86 inches.
Electricity active on the 15th, 16th, 18th, 19th, 20th, 22nd, 23rd, 24th, and 31st.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR JANUARY, 1865, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

One thousand eight hundred and sixty-five has commenced with weather of an abnormal character, though so favorable to life, that the mortality for January is considerably less than the average for the previous eight years. Nevertheless, January 1864 had greatly the superiority in this respect, not only over all other Januaries, but in comparison with any month of the twelve in a year of the eight years now tabled. By the seven years' standard January stands next to February for being the most fatal to life of the months of a year.

Atmospheric pressure, though continuously high and in a constant state of oscillation, had no very extensive fluctuation on any day, and the whole range of the month was only ·711 of an inch, being considerably less than that of any January of the previous twenty-four years recorded. 1846 had the nearest approximation, but even its range was ·779 of an inch. 1857 had the widest range, being 1·492 inches. The mean of the present month was 29·855, being + ·140 above the twenty years' adopted standard mean for January. Last year the mean was almost identical with that of the twenty years. The extremes of the present month were—maximum, 30·175, on the 3rd; minimum, 29·464, on the 17th. Last year the maximum was nearly as high, but the minimum very much lower. In fact, there is not on record so high a minimum for January as that of the present month. The greatest movement of the barometer on any day was a fall of —·428 of an inch on the 8th. The greatest rise was + ·329 of an inch on the 18th. Altogether there were daily movements exceeding one-fifth of an inch only nine times.

Wind force, 71·79 lbs., though almost identical with the four years' average in Mr. Abbott's "Twenty Years' Meteorological Tables," is nevertheless —7·31 lbs. below the average of January for the last eight years. At the same time the present month had greatly the predominance in winds blowing from the quarters most propitious to health. The frequency and strength of the south-west winds is without parallel in the month of January. The strongest wind noted had a pressure to the square foot of 5·21 lbs., and was registered on the 2nd, 6th, and 10th, two of the three being N.W. and one S.W. The calms were only 13, being 4 4-7ths below the seven years' average.

Temperature mean, 59·53, was only a few decimals higher than that of the previous month of December, and—4·04 degrees lower than the 20 years' mean for January. It was also nearly two degrees less than January 1864 had. January 1853 had the lowest mean 57.67.—1852, 1860, 1849, were nearly the same as the present month, but no other January in the last twenty-four years has had a mean below 60 degrees. The 14 years' records at the Royal Observatory give a mean of 61·24 degrees, and with the six subsequent years, the mean is 63·57 degrees. By the self-registering maxima and minima thermometers, the mean of the present month is 60·11 degrees, a much smaller variation from the foregoing than is usual. The maximum temperature 78 degrees on the 30th, is the lowest in the past 24 years, and three degrees below the maximum of January last year. The minimum temperature was 43 degrees, and noted on the 20th and 21st. 1862 had as low a minimum, and 1857 1856, 1855 each one degree lower. The extreme range of temperature, 35 degrees, exceeded that of January 1864 by two degrees, but was less than any other January of the previous 24 years, The mean of all the maxima was 69·48 degrees, and of its minima 50·74.

The *daily range* of temperature had a mean of 18·74 degrees, being—1·90 less than that of the 20 years, though + 1.61 degrees higher than January 1864 had. To this more variable temperature of the present month is principally to be ascribed the difference in mortality between the two months. The greatest range on any day was, 29 degrees on the 21st, being two degrees above that of last year's January. The smallest range was 9 degrees on the 30th.

Solar-Intensity had a mean of 104·45 degrees, being more than three degrees below January 1864, and—5.77 less than the mean of nine years. The maximum, 122 degrees, was on the 16th, and one degree less than that of last year. The minimum was 70 degrees on the 1st.

Terrestrial Radiation mean was 47·51 degrees, being —4·15 degrees below the mean of the previous nine years, and less than any one of them. The maximum was 53, on the 5th and 28th, and the minimum 40·5 on the 20th and 24th. Both were three to four degrees less than the corresponding observations in January last year.

The *rain fall* was —·87 of an inch below the 20 years' average, being only ·63 of an inch; and the greater part of this, even, fell upon the first day of the month, after which there were mere sprinkling showers, insufficient to cause a flow in the surface channels. For January last year, though the total fall was but slightly more than that of the present month, yet it was distributed more beneficially for health purposes there being a sufficient deposit on the 24th day of the month to flush the drainage channels. Both months were preceded by copious falls in the preceding months of December. The wet days of the present month were 8, being only —·70 below the average of the previous eight years. *Snow* never appeared on Mount Wellington during this month.

Humidity had the mean of 67, being—1 less than the 20 years' average.

Elastic-force of vapour mean was 247 being —33 below the 20 years' mean.

Spontaneous Evaporation amounted to 3·49 inches. January 1864 had nearly twice as much.

Cloud mean, 6·75 is + 1·01 above the 20 years' mean. Only three years out of the 24 recorded, had so cloudy a January as this.

Ozone was more abundant than ever before registered for the month of January, having a mean of 8·05, or + 1·18 more than the average of the previous eight years. The strong and numerous breezes from the ocean quarters together with the electrical condition of the atmosphere, no doubt effected this purifying result, notwithstanding the paucity of rain.

Electricity had 16 positive indications, with a maximum tension of 6, being in both respects inferior to January 1864.—On the other hand the 45 records of negative with maximum tension of 9,— far exceeded the corresponding amount last year. There was only one "nil" registered, that is at the 1 p.m. observation on the 1st, when there was much rain, but little wind, with cold gloomy weather. No *lightning* was observed during the month, but *thunder* was heard, early in the morning of the 28th.

The 41 *deaths* for the month of January 1865, as the following table shows, is —$12\frac{7}{8}$ less than the average of the previous eight years, though + 17 more than January 1864 had; but the latter month was quite exceptional, having the smallest mortality of any month of the twelve in any of the last eight years. Both Decembers, too, had a death rate below the average.

Jan., 1865.	Ages.	Dec., 1864.	Januaries. Min. 1864	1863	1862	1861	1860	1859	Max. 1858	1857	Avg. 8 yrs. Jans. 1857–1864.
10	Under 1	11	2	9	19	12	28	17	32	27	18 2-8
1	1 to 5	1	2	11	13	3	7	9	10	5	7 4-8
2	5 to 20	4	2	4	0	2	7	3	3	1	2 6-8
7	20 to 45	7	5	6	8	12	16	16	14	12	11 1-8
11	45 to 60	8	6	6	8	8	5	8	7	10	7 2-8
10	60 and above	5	7	9	7	8	9	3	8	5	7
41		36	24	45	55	45	72	56	74	60	53 7-8

In all the groups of ages under 45, the deaths were considerably below the average of the previous eight years. At all ages above 45, the deaths were one third more than the average, and greater than in any year in the table. The oldest was aged 82 years. In every group, but that from "1 to 5" years of age, the deaths were more numerous than in January 1864. The deaths under five years of age were little more than one fourth of the total of all ages, while the 8 years' average is not far short of one half. Every January, except that of 1864, had more deaths under five years old than the present month. With the annually increasing diminution in the average age of the population as a whole the foregoing fact affords the very strongest proof of the favorable meteorological conditions to health, existing during the month. Another important fact is deducible from the table, *i.e.*, that while the total deaths for each year, since 1861, has been diminishing, those above 45 years of age have scarcely varied, indeed in the present month increased. This arises from the departure from the colony of so many healthy adults in the prime of life, leaving the infirm and aged behind.

Jan., 1865	Classes of Disease	Dec., 1864	Januaries. Min.							Max.	Average of 8 years Januaries, 1857-1864.
			1864	1863	1862	1861	1860	1859	1858	1857	
10	1. Zymotic	9	9	15	24	11	24	13	17	11	14 6-8
3	2. Constitutional	7	7	9	4	1	7	7	8	7	6 2-8
24	3. Local	15	15	15	22	27	26	30	32	32	24 2-8
4	4. Developmental	3	3	2	3	2	12	5	14	7	6
0	5. Violent	2	2	4	2	4	3	1	3	3	2 5-8
41		36	36	45	55	45	72	56	74	60	53 7-8

The *Zymotic* class of deaths was considerably below the average, and less than any year of the eight, except 1864. The ten deaths were : from diphtheria 1; puerperal-fever 1; dysentery 2; diarrhœa 4; (all the two last being children at and under twelve months old :) delirium tremens 2. The latter disease is very rarely registered thus, but gets recorded under other of its phases.

The *Constitutional* class had less than half of its death average. Two of the cases were registered consumption, one of the two, a man of 28, being born in Tasmania. The *Local* class had very nearly the average proportion of deaths, but 14 more than 1864 had. A comparative contrast, therefore, between these two will be instructive. In the 1st order, "diseases of the brain and nervous system," this year had 7 deaths, 1864 had only 3, all from apoplexy; while this year's were, apoplexy 2; epilepsy 1; convulsions 2 (both under three weeks old); brain disease 2. The 2nd order, "diseases of the heart and organs of circulation" 4; 1864 had 3. The 3rd class "diseases of the lungs and organs of respiration" (excluding consumption) 5; 1864 had not any. I before remarked that the colder and more variable temperature of the present month would account in a great measure for its excess of deaths over last January: in these diseases, it is in part exemplified, though the effect was comparatively small in the general population, the youngest of these persons being 47, and the oldest 72 years old. In the 4th order "diseases of the organs of digestion," 5 died; 1864 had 4. In the 5th order, "diseases of the urinary organs," the deaths were two this year, but not any last. The 6th order, "diseases of the organs of reproduction," 1865 one, 1864 none. The *Developmental Class* had one-third less than the average; of the four deaths, three were under two months old. No deaths in the class "Violent, &c,," took place, though the January average is $2\frac{5}{8}$, and January last year had one. There was but one inquest on a death in this month, a man of 65 in the gaol, who died suddenly from the bursting of aneurism of the aorta. No inquests were held in January 1864. In the Public Hospital 10 deaths took place; 1864 had only 8. At the Male Invalid Asylum two deaths occurred, aged respectively 62 and 72; January 1864 had only one. Of the 41 deaths this month, 22 were males, 19 females. In the Glenorchy and Queenborough divisions of the district, 8 died, the rest in the city. The former is an unusually large proportion of the whole. In the first week of the month there died 8; in the second, 6; in the third, 12; in the fourth, 7; in the last three days, 8. The greatest number on any two consecutive days was 6, on the 20th and 21st, already alluded to for the low temperature; but for three successive days, the heaviest mortality was on the three last days of the month, 8. The hottest day of the month, was the 30th, and on these three days the ærial movement was less than the average of any other three in the month.

The *births* registered were 68, being one more than January 1864 had.

The "Vital Statistics" of all Tasmania, for 1864, were of a more hopeful character than those of the preceding year.

The registered *births* were 3,031, being 33 more than 1863 had.

While 1863 had a balance against the colony, in "departures," of 6 males, 337 females, 146 children, above "arrivals"; 1864 had 666 more "arrivals" than "departures" of adult males; though 189 less adult females, and 287 less children; the actual total numerical surplus of "arrivals" over "departures" being 190 Since the census of 1861 until the year under review, though the actual number of the total population has annually increased, it has been by the births so greatly exceeding the deaths, the proportion of the former being nearly $2\frac{1}{4}$ to one of the latter

The total *deaths* in all Tasmania for 1864 was 1,435; which, on a computed estimate of the population at 95,000 persons (including a calculated number of unregistered births) gives a death rate but slightly exceeding 15 in the 1,000; being nearly one-quarter per thousand less than 1863 had, and less than that of any previous year. The rate of 15 per 1,000, is the minimum rate of the healthiest districts in England and Wales. The whole rural death rate of Tasmania, after excluding Hobart city and Launceston, is very much lower than the minimum rate of England and Wales. In 1863, it was only $10\frac{3}{4}$ per 1,000, and for 1864, though the population has increased, the actual number of rural deaths only exceeded the former year by 2; Hobart city exceeded it by 29, while Launceston had absolutely 16 less. No data exist by which the 1,883 increase in the population of 1864 over 1863, can be duly apportioned to the towns and country respectively, but I conclude that Hobarton has had, if any, smaller share of it than Launceston and the country districts. When Hobarton and Launceston shall have done all that modern sanitary science dictates to be requisite for the reduction of unnecessary deaths in town populations, the Tasmanian rate will become marvellously small. Every advancing year, since transportation ceased, and immigration became reduced, tends to prove that, as the island-born population increases its numerical proportion to that of the imported inhabitants, so does the death-rate diminish. By the ordinary laws of mortality it ought to be otherwise, for wherever the infantile element of the population is above the normal state it is usual to have a higher death rate. The interesting fact alluded to shows that the real salubrity of the Tasmanian climate—much as it has been lauded—has hitherto been understated by most writers on the subject.

It is greatly to be regretted, that in the admirable and instructive "*Statistical, Sanitary, and Medical Reports*," now annually emanating from the *Army Medical Department*, Tasmania should be grouped with continental Australia. In the last "report" published, 1862, it is said (page 108,) by Dr. Graham Balfour, (and his name gives a weight to the statement which those only well versed in Med cal statistics can appreciate,) that "cases and deaths among the military from *tubercular diseases* is very high, and would seem to indicate, that the climate of the Australian colonies is not well suited to persons having a tendency to these diseases." For a long series of years I have been storing and publishing facts to show that in the civil population of Tasmania the data proves the climate of Tasmania to be supereminently "well suited" to avert the tubercular diathesis. Only one person belonging to the military, a sergeant of the 12th Regiment, aged 28, died from consumption in Tasmania in 1862. He had been left behind, as unfit for service, when the greater part of the troops left this island for New Zealand.

ROYAL SOCIETY.

METEOROLOGY FOR FEBRUARY, 1865.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced: Highest.	Bar. 37 feet abv. sea level, cor. & reduced: Lowest.	Self-registering Thermometers: Highest in shade.	Self-registering Thermometers: Lowest in shade.	Self-registering Thermometers: Highest in sun.	Self-registering Thermometers: Lowest on grass.	Wind: Direction from three daily registers.	Wind: Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	29·945	29·910	68	44	100·0	41·0	NW SE S	·52	0·06
2	29·821	29·574	70	57	104·0	56·0	NE SE SE	·78	0.67
3	29·222	29·099	66	54	78·0	49·0	SW NW SW	2.60	0·02
4	29·575	29·451	63	45	100·0	40·0	SW NW	8·33	
5	29·725	29·706	69	45	114·0	42·0	NW	·52	0·19
6	29 704	29·322	68	55	110·0	51·0	NW N	5·20	
7	29·507	29·290	64	48	88·0	46·0	NW NE N	1·04	0·15
8	29·958	29·758	62	43	101·o	39·0	NE W NW	3·12	0·05
9	29·960	29·818	69	48	109·0	45·5	NW W	1·04	0·73
10	30·132	30·067	72	49	118·0	46·0	NSW NW	·78	
11	30·295	30·289	69	46	113·0	44·0	NW SE S	1·04	
12	30·258	30·140	78	51	122·0	50 5	NW N SE	·78	
13	30·129	30·086	78	53	120·0	50·5	SE	.26	
14	30·063	29·889	78	57	120·0	53·0	W SE E	·26	0·03
15	29·707	29·644	74	60	90·0	58·0	NE NW SE	1·04	0·02
16	29·633	29·556	70	56	112·0	50.0	NS W W	·78	0·90
17	29·774	29·635	67	52	89·0	49·0	NW SE	·52	0·19
18	29·871	29·844	63	45	103·0	45·0	N SE	·78	0·10
19	29·971	29·892	62	48	92·0	45·5	SE NE SW	0·	
20	30·132	30·093	65	52	111·0	52·0	N SE S	·78	
21	30·069	29·955	72	50	118·0	46·0	N SE	·52	
22	29·912	29·686	79	53	120·0	50·0	N NW SE	1·04	
23	29·762	29·755	74	56	115·0	53·0	SW SE SW	1·04	
24	29·710	29·702	71	56	107·0	51·0	NW W	1·04	
25	29·857	29·756	68	55	97·0	50·0	NW NW	1·30	0·02
26	29·954	29·908	70	48	108·0	44·0	NW SE SW	3.12	
27	29·724	29·443	76	55	110·5	54·0	N NW N	·52	0·24
28	29·849	29·567	71	57	114·0	51·0	N NW	5·46	0·22
							Total force 44·21lbs.		

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

The direction of the wind is registered from currents moving at the height of 192 feet, and the force according to Lind's Wind Guage. 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 sun-down.

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 :—

7th. Kerry Pippin Apple commencing to ripen.
9th. Windsor Pear commencing to ripen.
14th. Bon Chretien Pear commencing to ripen.
15th. Green Gage commencing to ripen.
24th. Ash commencing to shed seed.
27th. Sycamore commencing to shed seed.

Barometer mean, 29·801 inches, being 0·049 inches below the average.
Temperature mean, 60·74°, being 1·79° below the average.
Solar intensity mean, 106·55°, being 2·45° ditto.
Dew point mean, 51·7°, being 1·49° above ditto.
Humidity mean, ·74, being 3·5 *per cent.* ditto.
Elastic force of vapor 393°, being ·020 *per cent.* below ditto.
Total amount of rain, 2·94 inches, being 1·47 inches above the average.
Mean amount of ozone 7·81, being 0·94, chromatic scale, above the average.
Increase of spontaneous evaporation on rain-fall 0·80 inches.
Electricity active on the 1st, 4th, 5th, 7th, 8th, 9th, 10th, 11th, and 28th.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR FEBRUARY, 1865, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

Though some of the meteorological phenomena this month were inimical to health and life, yet others were so propitious, that the general result was favorable, and the mortuary record is, therefore, considerably below the 8 yrs.' average.

Atmospheric pressure had the widest range this month, 1·196 inches, of any February in the previous 24 years, except February 1846, when it was 1·270 inches. The extremes were only eight days apart, the minimum, 29·099, being noted on the 3rd, and the maximum, 30·295, on the 11th. The greatest movement on any day was a fall of —·584 of an inch on the 3rd; and the greatest rise was + ·532 on the 8th: other fluctuations, exceeding one-fifth of an inch, occurred eight times. Though the daily variations of pressure were so incessant, yet the month's mean, 29·801, only differs from that of the 20 years, by being —·049 below it. As usual this perturbed state of atmospheric pressure had a very fatal effect on aged and diseased persons.

Wind-force total for the month, was only 44·21 lbs., 14·40 less than the average of the previous eight years. The calms were 19, being +12-7 more than the mean of the seven years preceding. North-west winds were more than usually prevalent, but of so gentle a character that the force was considerably below the average. On the other hand, north winds were fewer in number, but stronger in force than usual. South-east, the most auspicious wind for health, was greatly below the mean, both in frequency and force. In some measure this was compensated for by south-west and west winds being above the average, both in frequency and force. The strongest wind of the month had 5·21 lbs. pressure to the square foot, but was only recorded once, *i.e.*, at 7 a.m. on the 4th, the direction being from the south. west.

Temperature by three daily observations had a mean of 60·74 degrees, which is 1·79 degrees less than the 20 years' average for February, though only differing from February last year, by +·37 of a degree It is remarkable that the mean for the self-registering maxima and minima thermometers, was below the foregoing, being only 60·61 degrees. Never before has such a disparity been recorded, the usual fact being an excess of about one degree for the mean of the self-registering, over that of the observed thermometers. The maximum temperature of the month was only 79 degrees on the 22nd, which is the lowest maximum for February in the last 24 years, with the exception of 1853, when it was only 77·80. The highest ever recorded in this month was 100 degrees, in 1847. Thirteen other years have had maxima between 90 and 100 degrees. The minimum of the present month was 43 degrees on the 8th, which is not remarkable. The month's range, therefore, was only 36 degrees; 1861 had one degree less, but all the other 9 of the previous 10 yrs., ranged from 43 to 53 degrees.

Daily range of temperature had a mean 1·89 degrees below that of the 20 years, being only 18·50 degrees, and varying from that of February 1864, by only +·30 of a degree more. The greatest range was 27 degrees on the12th, and the smallest, 12 degrees, on the 3rd. Except in 1861, when the maximum range was one degree less, no other year since 1853 had so small a maximum. The highest was 51 degrees in February 1856. So equably cool a temperature for this usually hot summer month, numerically the most fatal to life of any month of the twelve, though having the smallest number of days, was most propitious to health and life.

The *Solar Thermometer* had a mean of 106·55 degrees, being —1·47 degrees less than the average of the previous 9 years, and —1·58 less than last year. The maximum record was on the 12th, being 122 degrees. Last years was higher by seven degrees; and out of theprevious ten years, seven others greatly exceeded that of the present month; 1857 having the maximum,—143 degrees. The minimum record of the present month was 78 on the 3rd.

Terrestrial radiation mean, was 48·28 degrees, being—1·33 below the average of the previous nine years, and —·82 less than 1864 had. With such a number of wet days, and so high a cloud mean, so low a mean for this thermometer is very unusual, and indicates clear nights. The extremes were, 39 degrees on the 8th, 58 degrees on the 15th.

Rain fell to the aggregate amount of, 2·94 inches, being exactly double the February average of 20 years. 15 days were recorded wet, being twice as many as the average of the previous ten years. On the 3rd, 6th, 16th, 17th, 27th, 28th, it was copious enough to flush the surface drains. At daylight on the morning of the 8th *snow* was visible on Mount Wellington, but it speedily disappeared. So much rain equally distributed throughout the month, and precipitated at a moderate rate, had a very purifying effect on the atmosphere, and obviated much of the evil arising from want of aerial movement.

Spontaneous evaporation amounted to 3·74 inches.

Elastic force of Vapour had a mean of 393, being +20 above that of the 20 years; rather an anomalous result, considering the condition of other of the meteorological phenomena. It was also + ·30 higher than February 1864 had.

Humidity mean was ·74, being + 3½ higher, than the 20 years' average, and + 5 above 1864.

Cloud mean was, 6·50, being + ·81 more than the February average of 20 years, and + 1·58 more than February 1864.

Ozone mean was, 7·81, being + ·91 above the average of the previous seven years, and only exceeded by that of 1863. The maximum was, 9·5 on the 28th, the minimum 5·5 on the 3rd.

Electricity had only three positive indications, with maximum tension of 4. The negatives were, 42, with maximum tension of 7; nil was recorded 11 times. *No lightning* was seen; but mutterings of *thunder* were heard on the evening of the 16th. The *Southern lights* were strong on the evening of the 18th.

The 53 *deaths* for February 1865, is − 7 2-8ths below the eight years' average for this month; but last year, and 1861 were both numerically smaller as the table following exhibits :—

Feb., 1865.	Ages.	Jan., 1865.	Februaries. 1864	1863	1862	1861	1860	1859	1858	1857	Avg. 8 yrs. Febs. 1857–1864.
15	Under 1	10	10	25	21	8	22	31	34	19	21 2-8
5	1 to 5	1	4	9	9	10	13	11	16	5	9 5-8
2	5 to 20	2	1	2	1	2	3	2	1	1	1 5-8
7	20 to 45	7	11	12	8	3	10	18	8	10	10
9	45 to 60	11	8	5	11	8	14	5	5	8	8
15	60 and above	10	13	16	8	11	5	8	6	11	9 6-8
53		41	47	69	58	42	67	75	70	54	60 2-8

In every group of ages below "45 to 60," it will be perceived that the deaths were less than the eight years' mean; except at from "5 to 20," which had a small excess. The average was also slightly exceeded at, from "45 to 60;" but the principal excess fell upon old people at "all ages above 60." The fluctuations of atmospheric pressure, as already alluded to, was the phenomenon principally accountable for this. At all ages below five years, the deaths were not quite two-thirds of the 8 years' average, though the month of February is usually the most fatal of all the months of the year, to children of that age. Nine of the 15 deaths in the last group, were above the "three score and ten" the Royal Psalmist gives for the normal duration of the life of man; three were respectively aged 81, 84, 85, being one-half of the deaths at the Male Invalid Asylum at the Brickfields; the other three being 70, 74, 76. In February, 1864, only one man died in that establishment, aged 73.

Feb., 1865	Classes of Disease	Jan., 1865	Februaries. Min. 1864	1863	1862	1861	1860	1859	1858	Max. 1857	Average of 8 years Februaries, 1857-1864.
11	1. Zymotic	10	3	28	27	14	19	29	30	7	19 5-8
11	2. Constitutional	3	8	14	9	8	13	8	6	6	9
20	3. Local	24	27	17	15	14	28	28	27	32	23 4-8
8	4. Developmental	4	8	7	5	2	3	6	5	7	5 3-8
3	5. Violent, &c.	0	1	3	2	4	4	4	2	2	2 6-8
53		41	47	69	58	42	67	75	70	54	60 2-8

The deaths in the *Zymotic class* of diseases were little more than half of the eight years' mean, but considerably less than any year of the eight, except the first and the last. 1864 having little more than one-fourth of the number in the present year. The diseases causing death were scarlet fever, 1; croup, 1; puerperal fever, &c., 1; a woman who died the day after she was brought to town, from a rural district on the sea coast, and, therefore, not fairly to be calculated as a death in the Hobarton Registration District; the remaining 8 were different phases of bowel complaint, usually so fatal at this period of the year, but from which the community has suffered so little during the last and present summer. February, 1864, had only three deaths in the zymotic class, being one from scarlet fever, and two from diarrhœa.

The deaths in the *Constitutional class* were above the eight years' average, and only exceeded by two years out of the eight; 2 were from cancer; 3 from hydrocephalus; 6 from consumption, of which one youth, 19 years old, was a Tasmanian by birth. In February 1864, the consumptive deaths were only 4.

The *Local class* of deaths had less than the eight years' average, though two of the orders in this class had more than the usual number of deaths, attributable mainly to the variations in atmospheric pressure. The first order "Diseases *of the Brain and nervous system*" had 6 deaths; the second order "Diseases of the *Heart and circulatory system*, had also six deaths, only one being below 60 years old. The *Lungs and respiratory system* had only 3 deaths, notwithstanding the coldness of the month, to which common belief, ordinarily but erroneously, attaches so much mischief to health. None of the other orders had deaths requiring special notice, either from their number or peculiarity.

The *Developmental class*, had the same number of deaths in February 1864, being more numerous than any of the other 7 years—5 were from *old age;* all but one, being 75 years old and upwards. Three were from *atrophy*, under three months old. Last year the numbers from the foregoing were 3 and 2 respectively, the other 3 being connected with *child-birth*.

The *Violent and accidental* class, had a fraction more than the eight years' average under this division. Two of the three were, *fractures of the spine* in men each aged 50; one arose from the kick of a horse which caused immediate death; the other was caused by being thrown out of a cart, and was brought to the City Hospital from a rural district on the other side of the Derwent. The third was a boy *drowned*. One death only in this class occurred in February 1861, being caused by a crush between a dray and a tree.

The *Inquest* deaths this month, were 3. February 1864 had only 2. The deaths in *Hospital* were 15, including one of the inquest cases. Seven of the number were brought to Hospital from other districts, a proportion of the whole, far greater than has ever before been recorded. February 1864 had two less deaths, and only three of them were from country districts.

Of the 53 deaths, 36 were males, 17 females, the latter being much below the ordinary proportion. Two only of the deaths took place beyond the city boundaries, that is, considering the Male Invalid Asylum as within the latter.

In the first week, 13 died; in the second, 14; in the third, 8; in the fourth, 18. On any two days consecutively, the greatest number of deaths was 7, on the 13th and 14th. On the 3rd, 10th, 17th and 10th, no deaths occurred.

The *Births* registered were 67, being 10 less than February 1864 had.

ROYAL SOCIETY.

The monthly evening meeting of the Society (being the first of the session of 1865) was held at the Museum, Macquarie-street, on Tuesday, the 14th March, J. Barnard, Esq., in the chair.

The following gentlemen, having been previously nominated by the Council, were duly elected Fellows of the Society—Messrs. A. G. Webster and W. J. Bellette.

The SECRETARY (Dr. Agnew) laid on the table the following returns:—

1. Visitors to Museum during February, 541.
2. Ditto to Gardens ditto, 2,203.
3. Seeds received at Gardens.
4. Plants sent from Gardens—To A. Verschaffelt, Ghent, Belgium, two large Tree Ferns.
5. Books and Periodicals received during January and February.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.
   (*a*) Monthly Tables for November and December, 1864; January and February, 1865.
   (*b*) Summary and Analysis of Observations for February.
2. Port Arthur, from J. Boyd, Esq.
   (*a*) Monthly Tables for November and December, 1864; January and February, 1865.
   (*b*) Reading of Schooner's Barometer for ditto.
   (*c*) Summary of Observations taken during 1864.
3. Swansea, from Dr. Story.
   (*a*) Tables for November and December, 1864; January and February, 1865.
4. Tamar Heads, from R. Henry, Esq.
   (*a*) Tables for November and December, 1864; January and February, 1865.

A letter from A. J. Ogilvy, Esq., was read, enclosing a table showing the rainfall in the district of Richmond for the years 1863 and 1864. In 1863 December was the month in which most rain fell. The total amount was 24·2 inches. In 1864 July was the wettest month, showing a fall of 5·55 inches, and December was next, with a fall of 4·85 inches. Total for the year, 26·10 inches.

The SECRETARY also read the usual analysis of the Hobart Town observations, together with the Health Report for the month, by E. Swarbreck Hall, Esq.

The following presentations to the Museum were brought under the notice of the meeting:—

1. From Mr. O. H. Hedberg. An exploded whaling bomb lance, shewing its destructive action. (These bombs are fired from a short and very heavy musket, and strike with accuracy and effect.) Also two harpoons, one broken, and the other twisted in a remarkable manner, in an encounter with a whale.
2. From G. H. Anderson, Bridgewater. Three limestone fossils.
3. From R. P. Adams, Esq. A specimen of slate, from the River Mersey, with a letter.
4. From the Marine Board, Hobart Town. Specimens of Teredo navalis, and wood bored by the same.
5. From Mr. E. Lipscombe. Twenty coins and tokens.
6. From H. D. Addison, Esq. Three rupees, 2 Belgian cents, 1 do 2 cents, 1 Helvetian coin, and 1 silver coin (20 cents) of Republic of France, 1850.
7. From—Owen, Esq., per Morton Allport, Esq. A fine collection of Silurian fossils, from England.
8. From Mr. Barlow, Swansea. Seeds of grape (a cross between the Black Hamburgh and the Chasselas Musk) from the garden of Mr. Thos. Rivers, Sawbridgeworth, England.
9. From A. Nicholas, Esq. Two shells of the Nautilus Pompilius, and two of the Pearl Oyster.
10. From Mr. S. Clifford. Photographic view of Museum building;

11. From Mr. W. J. Bellette. Specimens of the Bittern *(Botaraus Australis* Spotted Owl *(Athene maculata)* and Spine-tailed Swift *(Acanthylis caudacuta)*.
12. From M. Allport, Esq. A White Hawk *(Astur Novæ Hollandiæ)*
13. From Mr. Roblin. A Brown Hawk *(Ieracidea berigiora)*.
14. From Mr. Caville. A Ground Parrakeet *(Pezoporus formosus)*.
15. From Mr. G. Whitcomb. Specimens of limestone and iron ore, from the neighborhood of the Mersey River (with a letter).
16. From Dr. Milligan, London. Pennant's Arctic Zoology, 3 vols. quarto; Voyages to the South Pacific Ocean in 1786-7-8, 1 vol. quarto; Salmon Fisheries Report, Ireland, 1857; ditto, 1860; ditto, 1862; ditto, England and Wales, 1861; ditto, maps; ditto, 1864; ditto, Scotland, 1860; ditto, 1864; Report on British Fisheries, 1861; Bill for Regulation of ditto, 1861.

Two parcels of dried plants, named, collected in various parts of Italy, supplied from the Royal Museum at Florence.

Seven specimens of lava, &c., from Mount Vesuvius, Naples; 1 ditto from the crater of Solfatara, 2 Roman lamps from ancient funereal urns, 3 fragments of Mosaic pavement from Rome, 1 Roman discobolus or quoit (ancient), 1 parcel of frgaments of ancient Roman glass from the Palace of the Cæsars, Rome; 1 parcel of fragments of glass pottery, and enamel ware, from ancient ruins in Rome; 3 parcels of fragments of marble from ditto, 1 parcel of cubes for Mosaic work from the Palace of the Cæsars, 1 fragment of Jaune antique from ruins of ditto, 1 do of Rosso antico from do, 1 Lachrymatory from Palace of the Cæsars, 1 fragment of serpentine from do, 2 parcels of Mosaic cubes from Mount Testacea, Rome; 1 do do from Garden of Sallust, do; 1 do do from the Mausoleum of Augustus, in Rome; Mosaic cubes from Baths of Diocletian, do; do do from Baths of Caracalla, do; 1 piece of Carara marble from Baths of Diocletian, do; 1 do Rosso antico from do; 1 do Porphyry from Baths of Titus, Rome; Mosaic cubes from the half-submerged Temple of Mercury, at Baia; 15 ancient coins from Rome; 1 parcel Roman buttons, so-called, and said to have been used for fastening the toga upon the shoulder; ancient needle and pin obtained at the ruins of the Roman Amphitheatre, at Arles; a parcel of seeds from Rome.

Four parcels from Royal Horticultural Society's Gardens, London, containing 38 varieties of vegetable seeds.

17. From the Smithsonian Institution, Washington, United States. Smithsonian Report for 1861, Smithsonian Contributions to Knowledge, vol. 13, 1864, Miscellaneous Collections, vols. 1, 2, 3, 4, 5, 1862-4.
18. From the United States Government. Introductory Report of Commissioners of Patents, Patent Office Reports, 1860, vols. 1, 2, (Mechanics,) 1861, vols. 1, 2, and 1 vol. Agriculture 5 vols. (bound).
19. From the Boston (U.S.) Society of Natural History. Boston Journal of Natural History, No. 2, 1861, No. 3, 1862, No. 4, 1863, Proceedings of the Society, vol. 9, Constitution and Bye-laws.
20. From the Museum of Comparative Zoology, Boston, Annual Report for 1836.
21. From the author, Lieut.-Col. J. D. Graham, United States Topographical Engineers. Reports on Lake Harbor Improvements, 1857, 1858, 1860, Report on Mason and Dixon's Line, Chicago, 1862.
22. From the American Academy of Arts and Sciences. Proceedings, 1863.

In reference to presentation No. 3, extracts were read from a letter which accompanied it, wherein Mr. Adams states that the specimen was taken by himself from a locality on the banks of the Mersey, about sixteen miles distant from the township of Deloraine. Any quantity could easily be obtained, and there is a good bush road within a mile and a half. The cleavage is vertical. (In the opinion of a practical builder this slate promises well to be valuable, although taken from the surface the quality of the specimen is very good, and probably were a quarry opened it would be found to be still finer at greater depths.)

A letter which had been received with presentation No. 15 was also read, wherein the donor states that the limestone is so plentiful that it can be "quarried the same as any other stone," and he was informed that the ore was "in equal abundance." The specimens were carefully examined by the Fellows present, and it was evident that the ore was extremely rich in iron. The juxtaposition of the ore and limestone is so important in enhancing the value of each in a manufacturing point of view, that it is to be hoped further action will soon be taken in order to determine if smelting on an extensive scale might not be undertaken with profit to the proprietors, and advantage to the colony.

The very valuable presentation from Dr. Milligan—to whom the Society owes a still increasing debt for the conspicuous zeal and liberality which he has on many occasions exercised in its behalf since his departure from the colony—excited particular notice. Many of the objects were of peculiar interest, such as the ancient Roman quoit, the funereal lamps, the Mosaic work, coins, &c.

In reply to a question, the Secretary observed that the geological specimens sent for from home according to the list furnished by Mr. Gould, were expected in the course of two or three months, and when our present collection was supplemented by these the whole would afford a tolerably complete and systematic means of instruction for the student of geology,

A paper on the "Frogs of Australia," by G. Krefft, Esq. (the zealous naturalist of the Sydney Museum), was read by the Secretary.

In Mr. Abbott's absence, his "Observations on Comet 1, of 1865" were read; and also further notes by the same observer on the star η Argus and its Nebula.

The thanks of the meeting on the motion of Mr. W. Johnston, seconded by Mr. Bilton, were accorded to the donors of presentations, and the authors of the papers just read. It was felt that this compliment was due in an especial degree to Mr. Krefft, who, although but recently elected a corresponding member of the Society, had already favored it with a communication of such scientific interest that it was hoped it would prove a precursor of many others from the same pen.

The proceedings then terminated.

THE FROGS OF AUSTRALIA.

By Gerard Kreft.

BATRACHIA SALIENTIA.

A. Aglossa.

Aglossa diplosiphona.

Fam. Myobatrachidæ.

Myobatrachus (Schleg.)

Myobatrachus paradoxus (Schleg.) Swan River.

B. Ophistoglossa.

Ophistoglossa oxydactyla.

Fam. Ranidæ.

Myxophyes (Gthr).

Myxophyes fasciolatus (Gthr). The geographical range of this new genus appears to extend much further than I suspected, as Mr. George Masters has lately discovered a fine large specimen near Kiama, Illawarra district. It is singular that this frog should occur on the Clarence and Richmond, and at Illawarra, without being ever observed near Sydney.

Fam. Cystignathidæ.

Cystignathus (Wagl.).

Cystignathus Georgianus (D. and B.). King George's Sound and South Australia.

Pterophrynus (Peters). Sydney, Illawarra, Queensland.

Pterophrynus affinis (Gunther). This new species is described by Dr. Gunther in the Proceedings of the Zoological Society, 1864, page 47. Habitat, Western Australia.

Pterophrynus Tasmaniensis (Gthr). Proceedings Zoological Society, 1864, page 48. Habitat, Tasmania.

Pterophrynus lævis (Gthr). Proceedings Zoological Society, 1864, page 48. Habitat, Tasmania.

Limnodynastes (Fitzinger).

Limnodynastes dorsalis (Gray). Australia generally. This species has been observed at Swan Hill, South Australia, and on the east coast from Cape Howe to Port Denison.

Limnodynastes Bibronii (Peters). South Australia. The Australian Museum collection contains specimens of this frog captured at Dabbee, Ryalstone, New South Wales.

Limnodynastes Tasmaniensis (Gthr.) This is a very common form, widely distributed over Tasmania and the southern portions of Australia.

Limnodynastes affinis (Gthr.) Clarence River.

Limnodynastes Krefftii (Gthr.) Common near Sydney and the southern portion of Australia.

Limnodynastes ornatus (Gray). Common on the north-east coast of Australia, in particular near Port Denison.

Neobatrachus (Peters).
Neobatrachus fictus (Peters). South Australia.

Platyplectrum (Gthr.)
Platyplectrum marmoratum (Gthr.) Clarence River.

Fam. DISCOGLOSSIDÆ.

Chiroleptes (Gthr.)
Chiroleptes Australis (Gthr.) North-east and north coast, common near Port Denison.

Fam. ASTEROPHRYDIDÆ.

Cryptotis (Gthr.)
Cryptotis brevis (Gthr.) Clarence, Richmond, and Hastings Rivers, Queensland (neighborhood of Ipswich).

Fam. ALYTIDÆ.

Heleioforus (Gray).
Heleioforus alleopunctatus (Gray). Western Australia (particularly King George's Sound), Murray River, North Australia (?)

Fam. UPEROLEIDÆ.

Uperoleia (Gray).
Uperoleia marmorata. Western Australia, South Australia, Sydney, Illawarra district, Clarence and Hastings River, Brisbane.

Fam. BRACHYCEPHALIDÆ.

Pseudophryne (Fitzinger).
Pseudophryne Australis (Gray). All the specimens of this species which came under my notice were captured in the neighborhood of Sydney.
Pseudophryne Bibronii (D. and L.) Tasmania, and southern portions of Australia.
Pseudophryne Bibronii (variety). This may probably be the type of a new species; it inhabits the Clarence River district.
Pseudophryne (new species). This is a very distinct species, and the largest of this genus yet discovered; it is of a uniform brick red color on the back, beneath black and white marbled. Hunter River district.

Fam. ENGYSTOMATIDÆ.

Chelydobatrachus (Gray).
Chelydobatrachus Gouldii (Gray). West Australia.

OPHISTOGLOSSA PLATYDACTYLA.
HYLINA.
Fam. POLYPEDATYDÆ.

Hyperolius (Rapp).

Hyperolius bicolor (Gthr.) Blue Mountains, Clarence River, common near Port Denison.

Fam. HYLIDÆ.

Litoria (Tschudi.)

Litoria Freycineti (Bibr.) Port Curtis.

Litoria nasuta (Gray). Sydney, Port Essington.

Litoria punctata (Dum.) Sydney.

Litoria marmorata (Dum.) Sydney, Clarence River.

Litoria Wilcoxii (Gthr.) Clarence River, Port Curtis.

Hyla (Burm).

Hyla Ewingii (D. and B.) Sydney and east coast of Australia, Tasmania.

Hyla rubella (Gray). Port Essington and Port Denison.

Hyla Peronii (Bibr.) Port Essington, east coast generally, and Tasmania.

Hyla Jervisiensis (D. and B.) Jervis Bay.

Hyla Adelaidensis (Gray). Adelaide and King George's Sound.

Hyla aurea (Less). Australia generally.

Hyla Verreauxii (Dum.) Sydney, Clarence River.

Hyla citropus (P. and L.) Sydney.

Hyla Krefftii (Gthr.) Sydney.

Hyla phyllochnoa (Gthr.) Sydney, Brisbane.

Fam. PELODRYADIDÆ.

Pelodryas (Gthr.)

Pelodryas cæruleus (White).

The above-enumerated 39 species of frogs have with few exceptions a very wide distribution, but are principally inhabitants of the eastern and southern portion of the Australian continent. Of the west and north-west coast we know as yet little or nothing. It is probable, however, that when these regions are better explored by naturalists many more new genera and species will be discovered, and I am confident to see our Batrachio-fauna numbering more than a hundred species a few years hence.

With regard to the frogs of Tasmania we are very much in arrear, for looking over the British Museum catalogue we find the following species only mentioned as inhabiting that island :—

Limnodynastes Tasmaniensis
Pseudophryne Bibronii
Hyla Ewingii
Hyla Peronii
Hyla aurea.

The neighborhood of Sydney is very rich in *Batrachians*, and I have found, besides several new species, many forms which previously were only known from the north-east and west coasts. There are altogether 19 species, namely:—

Pterophrynus varius
Limnodynastes dorsalis
——— *Krefftii*
Uperoleia marmorata
Pseudophryne Australis
——— *Bibronii*
Hyperolius bicolor, 30 miles from Sydney.
Litoria nasuta
——— *punctata*
——— *marmorata*
Probably varieties of *L. nasuta.*
Hyla Ewingii
——— *Peronii*
——— *aurea*
——— new species
——— new species
Not yet described
——— *citropus*
——— *Krefftii*
——— *phyllochroa*
And *Pelodryas cæruleus.*

Believing that the habits of our Batrachians have never been properly recorded, I will give some of my observations:—If we except a few species, we find that by far the larger number of them are nocturnal; those observed in the day time are generally asleep, though some are active, but perhaps disturbed only. During the breeding season, however (about November), many otherwise nocturnal frogs may be seen in broad daylight in search of their mates, the males calling in their loud, often not unpleasing, voice, which at the beginning of dusk is always loudest. The greater number of species have deposited their ova in the beginning of December, though I have reason to believe that some species breed at all seasons, for I have taken *Pseudophryne Australis* in midwinter full of ova, and have observed larva of this and of several other species in pools of water about the same time. All the *Hylidæ*, however, deposit their ova only once a year, generally in November and December.

The localities in which the different species are found vary considerably. Of *Myxophyes fasciolatus* I know little, but what I have seen of the single living specimen once in my possession I believe that this frog is remarkably fond of lying buried under moss in water, never making its appearance before dark. The members of the family *Cystignathidæ* frequent the water much more than the land, whilst such genera as *Uperoleia* and *Pseudophryne* give the preference to moist or damp places, and are never seen in the day time; they hide under stones or logs of wood, and never climb, nor do they swim about in swamps or pools.

Of the Ophistoglossa Platydactyla very few take freely to the water, though some, as *Hyla aurea*, appear to live in it exclusively. Most of the frogs of this group frequent shrubs or trees, and all have the power to change their color.

Hyperolius bicolor I have observed asleep upon orange trees and other shrubs during the day, and taken several specimens by the light of a lanthorn in swampy places. At first sight they look exactly like the young of *Hyla aurea*, but the the absence of vomerine teeth, and the delicate light green color upen the back, and pale orange between the legs, soon determines its true character. It is a remarkable fact that this frog has as yet been found in a few localities only, all wide apart from each other. The first specimen was received from Port Denison, and several others from Port Curtis and Brisbane. I am confident that it does not exist in the immediate neighborhood of Sydney, but some 50 or 60 miles from this city, at the foot of the Blue Mountains, several specimens were taken by me.

All the frogs belonging to the genus *Litoria* are found in swampy places in particular localities covered with long grass or reeds; they make most extraordinnry leaps, as much as six feet high, and may be often met with in broad daylight. The genus *Hyla* proper, if we except *Hyla aurea*, is always found on shrubs or trees, some hiding under bark during the day, as *Hyla Ewingii*, *Peronii*, *Adelaidensis*, and *Krefftii*; *Hyla citropus* inhabits the tops of high trees, and is, therefore, seldom captured during the summer, whilst during the cold season it retires under stones in creek beds. *Hyla phyllochroa* frequents fern groves, and *Pelodryas cœruleus* is quite a domestic creature, taking up its quarters under the roof of dwelling-places, in water-spouts, post-holes, &c., and it has proved itself a surer prophet than Mr. Saxby—the deep croak of the male being a certain sign that rain will not long be wanting. This frog has the widest range of all; it is found from South Australia to the east coast, and from Melbourne to Port Essington and New Guinea.

NOTES ON COMET 1, FOR 1865,

Together with additional Notes on the Nebula surrounding η Argus. *By Francis Abbott, F.R.A.S.*

Read before the Royal Society, March 14th, 1865.

Various conjectures are frequently offered respecting the physical aspect, nature, origin and office of Comets, and these subjects are at the present time, still involved in great obscurity. A Comet when examined by proper optical means, has the appearance of an ill-defined gaseous or nebular substance surrounding a dark nucleus, which nucleus has different degrees of opacity in different Comets, and which in general becomes more brilliant as the Comet approaches its perihelion.

A second characteristic is their internal condensation. Most of them have a minute stellar point, called the nucleus, which occupies the position of maximum density. This centre of condensation, or brightest point is, with rare exceptions, placed on the side which is nearest to the sun, and is always very close to the centre of gravity.

Another feature of importance is the tail (so-called) although it sometimes precedes the nucleus in its motion, and usually in a direction opposite to that of the sun—the convex, and brightest side of the tail being ordinarily presented to the region towards which the Comet is moving.

To determine the orbit of a Comet requires a very difficult and troublesome computation, chiefly because none of them are visible through the whole of their revolution. Such a computation would occupy a person well acquainted with the subject about twenty-four hours ; but a Comet's proper course may be found by observing its distance, from time to time, from two fixed stars, whose positions are accurately known. Or by finding its altitude when in the same azimuth with two known stars. By either of these means the place of a Comet may be computed for each night, and thence its course, and if a great circle be drawn through three distant places thus laid down, it will intersect the Ecliptic, and show approximately the place of the node. The inclination of the Ecliptic being thus found from several triplets, independent of each other, a mean of the results may be considered tolerably correct.

In a similar way a Comet's distance may be approximately known by parallax. A Comet shortly before it disappears moves so slowly, that for several days it appears to have but little motion among the Stars, let it be first observed when it is high above the horizon, take any two stars between which the Comet lies in a right line parallel to the horizon, extend a thread directly between the stars, and when the Comet approaches the horizon try again whether it continues in the same right line, between the same two stars. If there be any sensible parallax which depresses the Comet, it will not be seen in the same right line in both situations, but if the line is threaded by the two stars and Comet, it is a convincing proof that they have in these positions no sensible parallax, and must be at an enormous distance; refraction in this case will equally effect both Comet and Stars, and therefore need not be regarded.

The approximate distance of a Comet from the Earth—and its distance from the Sun, may be found by Plane Trigonometry. The length of a line drawn on a celestial globe or chart, from the position of the Sun to that of the earth, is known from the last transit of Venus to be 95,273,868 miles, a second line then drawn from the position of the Sun in the direction of the Comet's tail, and meeting a third line drawn from the earth to the Comet, will form a triangle, from which the two latter sides, or distance of the Comet from the Sun and earth may be computed, and if carefully conducted. especially if cleared from parallax and refraction, they will be found sufficiently near to correct the many contradictory and embarrassing statements, that during the apparition of the late Comet have found their way into the public prints. They are also sufficient for identification, and will enable anyone to ascertain whether the computed elements differ from authorised catalogues, upon the inclination of the plane of the orbit; upon the longitude of the node; and upon the longitude of perihelion distance. When these parabolic elements are found none resemble any of those recorded in catalogues of calculated Comets, we are justified in concluding that it had not been observed before.

From the foregoing rule the recent Comet's approximate distance was found by a vertical angle to be on tho 21st January—From the earth, 88,000,000 of miles; from the Sun, 42,000,000 of miles. January 28th — From the earth, 92,000,000; from the Sun, 62,000,000. February 4th—From the earth 98,000,000; from the Sun, 73,000,000. February 18th—From the earth, 110,000,000; from the Sun, 98,000,000. Assuming the Sun's distance from the earth to be 93,500,000 of miles, which, from more recent observations, is probably nearer the truth, from these distances it will be apparent that the Comet was receding from the earth at its first appearance, on the 17th January, and must have passed the perihelion before it was seen at Hobart Town.

The low position of the Comet, together with the unusual cloudiness of the evenings, rendered it difficult to get suitable stars to observe with it. In obtaining the following positions the Comet had frequently to be watched for between banks of dark cumulus clouds, and at times when few stars could be seen. The night of the 28th of January was the most favorable, the sky was clear and brilliant with stars; the penetrating light of the Comet on that evening shewed itself in the twilight a few minutes after the star Fomalhaut, and a few minutes before α and β Grus. It had a fine planetary nucleus, with a bushy tail, very little curved, about 14° in length. From this date it diminished in appearance as if moving slowly off into space, and on the 4th of February was much fainter, with a tail only 4° in length. On the 8th, 9th, 10th and 12th February, it was only seen with the telescope, the moon being near full, and the nights clear and moonlight. The 14th was favorable, for three days previous the weather had been close and sultry, but at 5 p.m. on that day a heavy shower of rain fell which rendered the atmosphere very transparent. The Comet had decreased much in size—the neuclus had lost its planetary appearance, and the tail was not more than $1\frac{1}{2}$° in length. It was also seen distinctly on the 1st and 3rd of March, after which the moon's light again interfered.

APPARENT POSITIONS OF COMET 1, 1865:—

	Mean Time		R. A.		N. P. Distance	
	h.	m.	h.	m.	°	
January 19.—	8	35	20	41	125	07
„ 20.—	8	30	20	47	127	15
„ 22.—	9	00	21	00	130	30
„ 23.—	8	30	21	06	132	12
„ 24.—	9	30	21	14	133	45
„ 26.—	9	45	21	26	136	22
„ 28.—	9	00	21	40	138	22
„ 31.—	9	15	21	58	140	15
February 3.—	8	40	22	14	141	30
„ 4.—	8	45	22	20	142	15
„ 7.—	8	30	22	36	143	22
„ 8.—	8	45	22	41	143	45
„ 9.—	8	20	22	47	144	12
„ 10.—	9	00	22	56	144	28
„ 12.—	8	20	23	02	144	40
„ 13.—	10	5	23	8	144	55
„ 14.—	8	15	23	12	145	00

From the above records it will be seen that the Comet from its first appearance on January 17th in Capricornus passed through the Constellation Microscopium, and when last seen on the 3rd of March, it was near to the extreme point of Grus.

SOME FURTHER NOTES ON η ARGUS.

[Continued from the Monthly Notices of June, 1863.]

This appears a suitable opportunity for continuing some Notes on the variable Star η Argus and the surrounding Nebula. I was glad to notice the communication on this subject to the Royal Astronomical Society, by E. B. Powell, Esq., of Madras, published in their Monthly Notices, and wish that he had entered more fully into the discussion of the continued changes which are constantly taking place in the surrounding Nebula of η Argus.

I have taken my starting point from the Cape observations, and the quotation from Sir J. Herschel's description, given in my former notes, has always accorded with the conception of my own mind—every time I observe the object I am more convinced that the whole Nebula surrounding η Argus is breaking up into stars.

I have previously described the so-called dark space as resembling in shape a clearly-defined "crooked billet." It now assumes a very different form, and it is singular that Sir J. Herschel, who describes κ Crux in glowing colors, as "like a rich piece of jewellery," should be silent as to the colors of the stars around η Argus. In my previous notes, I mentioned many of them as being of a ruddy color, but now they are of decided colors, *blue*, *green*, and *red*, the two former predominating. If the telescope is turned from one object to the other, it will be seen that, although Sir John has not overdrawn the beauty of κ Crux, the object η Argus is now much more superb—η standing out sharp and clear, amidst a large field of rich-colored gems, with only a very small patch of nebulous matter seen under the telescope. I have a note, made this month, while looking after the Comet, during the period of Full Moon, as follows:—"The position of η Argus was distinctly seen with the naked eye by the white light which surrounded it, although the Star η could not be seen as a point, nor could the position of Nebicula major, Nebicula minor, the Via lactea, or any other Nebula be seen at the time. This appears plain proof that the objects composing the Nebula around η Argus, are now of a larger character, and more refulgent than nebulous matter in general."

METEOROLOGY FOR MARCH, 1865.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced — Highest.	Lowest.	Self-registering Thermometers — Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind — Direction from three daily registers.	Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	29·955	29·874	67	56	114	50·0	N SW W	·78	
2	30·045	29·749	72	44	115	43·0	NW SE SW	·52	
3	29·702	29·657	73	50	117	48·0	NW NW SE	·78	
4	29·609	29·527	82	49	120	45·0	N NW NW	3.38	
5	29·707	29·467	76	56	111	51·0	NW NW W	10·41	0·73
6	29·933	29·879	70	51	90	46·0	N W W	·78	
7	29·994	29·992	75	50	118	47·0	NW SE SE	·52	
8	29·980	29·961	71	52	110	50·5	N SE S	·52	
9	30·006	29·947	78	49	114	46·0	NW N SE	·52	
10	29·826	29·715	73	53	73	48·5	N NW NW	·52	0·02
11	30·124	30·042	69	46	108	43·0	N SE SE	·78	0·04
12	30·127	30·010	71	51	93	50.0	NW NW NW	·78	
13	29·837	29·627	60	59	70	45·0	S SE SE	·26	0·14
14	29·635	29·625	63	57	95	51·0	S SE S	1·4	0·19
15	29·785	29·573	67	51	108	48·0	NE W SW	5·73	0·03
16	29·800	29·517	64	45	85	42·5	N NW N	10·68	
17	29·734	29·421	61	45	94	41·0	SW SW S	·78	0·09
18	29·828	29·763	62	44	72	40·0	N N N	8·07	
19	29·995	29·959	69	52	99	50·0	N NW S	·52	0·02
20	30·063	30·000	74	52	116	50·5	NW SW S	·78	
21	30·074	29·927	75	55	108	51·0	E SE S	·26	
22	29·995	29·932	68	48	82	47·0	N SE S	·52	
23	29·976	29·850	73	55	113	48·5	SW SE S	.26	0·02
24	29·891	29·864	68	54	103	49·0	SW E S	·52	0·07
25	30·130	29·937	68	51	99	44·5	NW S S	·52	
26	30·165	30·141	73	46	115	41·0	N E S	0·	
27	30·170	30·138	77	46	113	44·0	N E S	0·	
28	30·207	30·105	79	46	109	43·5	N S NW	0·	
29	29·987	29·926	78	61	105	58·5	S N E	·78	0·02
30	29·822	29·598	73	54	76	51 5	N N E	3·38	0·27
31	29·856	29·845	69	41	82	40·5	N N N	3·12	0·29
							Total force	57·51	1·93

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 the height of 192 feet, and the force according to Lind's Wind Guage. 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 :—

11th. Seckle Pear commencing to ripen.
14th. Tips of Hornbeam turning yellow.
21st. Tips of Elm turning yellow.
28th. Horse Chestnut leaves turning brown.
28th. Ash leaves commencing to fall.
29th. Oak leaves commencing to fall.

Barometer mean, 39·874 inches, being ·017 above the average.
Temperature mean, 59·02°, being 0·96° below the average.
Solar intensity mean, 100·87°, being 4·13° ditto.
Dew point mean, 49·5°, being 0·56° above ditto.
Humidity of air mean, ·76, being 5·5 *per cent.* ditto.
Elastic force of vapor mean, ·781° being ·023 *per cent.* ditto.
Total amount of rain, 1·93 inches, being 0·41 inches above the average.
Mean amount of ozone 7·65, being 0·92 of chromatic scale, above the average.
Increase of spontaneous evaporation on rain-fall 0·67 inches.
Mount Wellington was copiously mantled with snow on the 18th and 31st.

FRANCIS ABBOTT.

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

This March has been much more favorable to life than last year's, though singularly enough the total mortality is almost exactly that of the mean of the previous eight years. The diseases, however, which caused death were principally those of long standing, rendered fatal by sudden variations of the temperature and pressure of the atmosphere. The class depending mainly upon purity of the air, (zymotic) contributed far less than the usual average to the mortuary records.

Atmospheric pressure mean 29·874, differed little from the 20 years' adopted standard average, being only + ·017 of a degree higher. The contrast, however, with the high mean of March last year, 30·109, is noteworthy in connection with its much heavier mortality. The extremes of the present month were, minimum 29·330, on the 11th; maximum 30·207, on the 28th. The range ·877, though somewhat less than that of March 1864, was greater than that of the three preceding years. The daily perturbations were more numerous and wider in extent, than last year, there having been nine days on which the movements of the barometer exceeded one-fifth of any inch. The greatest range for any day was a fall of —·376 of an inch on the 13th. The most extensive rises were on the 6th and 11th, + ·359 + ·355 respectively, the latter having the greatest number of deaths of any day in the month.

Wind force had a total of 57·51 lbs. being +4·97 more than the March average of the previous eight years, and nearly the same excess over March, 1864. Nevertheless, the predominant winds in force and number. North and North West, were those least favorable to health. The number of faint South winds was unusual, 12 in excess, yet not reaching the average in strength; South-East, South-West, and West were all below the mean in both frequency; force the greatest pressure to the square foot, 5.21 lbs, was noted five times *i.e.* on the 5th, 15th, twice on the 16th and the 18th, one West, two each North and North-West. No hot winds occurred.

The mean *temperature* of the month was colder than that of any March since 1854, being only 59.02 degrees; which is—00.96 less than the 20 years' average. March 1864 was somewhat above the 20 years' mean, thus affording another datum to account for the superior health of the present month. The mean deduced from the self-registering thermometer is, 60·90 degrees, giving a rather wider discrepancy than usually occurs, and very different to what was remarked for February. The warmest day of the month, the 4th, had the maximum of 82 degrees; and the coldest night in the month was that of the 31st when the self-registering thermometer fell to 41 degrees. Last year the extremes were 81 and 43 respectively. Sixteen times in the previous 24 years has the maximum much exceeded that of the present year, four times being above 90 and the highest 99 degrees in March 1861. Seven times in the same period has the minimum fallen lower, the lowest being 36 degrees in March 1850. The mean of all the maxima exceeded both February and January, being 71.19 degrees; but the minima mean, on the other hand, fell below both those months, being 50·61.

The *daily-range of temperature* mean, was, 20·58 degrees; which is + ·54 of a degree more than the 20 years' average, and even + ·26 higher than in last March. The greatest range of any day was 33 degrees, noted on the 4th, and the 28th. March 1864 had four degrees less, and the two previous years were not so variable as the present one. The smallest variation was only 6 degrees recorded on the 14th. In 1864 the minimum was 13 degrees.

The *Solar-thermometer* mean was, 100·87 degrees, being —2·68 below the mean of the previous nine years, and —7·00 less than March 1864 had. The much greater number of wet and cloudy days in the present month accounts for this. The greatest heat was 120 degrees on the 4th. Last years' maximum was four degrees more, and the thermometer only marked below 100 degrees six times; while in the present month it has done so fourteen times.

The Terrestrial radiation thermometer had a mean of, 46·93 degrees, which is—1·36 less than the average of the previous nine years, and —·57 less than 1864 had. It would appear from this, that though the day time was so much more cloudy in the present March than in that of 1864, yet that in the night time the sky was nearly as cloudless. The extremes were, maximum 58·5 degrees on the 29th ; Minimum 40·5 ont he 31st ; the last being + 1·5 higher than the minimum of 1864.

Rain fell freely during the first half of the month, and on the last two days ; but for the fourteen days, between the 15th and 29th inclusive, there were only sprinkles, insufficient to scour the surface channels, though cleansing and purifying to the air. The wet days registered, were + 4·10 more than the average of the previous ten years, being 13. On the 5th and 30th the streets and sewers got well flushed. The total precipitated during the month was 1·93 inches, which is, + ·41 more than the 20 years' average for March, and nearly three-quarters of an inch more than was deposited in March 1864. In that month the wet days moreover were only four. *Snow* covered Mount Wellington very low down on the 17th,but disappeared before 10 a.m., next day. Again on the 31st Mount Wellington was copiously mantled with snow.

Spontaneous Evaporation total was 2·60 inches, a very slight excess indeed over-rain fall, for the month of March.

Elastic force of Vapor notwithstanding so much rain, was + 23 more than the 20 years' average being 378.

Humidity, also, 76, was + 3½ above the 20 years' mean.

Cloud mean, 6·54, too, was unusually high ; being + 1·13 above the 20 years' average, and + 2·49 more than March 1864 had.

Ozone mean, 7·65, was + 73 above the average of the previous 7 years, and + ·69 more than March last year had. The maximum was 9, and the minimum never fell below 5. With ozone-bearing winds so few and gentle, the influence of frequent though even slight showers, in purifying the air,is more thoroughly marked this month than usual.

Electricity was more abundant than in February, having twice as many, or 6 positive indications with maximum tension of 5, and 49 negative records with maximum tension of 5·5, " nil" was registered 7 times. In March 1864, electricity was both more abundant and stronger, and the positive indications, in proportion to negative, much greater. No *lightning* was observed during the month, but some heavy peals of *thunder* ushered in the commencement of the rain on the 30th.

The tables, following, show that the *deaths* in March 1865 were 56 ; being 17 less than in March last year, though a few fractions only below the average of the previous eight years :—

Mars., 1865	Ages.	Feb., 1865.	Marchs. 1864	1863	1862	1861	1860	1859	1858	1857	Avg. 8 yrs. Marchs, 1857–1864.
12	Under 1	15	25	16	12	19	16	15	26	14	17 7-8
6	1 to 5	5	13	11	8	6	9	9	17	6	9 7-8
2	5 to 20	2	2	1	3	4	2	4	3	2	2 5-8
9	20 to 45	7	11	9	10	6	11	8	7	16	9 6-8
9	45 to 60	9	13	5	9	9	8	8	5	11	8 4-8
18	60 and above	15	9	11	10	7	7	4	8	6	7 6-8
56		53	73	53	52	51	53	48	66	55	56 3-8

In every group of ages below 45, the deaths were less than the eight years' average ; but at all ages above 60, the mortality was much greater than in any year of the eight, and considerably more than double the average of the whole. The atmospheric causes conducing to this unusual high rate of senile deaths have already been referred to. It will be seen by an examination of the foregoing table, that the deaths under five years of age, were not quite half of those at the same age in March, 1864, while in that month the deaths at all ages above 60, were only half of those recorded for the present month. The oldest noted in the registry for the present March, was a woman 98 years old, who retained her ordinary faculties to the last, tottering about until the very day of her death.

Mar., 1865	Classes of Disease	Feb., 1865	Marchs. Min.					Max.			Average of 8 years' Marchs, 1857-1864.
			1864	1863	1862	1861	1860	1859	1858	1857	
10	1. Zymotic	11	35	21	15	15	15	16	25	9	18 7-8
9	2. Constitutional	11	8	8	10	11	8	5	10	6	8 2-8
29	3. Local	20	19	13	19	21	24	17	14	29	19 4-8
5	4. Developmental	8	8	9	5	2	5	6	11	7	6 -58
3	5. Violent, &c.	3	3	2	3	2	1	4	6	4	3 1-8
56		53	73	53	52	51	53	48	66	55	56 3-8

In the *Zymotic* class, the deaths were but little more than half of the eight years' average, and less than half of those in March, 1864. Nine out of the ten deaths were from *bowel complaints*, while last year these diseases caused 26 out of the 35, in the Zymotic class. The *Constitutional* class of the diseases had slightly morethan the average. Five of the nine were from *Consumption*, and of those one was Tasmanian born, a boat-builder by occupation, and aged 22 years. The class of *Local* diseases was rather more than one third higher than the eight years' average, and a trifle more than that above the number in the same class in March 1864. The *Brain and Nervous System* had 11 deaths in the present March, but only eight last year. ·The *Heart and Circulatory System* five this year, four last. The *Lungs and Respiratory System*, seven in this month, 2 only in March 1864. The *Digestive System*, four this March, only two last year. The *Urinary System*, two deaths in both years. The *Reproductive System*, no death this year, but onein 1864. The *Developmental* class had considerably less deaths than the eight years' average, and a still smaller proportion to that of last year. Four, of the five deaths, were from old age; the other was a babe only four months old. In the class of *Accidental and Violent* deaths the number was a fraction below the average. Of the three, one, a babe of six months old, owed its death to *suffocation* from the fault of drunken parents; the second, an old woman of 74, died in Hospital from *burns*, caused by the ashes falling from the pipe she was smoking; the third, a man of 55, was killed by a spar falling and *fracturing his skull*, while he was kindly aiding others in lifting it out of a cart.

Eight (8) *Inquests* were held this month, March 1864 had only 5.

In *Hospital* the deaths were 16, including one of the inquest cases. Of these, three were brought to hospital from country districts; and one, a young South Sea Islander, from a whaler in the harbor. In March, 1864, the hospital mortality was only 12. At the Male Invalid Asylum, Brickfields, two died, aged respectively 50 and 66. In 1864 there was only one. A female invalid, aged 81 years, died at the Cascades establishment.

Of the 56 deaths, 26 were males, 30 females, a complete reversing of the ordinary proportions of the sexes. Of the 56 deaths, only two died in Glenorhcy, and one in Queenborough, electoral districts, the rest in the city.

In the first week of the month 15 deaths occurred; in the second, 14; in the third, 10; in the fourth, 10; in the last three days, 7.

On the 9th, 13th, and 25th, no deaths took place. On any two consecutive days, the greatest number of deaths were 9, on the 11th and 12th. The most fatal period of the month was from the 10th to 12th inclusive, when 12 deaths took place.

The *births* registered were 70, while in March, 1864, only 58 were recorded.

For the first, and usually the most fatal quarter of the year, (though 1864 was an exception), the deaths in the Hobarton Registration District amounted to 159; being 29 less than the average for the same quarter of the preceding eight years. Our more than usually cold summer, therefore, has been highly favorable to health and life, though at times not very agreeable to the feelings.

For all the Registration Districts of the Island the *births* registered in the first quarter of 1865 were:—404 males, 348 females, total 752; being 32 more than in 1864, and the excess all in males.

The *deaths* during the same period were:—178 males, being 32 less than in 1864; 148 females, or 18 more than last year; total 326, being 14 less than the first three months of 1864, and 90 less than the average of the previous seven (7) years, and less than any one of them. The mortality has fallen off in every year's first quarter consecutively, though 1861-2-3 differed very slightly.

ROYAL SOCIETY.

APRIL, 1865.

The monthly evening meeting of the Fellows was held on Tuesday, the 11th April, J. Barnard, Esq., in the chair.

The following gentlemen having been previously nominated by the Council, were, after a ballot, declared to be duly elected Fellows of the Society:—James Lord, Esq., Hobart Town; E. M. Lloyd, Esq., R.E., Hobart Town; and as corresponding member, the Rev. Julian E. Woods, of Penola, South Australia.

The following returns were laid on the table:—

1. Visitors to Museum during March, 663.
2. Ditto to Gardens ditto, 2,127.
3. Seeds received at Gardens. From Justin Browne, Esq., six varieties of Chinese peas.
4. Plants sent from Gardens. To Mr. Diehl, Dunedin, 48 roses, 12 shrubs; to Mr. H. Low, London, one case plants; to A. Verschaffett, Ghent, Belgium, two large tree ferns.
5. Books and Periodicals received.

The SECRETARY drew special attention to the two valuable illustrated Botanical Works, by Dr. Mueller, presented by the Victorian Government.

Meteorological Returns.

1. Hobart Town, from F. Abbott. Esq.
   (*a*) Table for March.
   (*b*) Summary of Observations for ditto.
2. Tamar Heads, from R. Henry, Esq.
   (*a*) Table for February.

The SECRETARY read the usual Analysis of the Observatory Records for March, together with a Health Report for the month, by E. Swarbreck Hall, Esq.

The following presentations were brought under the notice of the meeting:—

1. From C. Degraves, Esq.—A model of a Cingalese boat, two dirks from Algeria, two Spanish knives, two fossil shark's teeth from Malta, a mineralogical specimen.
2. From P. Seal, Esq.—Portions of the hull of the steamship "Royal Charter," wrecked in Moelfra Bay. Also part of the woodwork of a sofa from the wreck of the same vessel.
3. From A. Nicholas, Esq.—Specimen of Whalebone, showing its mode of growth from the jaw.
4. From Mr. Russell, Sandy Bay.—A large excrescence from the root of a honeysuckle tree.
5. From Mr. Bellette.—Skin of white hawk (*Astur Novæ Hollandiæ*).
6. From T. Stephens, Esq.—A specimen of Slate quarried for roofing purposes, at Middle Arm on the Tamar; two cones and flower of a rare species of Banksia (*B. media*) from the "Sisters," near Rocky Cape; and a portion of the stem of a Tree Fern. (*Alsophila Australis*) from Table Cape.

In reference to the specimens presented by him, Mr. STEPHENS observed that the slate was associated with bands of blue and white limestone, and quartz rock, the series being highly inclined and contorted, and overlaid in places by horizontal beds of an impure limestone, containing upper Palæozoic fossils, and passing upwards into carboniferous sandstone. Like all the other slates which occur along the north coast, and in other parts of the colony, it differed from the roofing-slates of Great Britain in that it was only fissured along the planes of stratification, and possessed no true cleavage. It was not of a sufficiently durable character to be valuable for roofing, but might be utilised for other purposes.

The species of Banksia producing the large cones which were exhibited, was found only in one spot in Tasmania, a narrow belt some three miles in length near Rocky Cape on the north coast, growing in almost pure quartz sand to a height of 30 feet. It is not uncommon in the south of Gipps' Land nd other parts of Australia. Mr. Stephens also remarked that Table Cape might be registered as a new locality for the *Alsophila Australis.* Its chief peculiarity consisted in the persistence of the bases of the fallen fronds along the whole stem, and in the prickly epidermis with which they were covered. It is described in Hooker's Flora as occurring near the Asbestos Hills, and at Macquarie Harbor, but it had, he believed, been found by Mr. Gunn in other places.

Mr. M. ALLPORT observed that this tree fern is also found on Maria Island, where it grows away from the watercourses, and may be readily distinguished from the common tree fern by the greater breadth of the fronds in proportion to their length, and the slender stem which scarcely exceeds a foot in diameter when the tree is 25 feet high.

A parcel of small pearls, procured on the East Coast, from our salt-water mussel was exhibited. In reference to pearls Mr. M. Allport observed that the Unio (fresh-water mussel) of Tasmania closely resembes the pearl bearing Unio of Great Britain, and it is remarkable that it is found only in those rivers running to the north and west coasts, while it is absent in those running to the southward and eastward, though many of both sets of streams take their rise within a very short distance of each other, in the same mountains.

The address of the Chairman of the Physical Section of the Royal Society (E. Swarbreck Hall, Esq.) on the opening of the session of 1865 was read by the author. That portion of it which alluded to the new illuminating agent was illustrated by the burning of a small portion of magnesium wire, which had been procured for the occasion from Mr. Knight, (the Pyrotechnist) by Dr. Hall. The light was inconceivably brilliant, and had something of a bluish tint. The Secretary read some further details as to its capability from a lecture delivered by Professor Roscoe at the meeting of the British Association held last year at Bath.

The attention of the Fellows was directed to the exhibition of the apples and pears, from the Royal Society's Gardens, of which 70 varieties were on the table.

The usual vote of thanks to the author of the paper just read, and to the donors of presentations, having been passed, the proceedings terminated.

THE ADDRESS OF THE CHAIRMAN OF THE PHYSICAL SECTION OF THE ROYAL SOCIETY (E. SWABRECK HALL), AT THE OPENING MEETING OF THE SESSION, 1865. TUESDAY, APRIL 4TH.

No special subject has been selected for the opening address of this session of the "Physical Section of the Royal Society of Tasmania." But I think our time will not be mis-spent if I briefly direct your attention to some recent discoveries, which have an important bearing on philosophic research, and the economic application of scientific data to the comfort and welfare of the human race. Out of many such discoveries I choose three to pass a few comments upon. It has been found that the illuminating and heat-giving rays of the sun can be completely dissevered by passing the solar ray through a solution of iodine or sulphide of carbon. The illuminating rays are thus intercepted, while the calorific rays pass through the media with such undiminished power that when concentrated to a focus gunpowder can be ignited. The magnesium wire lighted, and even platinum melted. To Professor Tyndall, of the Royal Institute of London, science is indebted for the knowledge of this important fact. For optical and other curious enquiries into the laws of heat and light this discovery will be doubtless of much value, but I do not see that it is likely to be of much practical worth in the daily business of life.

The second of my subjects, however, is one of immense practical value, and is likely to supersede all our modern means of procuring artificial light. By applying the great decomposing power of the galvanic battery, the metal magnesium has been discovered. It much resembles aluminium in its external qualities, though of much less specific gravity. It can be drawn into a fine wire, like silver, and this wire can be ignited and burnt in ordinary atmospheric air, and the light eliminated is so intense that at sea it can be seen at a distance of 28 miles. At the same time the light is so pure that the photographer is now independent of the sun light, and can procure pictures by its use, of the inside of caverns, and other places where the sun light cannot be made available. Mr. Knight, the pyrotechnist, a gentleman not likely to be easily alarmed by a blaze, informs me that having had a couple of inches of the magnesium wire given to him, he ignited it, and the intensity of the light, that suddenly burst forth, frightened him, and that he at once commenced to puff it out, fearful lest some terrible explosion was about to occur. It is, however, one of the many great advantages that will result from this interesting discovery, that danger of all kind will be much diminished by its use for domestic and public lighting. It emits no sparks, it gives forth by its combustion none of the gases so deleterious to health, that are generated in the combustion of all the hydro-carbons— as gas, wax, oil, tallow, kerosene, &c., &c. It of course consumes the oxygen of the air in a room, and liberates the nitrogen, but the result is merely a white powder, that may be collected for use, and stored in the domestic medicine chest—oxide of magnesium, otherwise magnesia. The last number of the *Builder* states that a Mr. Grant, in London, is constructing lamps in which to burn the wire, and render it of ready household application. Two ounces and a half of the wire is said to be equal in illuminating power to 20lbs. of composite candles. It is sold in London at present at threepence per foot, but no doubt, if, as in all probability there will soon be, a great demand should arise for it, it will be manufactured at a much cheaper rate. The sources from whence it may be obtained, are perhaps more numerous and inexhaustible than coal itself. I have long been sanguine, that the electric-light might be made economically applicable for domestic and public lighting, but as yet the cost has limited its use. For sanitary ends, inasmuch as it is a generator of nature's grand aerial disinfectant, Ozone, it would surpass in its beneficial effects, the magnesium-light, with which many persons are apt to confound it. I apprehend no discovery of modern times, since coal-gas was made use of in private and public illumination, approaches any thing near in the promise of usefulness as this application of the combustion of magnesium wire.

My last subject is one of a purely sanitary nature, and refers to the well-being of those helpless infants, who cannot obtain the maternal nourishment. A loud cry has been raised throughout the civilised world, at the fearful extent of infant mortality, arising from ignorance and neglect. The greatest of modern dietetic chemists, the world-renowned Baron Liebig of Munich, from a family necessity, has been induced to direct his eminent skill to the compounding of a substitute for mother's-milk, which shall resemble, in its nourishing qualities, that best of all food for the human infant. The last number of the "Lancet" notices these efforts thus:—"With that remarkable estimation of the greatness of small things which is one of the most valuable of his many high intellectual qualities, and with a tender appreciation of the importance of small people, Baron Liebig devotes a special article in an English scientific periodical (the *Popular Science Review*) to the description of a new article of diet which he conceives to be the most fitting substitute for the natural nutriment for those children who are by circumstances robbed of their mother's milk. It is well known that cow's milk does not adequately represent the milk of a healthy woman, and when wheaten flour is added, as it commonly is, (I am sorry to say in Tasmania other farinaceous articles of less nutritious value than this, are more generally used,—corn-flour, arrowroot, sago, rice, and such like starch-abounding, stomach-oppressing, and diarrhœa-engendering viands.) Liebig points out that, although starch be not unfitting for the nourishment of the infant, the change of it into sugar in the stomach during digestion, imposes an unnecessary labor on the organization, which will be spared it if the starch be beforehand transformed into the soluble forms of (glucose) sugar and dextrine. (In which forms only the cane sugar of domestic use and the starch abounding in all cereals, can be assimilated for the uses of the body.) This he effects by adding to the wheaten flour a certain quantity of malt—"as wheaten flour and malt flour contain less alkali than woman's milk, he supplies this when preparing the soup." Cow's milk, and that of most animals whose offspring begin to move about soon after birth, has a lar ger relative quantity of muscle and bone-making ingredients, than human milk, while the latter has more of the saccharine and oily, or respiratory materials. Some water therefore is ordered by medical men to dilute cow's milk, though it is usually carried to an injurious excess, (Liebig only adds one-fifth of water) and some loaf sugar added. Milk-sugar is expensive even in England,and not to be obtained at all in the drug establishments of Tasmania. The great danger to be avoided in using cow's milk,is its liability to become sour, for acescent milk given to children is the great source of the bowel complaints, which carry off so many hand-fed children, so that it has almost become an axiom with medical men, that nine tenths of such children will die within one year after birth. Moreover, " wheaten flour, and the starchy farina generally have an acid reaction, and contain less alkali than milk; while, though women's milk contains less salts than cow's milk,it possesses a stronger alkaline reaction, and contains more free alkali, which in milk is always potash." " This alkali, we must pre-suppose, is requsite in the body for the normal functions of the child." Therefore, in compounding from cow's milk, wheaten flour, malt flour, and water, a substitute for woman's milk, potash must be added. This, I think, has generally been overlooked by medical practitioners. This "soup"as Baron Liebig denominates it, is prepared as follows:—" One part of wheat flour is put into the vessel used for making the soup (an enamelled saucepan is the best), and 10 parts of skimmed cow's milk are then added gradually, in small quantities, the mixture being stirred all the while uninterruptedly, to prevent the pap forming into lumps. To this mixture a proportion of bi-carbonate of potash is added, and then made to boil, the stirring continuing all the while, and after boiling from 3 to 4 minutes, the vessel is removed from the fire.

" One part of malt flour is now weighed, and mixed with 2 parts of water, and this is poured into the hot pap, and the whole once more stirred the while.

" The vessel is then covered to prevent the contents from cooling, and left to stand for half an hour. In order to avoid a too rapid cooling of the soup, it is advisable, after the addition of the malt, to put the vessel in hot—nearly boiling—water by which it becomes thinner and sweeter. At the end of this time the whole is passed through a fine sieve, in which the bran of the malt flour remains behind.

" For those persons who are acquainted with the mashing process, it is hardly necessary to call attention to the circumstance that after the addition of the malt the temperature ought not to exceed 148 Fahrenheit.

" In the preceding directions the time reckoned for the weighing and mixing the malt-flour with water is exactly sufficient to cool down the boiling milk pap to such a degree that when the malt is added, this mashing temperature is obtained." When the soup is properly prepared, it is as sweet as milk, and any further sweetening is unnecessary. It contains the double concentration of woman's milk. After boiling, the soup will keep 24 hours without undergoing any change. The malt-flour can be obtained by grinding malt in a coffee-mill, and sifting through a sieve or flour-dredge. I have prepared this artificial mother's-milk, and made a meal, of it. It is both palatable and easily digested. A portion kept in the ordinary temperature of a room was perfectly good and sweet, and exhibited the alkaline reaction to the litmus-paper test,when tried 27 hours afterwards. Nevertheless I shall always recommend that a baby's supply shall be freshly made night and morning,and that the most scrupulous attention be given to the cleanliness of all the utensils used. The proportions I used to meet this twelve-hourly demand as nearly as possible were :—15 fluid ounces of skimmed cow's milk,one and a half ounce by weight of wheaten flour, and 22grains of carbonate of potash boiled together as directed. In three ounces of cold water 1½ ounce of malt-flour was mixed, and added to the milk-flour pap when removed from the fire. The latter was of course then quite pasty, but at the end of the half hour's malting was sweet and thin. I am confident in the verity of Liebig's statement that this food will prove excellent for the nourishment of young infants, and that "children thrived perfectly well upon it, and many a petty suffering disappeared after some weeks' use of the soup." In Munich the apothecaries of the town have been induced by the most renowned of its physicians to keep for sale a mixture of the malt-flour,and bi-carbonateof potash, milk and wheat flour being supposed to be in every house.

It is the pride of modern science that its researches are made to have a practical application to the welfare of man. I shall not therefore deem it necessary to apologise for introducing so homely a subject into the discussions of the "Physical Section of the Royal Society of Tasmania." Whatever tends to benefit our common humanity, and may eventuate in the saving of many lives, will always hold the first place in my philosophy. How necessary such like information is, may be easily learned by enquiring from the Statist how many children perish, principally from mismanagement, before attaining the age of five years. In many places in England one-half of those born do so, and even in this admirably situated city, with its most propitious climate, out of about 920 annual births, on the last seven years' average, 138 infants under one year old annually perish, and 87 more between one and five years old. Whatever exertions may conduce to lessen this, generally remediable, mortality, is true philanthropy, and the subject is not unworthy of the best exertions of the most ardent, profound, and enlightened philosophy.

METEOROLOGY FOR APRIL, 1865.

Private Observatory, Hobart Town.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced: Highest.	Bar.: Lowest.	Self-registering Thermometers: Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind: Direction from three daily registers.	Wind: Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	29·727	29·595	60	46	89	44·0	N NW W	1·04	0·57
2	30·159	30·043	61	41	100	39·5	N E S	·78	0·02
3	30·206	30·146	61	40	75	38·0	NW N N	·52	
4	30·150	30·049	60	50	64	44·5	NW W S	0·	0·01
5	30·210	30·105	71	49	106	46·5	N NE S	·26	
6	29·956	29·844	76	53	94	49·5	NW NW SW	·52	
7	29·832	29·709	87	49	120	46·5	NW NE W	·78	
8	29·768	29·657	80	58	88	51·0	NW N W	2·86	0·31
9	30·079	29·895	74	59	84	43·0	W NW W	5·46	
10	30·072	29·964	67	49	69	46·0	NW NW NW	3·38	
11	29·795	29·630	69	54	102	42·0	NW W W	13·02	
12	29·906	29·842	65	49	95	46·0	NW NW NW	3·12	
13	30·071	30·057	78	49	103	45·0	NW NW NW	8·33	
14	29·895	29·877	69	54	94	44·0	NW NW NW	1·30	
15	29·941	29·921	69	57	90	46·5	NW SE SE	·52	
16	30·066	30·058	65	51	67	50·0	SW E SE	0·	
17	30·060	29·995	77	50	101	48·0	NW NW SE	1.04	
18	30·097	30·067	73	48	105	47·0	NW SE SE	·52	
19	30·079	29·881	77	53	103	52.0	NW NW NE	2·86	
20	29·730	29·548	73	63	84	60·5	NW NW NW	5·46	0·02
21	29·942	29·915	70	45	96	42·0	NW W NW	2·86	0·04
22	30·328	30·198	65	41	87	36·0	W SE S	·26	0·01
23	30·380	30·276	64	38	95	36·0	NW NW S	·78	
24	30·252	30·129	64	50	90	39·5	NW NE SW	·26	
25	30·061	29·926	63	38	72	35·0	NW NW NE	0·	
26	29·708	29·489	75	50	100	49·0	NW NW NW	·52	0·15
27	29·633	29·456	75	47	105	42·5	N NW NE	3·12	
28	30·012	29·798	71	44	93	40·5	NW W NW	1.30	0·10
29	30·188	30·129	66	39	93	36·5	NW NW NW	·26	
30	29·956	29·846	63	41	75	39·0	NW NW SW	0·	
								Total force 61·13	1·23

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 Guage. 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 sun-down.

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 :—

4th. Chrysanthemums commencing to flower.
8th. Elm leaves commencing to fall.
10th. Coe's Fine Late Red Plum commencing to ripen.
20th. Mountain Ash leaves commencing to fall.
25th. Black Mulberry leaves commencing to fall.
28th. Hornbeam seeds commencing to ripen.

Barometer mean, 29·951 inches, being 0·066 in. above the average.
Temperature mean, 56·49°, being 0·85° above the average.
Solar intensity mean, 91.32°, being 0·54° below the average.
Dew point mean, 46·3°, being 0·82° ditto.
Humidity mean, ·74, being $1\frac{1}{2}$ ditto.
Elastic force of vapor ·341 *per cent*, being ·17 above the average.
Total amount of rain, 1·23 inches, being 0·55 inches below the average.
Mean amount of ozone 8·16 chromatic scale, being 1·50 above the average.
Increase of spontaneous evaporation on condensation +1·37 inches.
Electricity active on the 11th, 13th, 23rd, 24th, and 28th.
Fresh deposit of snow on Mount Wellington on the 1st. Showery with thunder on the 8th. Much haze through the month, with frequent halos round the Moon.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR APRIL, 1865, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

In many respects this April has had anomalous weather, nevertheless the general result has been favorable to health and life, and more especially so to infants under five years old, whose deaths were less than one-fifth of the total at all ages. On the other hand, invalids, and particularly those of advanced age, have died in unusually large proportions; those at all ages above 60, constituting rather more than one-third of the total of all ages.

Atmospheric pressure mean, 29·951, was + ·066 above the 20 years' average for April, though less than either 1864 or 1863. The perturbations were both frequent and extensive. The extremes were, 30·380, maximum, on the 23rd, and 29·456, minimum, on the 27th, being a range for the month of ·924 of an inch, but occurring within four days. The deaths on the three following days amounted to 11, being by far the most fatal period of the month, no other three consecutive days having more than five; indeed, the first, second, and fourth weeks had each only six deaths. The greatest movement of the barometer in any twenty-four hours, was a rise of + ·510 of an inch on the 2nd, and the greatest fall was —·472 of an inch on the 26th. On thirteen other days there were movements exceeding one-fifth of an inch. Extensive and frequent changes in atmospheric pressure are always followed by the deaths of many invalid and old persons, though children and healthy adults resist its lethal influence wonderfully well.

Wind force,·61·13lbs., is +6·25lbs. above the April mean in the four years' computations contained in Mr. Abbott's 20 years' adopted standard tables, while it is +16·25 more than that of the seven years now recorded. This shows how necessary it is to obtain averages from a long series of records. Sir John Herschell's statement of the periodical cycles of meteorological phenomena makes it evident that nothing less than twenty years' records, can give means entitled to much reliance in comparing annual deviations. North-east, west, and north-west winds, were all above the average both in frequency and force, and the other five points were all below. The north-west was the predominant wind as indicated by the vane on St. David's Church, at the three daily observations; and yet there are other facts to prove, that the prevailing winds were more westerly. It has been often shewn before, that the peculiar conformation of the country to the west and north-west of this city, gives a north-westerly deflection to westerly winds. In April last year the total wind force was little more than one-third of that of the present month's, a very significant fact in connection with the much greater mortality April, 1864, had. The strongest winds in the present month had a pressure of 5·21 lbs. to the square foot, and were noted twice on the 11th, and once on the 13th. *Calms* were recorded 31 times, being only a few fractions beyond the seven years' average for the month.

Temperature mean, 56·49°, is +00·85 higher than the 20 years' average, and + ·34 more than April last year had. The self-registering thermometers give a much higher mean, 59·05°. The hottest day in this month, the 7th, is the hottest day yet registered in 1865, being recorded 87 degrees. In only three Aprils in the previous 24 years was a greater heat noted, *i.e.*, 89 in 1860, 90 in 1856, 89 in 1855. This day had three deaths, while in all the previous six days of the month only as many occurred. The minimum temperature of the month was, 38 degrees, on the nights of the 23rd and 25th. The month's range, 49 degrees, is greater than that of any April since 1857, when it was 50 degrees. But 1860 had the maximum range of the 24 years, being 60 degrees, the extremes being 90 and 30. The mean of all the maxima of the self-registering thermometer was 69·60 degrees. April, 1864, was only 64·50. The mean of all the minima records was 48·50, that of 1864 being 48·63. It thus appears that while the extreme night temperature of the two months, was almost indentical, the extreme day temperature of the present April was much greater than last year's. But the terrestrial radiation thermometers of the respective months shews that the absolute night temperature of the present month was below that of 1864, as will be seen hereafter.

The *daily-range of temperature* mean, was 21·10 deg.,being + 3·18 degrees above the 20 years' average, and + 5·24 more than April, 1864, had. The greatest range for any day was 38 degrees, and noted on the 7th. No other April since 1857 has had so high a maximum, but in that year it attained 39 degrees, which is the maximum of the 24 years' records in April. The minimum variation was 10 degrees, and registered on the 4th and the 20th.

The *solar thermomcter* had a mean of 91·32 degrees, which is —·54 below that of the 20 years, and —3·68 less than April, 1864, had. This is a puzzling contrast, when the records shew the present month to be considerably less cloudy than last year, and at the same time the mean shade temperature of this year, higher than that of 1864. The maximum was 120·5 on the 7th, which is half-a-degree higher than April, 1864, had. However, while the highest of the other nine records of 100 degrees or above, of the present month, only rose to 106 degrees; last year, out of ten, five exceeded that heat. The lowest of the present month was the same as in 1864, *i.e.*, 64 degrees

Terrestrial radiation mean was 44·18 degrees, being + 1·24 degrees more than the average of the previous nine years, though —1·33 degrees less than April, 1864,had. The extremes were 60·5 on the 20th; 35 on the 25th ; while those of 1864 were 56 and 32.

The *rain fall* this month was below the 20 years' average by more than half-an-inch (*i.e.*, ·55), being altogether only 1·23 inches; while April, 1864, had 2·18 inches. There were nine wet days, being —3·10 belowthe average for April of the previous ten years. On the 1st, 8th, and 26th enough of rain was precipitated to flush the streets and drains, and the other days' showers, together with the free ærial movement, sufficed to maintain a higher degree of atmospheric purity than April, 1864, had. The *snow* that remained on Mount Wellington on the last day of March,did not altogether disappear until the 5th of the present month; but there were no fresh deposits in April.

Spontaneous evaporation amounted to the same as the previous month, *i.e.*, 2·60 inches; 1864 had only 1·49.

Elastic force of vapour mean, was 341, which, though + 17 more than the 20 years' average, was less than 1864 had by —35; on the 6th, 7th, 20th, and 26th it was very high.

Humidity had a mean of 74, being —1½ below the 20 years' mean, and —8 less than 1864 had.

Cloud mean was 5·72, which is almost identical with the 20 years' average for April, though less by —·82 than April last year.

Ozone mean, 8·16, is + 1·32 above the mean of the previous eight years, and higher than any one of them, exceeding last year by + 1·23. How effectually this atmospheric purity protected the community from zymotic diseases will be seen when the death records are analysed. On the 9th, 12th, 16th, and 28th, at 7 a.m. observation, the maximum of the chromatic scale 10 (saturation) was recorded,and 6 was the lowest registered during the month.

Electricity had 19 positive indications, with a maximum tension of 5·5, and the lowest registered 4, but the majority were at 5. In April last year there were only 5 positive records with maximum tension of 4. Negative indications were 36 (6 less than 1864) with maximum tension of 4, but some falling as low as to 1. "Nil" was registered 5 times, *i.e.*, at the morning observation of the 1st, 5th, 8th, 19th, and 26th. No lightning seen during the month, but thunder heard with the showers on the 8th. All the collateral phenomenæ indicate that we were subjected on the 6th and 7th, to the skirts of a hot wind prevailing on the Australian continent, though in Hobarton the wind on the 7th was registered, 7 a.m., N.W., calm; 1 p.m., N.E., ·26 of a pound pressure to the square foot; sunset, W., ·52 of a pound pressure.

The 38 *Deaths* in the present month, contrast favorably with the eight years preceding Aprils, as shown in the tables following, for though 1862 had one less death, yet both the infantile and zymotic deaths were more numerous in that year's April than in the present; and that is the nicest test of the salubrity of any season or climate.

Apr., 1865.	Ages.	Mar., 1865	Aprils.								Avg. 8 yrs. 1857–1864.
			1864	1863	Min. 1862	1861	1860	1859	1858	1857	
5	Under 1	12	15	5	7	10	8	11	11	12	9 7-8
2	1 to 5	6	18	8	3	13	9	8	11	4	9 2-8
4	5 to 20	2	4	3	1	1	4	1	1	7	2 6-8
7	20 to 45	9	5	10	10	6	6	11	9	8	8 1-8
7	45 to 60	9	5	11	10	10	9	9	4	8	8 2-8
13	60 and above	18	7	11	6	8	9	7	11	3	7 6-8
38		56	54	48	37	48	45	47	47	42	46

The total of the deaths of the present April, is eight below the average of the previous eight years, and 16 less than April last year had. Moreover, it is eighteen fewer than occurred in the previous month of March. "Under five years of age" the deaths were little more than one-third of the eight years' average, and not many above one-fifth of the number that died in April 1864. At "5 to 20," however, the deaths were more than the average, though the same in number as in April last year. At "20 to 45" the deaths were more numerous than in 1864, though less than the eight years' average. The same remarks apply to the group at "45 to 60." But at "all ages above 60" the mortality was nearly double both the eight years' average and last years' numbers. Moreover, the previous month of March had exceeded the average in a still larger proportion. The oldest person that died this month was a man aged 80, but seven more of the 13 deaths had exceeded the "three score and ten."

April, 1865	Classes of Disease	Mar., 1865	Aprils. Min.								Average of 8 years' 1857-1864.
			1864	1863	1862	1861	1860	1859	1858	1857	
5	1. Zymotic	10	32	7	9	17	8	8	12	8	12 5-8
7	2. Constitutional	9	4	9	5	4	6	7	10	7	6 4-8
20	3. Local	29	13	24	16	21	25	24	16	20	19 7-8
5	4. Developmental	5	5	6	4	6	3	5	7	1	4 5-8
1	5. Violent	3	0	2	3	0	3	3	2	6	2 3-8
38		56	54	48	37	48	45	47	47	42	46

The class of *Zymotic* deaths never had so few in number as the present April exhibits. It is considerably less than half the eight years' average, and but little more than one-seventh of last April's mortality from this class of diseases. Four of the five deaths were from bowel-complaints, three of them being children aged respectively seven weeks, eleven months, and fourteen months. The fifth, a man aged 41, was registered "probably from cold and intemperance," therefore is classed alcoholismus. Last April, bowel-complaints caused 22 deaths; scarlet fever and diphtheria, 7; croup, fever, and pyœmia, each one.

The *constitutional class* of diseases caused a few fractions more deaths than the average. Dropsy, cancer, scrofula, and tabes-mesenterica each caused one death. Three were consumption, all British by birth.

The *local class* of diseases scarcely differs from the eight years' average of deaths, though it is considerably more than 1864 had. Diseases of the brain and nervous system had 7 of the 20 deaths. In 1864 this "order" had only

3. Diseases of the heart and organs of circulation had one death, being the same in number as in 1864. The lungs and organs of respiration had 8 deaths, all but one above 20 years old, the exception being a child aged nine months. Last year this "order" had exactly the same number of deaths. The organs of digestion had 3 deaths from inflammation of the liver, all above 45 years old. In 1864 there was only one. The organs of reproduction gave one death this April, none in the former.

The *developmental class* had a trifle more deaths than the eight years' average, but precisely the same in number as last year, though differing materially in age. All the 5 this year were from old age, aged respectively 62, 72, two at 75, and one 78. In April, 1864, three were young children, and two were old people from 70 to 75 years old. The 5th class, violent and accidental deaths, had less than half the eight years' average, though 1864 had none whatever. The death in the present month was a man of 77 brought to hospital from a country district with fracture of the thigh and other injuries.

The *inquests* held on deaths occurring during this month were 2; in April, 1864, there were not any. In the Hospital 9 deaths took place, the same in number as in 1864. Of these persons two did not belong to the Hobarton Registration District, one being a sailor, the other brought from a rural district. At the Male Invalid Asylum 5 deaths took place, three of them being upwards of 70 years old. Last April no deaths were recorded for this establishment. A female invalid aged 72 died at the Cascades establishment, together with a prisoner, aged 42 (one of the inquest cases), and a child aged 17 months. There were not any deaths there in April 1864. At the Queen's Asylum for Destitute Children, a boy verging on 9 years old, died from scrofula, after years of suffering; in fact life had been prolonged only by the assiduous attention he had received. No other death has occurred in this institution, so far, in 1865.

Of the 38 deaths, 23 were males, 15 females. Two of the deaths took place in the Glenorchy district, the rest in the city. On nine days there was not a single death; on 13 others only one each; on 3, two each; on 3, three each; and on 2, the concluding days and most fatal period of the month, five each. The first, second, and third weeks of the month each had six deaths, in the third week there were ten, and, as before stated, on the last two days ten.

The *Births* registered during the month were 61, being one less than in Aprils 1864 and 1863.

ROYAL SOCIETY.

MAY, 1865.

The usual monthly evening meeting of the Society was held on Tuesday, the 9th May, T. Stephens, Esq., in the chair.

Among the Fellows present were Dr. Agnew, Hon. Sec., Messrs. E. Swarbreck Hall, W. Henry, J. Davies, D. Lewis, R. Lewis, W. Johnston, H. S. Wintle, W. L. Dobson, F. Abbott, sen., F. Abbott, jun., Lieutenant Lloyd, R.E., &c., &c.

The Secretary laid on the table the usual returns for the past month, viz.,—

1. Visitors to Museum, 670.
2. Ditto to Gardens, 2,104.
3. Periodicals received (the usual).

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.
   (*a*) Table for April.
   (*b*) Summary of observations for ditto.
2. Port Arthur, from J. Boyd, Esq.
   (*a*) Table for March.
   (*b*) Reading of Government schooner's barometer for ditto.
3. Tamar Heads, from R. Henry, Esq.
   (*a*) Table for March.
   (*b*) Ditto for April.
4. Swansea, from Dr. Story.
   (*a*) Table for March.

The Secretary read the usual Analysis of the Observatory Records, together with a Health Report for April, by E. S. Hall, Esq.

The Presentations consisted of,—

1. A Golden Pheasant. From J. Maclanachan, Esq.
2. Two Gang-gang Cockatoos *(Callocephalon galeatum).*
3. Beaver Rat *(Hydromys chrysogaster).*
4. Fern *(Thalasseus poliocercus).* From Morton Allport, Esq.
5. Fish *(Clinus sp.).*
6. A large Centipede (picked up at sea, preserved in a bottle). From Mr. Turner.
7. Kingfisher. From Mr. Bellette.
8. Hyalea (with drawings). From Lieut. Lloyd, R.E. This specimen was procured at sea, in lat. 35° S., long. 18° W.

Mr. F. Abbott read some notes on the importance of establishing a Time Signal in Hobart Town, for the purpose of giving the correct time both to the city and to the surrounding districts. He recommended that a gun should be fired every day exactly at one o'clock, and as this would be attended with some expense he hoped the Society would think the matter of sufficient importance to bring it under the notice of the Executive.

Mr. Dobson observed if a time gun were established it would be well to be careful in fixing upon a proper site. When he was in Melbourne in February last the firing of the time gun at the University was discontinued as it was supposed to be the cause of some mortality in the Lying-in Hospital, situate in the immediate vicinity.

Mr. Abbott said that subsequent observation must have shown this opinion to be erroneous, as when he was in Melbourne, at a much later date, the firing of the gun had been resumed.

Mr. Davies thought it was entirely a question of expense, because as to the utility of the time signal there could be no doubt. He found, however, that firing a single gun, say a 32-pounder, could not be done for less than from £150 to £200 a year, a large expenditure for the colony. He was quite in favor, however, of a time ball, as at Greenwich.

Mr. Lloyd said that a much smaller gun than a 32-pounder would do. The sound would not, of course, be carried to the same distance as from a larger gun but he asked if a system of signals could not be established by the existing semaphores to repeat the time to the neighboring districts without expense.

Mr. ABBOTT did not think that anything but a gun would do. Signals would be affected by the weather, and could not be seen in all the circumjacent districts. A time ball, too, would not be of much use. It was not necessary in town, as St. David's clock always gave the correct time to within a minute or so, and it was not of much consequence to the shipping, as the port was small, and the captains of ships generally brought their chronometers on shore for regulation.

Mr. STEPHENS suggested, as the daily use of a gun was so expensive, that the firing might be done only at stated times, say once a week.

Mr. DAVIES suggested that before any action could be taken, it would be necessary to determine with accuracy to what distance the sound of a gun could be heard. He thought, if requested by the Royal Society, that the Volunteer Artillery might be able to institute some experiments on the subject.

Mr. DOBSON felt that definite information was wanted on many points, such as the expense, the size of the gun, distance to which the sound would be heard, &c.

Mr. JOHNSTON moved that the consideration of the question be postponed, and that a committee be formed to obtain full information on the subject, and to bring up its report to the Society at as early a period as possible. Such committee to consist of Col. Chesney, Mr. Lloyd (R.E.), Mr. Davies, Mr. Dobson, Mr. D. Lewis, and Mr. Abbott.

The motion was agreed to.

The SECRETARY reported that the Council had determined to devote the next evening meeting to a microscopic exhibition, to which each Fellow would have the privilege of inviting ladies. It was hoped the owners of microscopes would put themselves at once in communication with the Curator, as it was desirable that arrangements should be made at least a week before the meetings as to the best mode of exhibiting the various specimens from the animal, vegetable, and mineral kingdoms, &c., which would be submitted to the visitors for examination. It was expected that at least twelve microscopes would be in action.

The usual vote of thanks to the authors of the papers and the donors of presentations having been accorded, the proceedings terminated.

TIME SIGNALS.

It is much to be desired that the time kept by public or private clocks should agree better, if not with the heavens, at least with one another, and in order to accomplish this object satisfactorily a signal should be given from an Observatory, or from some public place where the time of the day can be known with certainty at every instant. This signal should be given at the precise moment of one o'clock each day, so that every inhabitant in Hobart Town, and for a considerable distance round will have the opportunity of regulating their own clocks. By this means clocks will no longer go irregularly, but without continually altering them their owners will have an opportunity of ascertaining their daily rate, and thereby be enabled to keep their common affairs of daily life more punctually.

Time signals are by no means new, perhaps the first adoption of them was by J. Letrow, director of the Observatory at Vienna, since which time they have become of general use in most commercial towns, particularly for the use of shipping. Their importance has been frequently brought before the British Association, and various systems have been adopted, but for general purposes the Time Ball, or the firing of a cannon is admitted.

The Time-ball apparatus was erected at the Royal Observatory at Greenwich in the autumn of 1833. This ball, which is five feet in diameter, is raised half-mast high at five minutes before one o'clock as a preparatory signal for the public to watch; it is then raised to the top of the mast, and at the precise moment of one o'clock it is dropped suddenly, and resumes its first position till the following day. The error of letting off the ball seldom amounts to more than three-tenths of a second.

Time-ball signals have been also adopted at Deal, Portsmouth, Liverpool, and Edinburgh; also at the Cape of Good Hope, St. Helena, Madras, and many other British colonies.

It was found at Edinburgh, that under some circumstances there was time wasted in waiting for the ball to drop, and in the event of any delay the exact time was lost. Thus the gun which could be heard everywhere effected an economy of time. At the Palais Royale at Paris, a small dial gun is fired when the sun arrives at a certain meridian. In 1861, by the aid of electricity, a gun was fired at Edinburgh Castle simultaneously with the dropping of the ball at the Observatory. Time gun signals are now becoming very general; they are adopted at Newcastle, Shields, Sunderland, and many other towns. Melbourne has also taken advantage of this plan of giving the public means of ascertaining correct time. Two 32 pounders have been mounted at the Melbourne University, and at one o'clock p.m. each day one of these pieces is discharged.

I have brought these few remarks before the present meeting, considering the subject of sufficient importance to induce the Council of the Royal Society to bring the matter under the consideration of the Executive Government. The expense and trouble consequent on the firing of a cannon at the battery or elsewhere, at a certain moment, once a day, will bear no comparison with the benefit to be derived from it—and although the colony is not sufficiently in advance to provide the necessary apparatus for passing a current of electricity from a galvanic battery to the transit circle, and from thence to the seconds hand of the clock so as to ensure accuracy in giving the signal to three-tenths of a second, it may in the ordinary way, with care and diligence, be given to two or three seconds of time, and in some cases even less than that.

A principal reason why gun signals are preferable to all others is the great distance to which sounds are propagated. A cannon fired at Hobart Town, under an ordinary state of the atmosphere, would be heard in all the surrounding districts; there are cases on record in which, under very favorable atmospheric circumstances, guns have been heard at distances from 100 to 200 miles.

If the Council of the Society, with the concurrence of the present meeting, consider this subject of any importance, and that the proper time has arrived for taking such steps, there is little reason to doubt but that on application the government will be induced to give the necessary assistance, which (apart from the expense), will only require the services of a correct man for about half an hour each day, with a good watch to carry the time from the transit clock to the cannon. The correct time, I scarcely need say, I shal always be happy to supply.

METEOROLOGY FOR MAY, 1865.

Private Observatory, Hobart Town.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced — Highest.	Lowest.	Self-registering Thermometers. — Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind. — Direction from three daily registers.	Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	29·906	29·874	66	41	91	37·5	NW SW	0·	
2	29·904	29·850	63	42	80	38·5	SW E W	·26	
3	29·860	29·635	60	42	68	39·5	NW	3·12	0·05
4	29·790	29·750	59	45	89	43·5	SE W NW	·52	0·03
5	30·148	29·976	56	41	80	40·0	SW S SW	5·99	0.08
6	30·219	30·166	66	43	93	32·0	SW NE NW	·52	
7	30·068	29·924	68	45	96	41·5	SW E S	·26	
8	29·840	29·719	66	49	65	47·0	NW N NW	·52	
9	29·698	29·521	67	44	93	43·0	NW N	·52	0·03
10	29·640	29·536	68	40	104	37·0	NW E SE	·26	
11	29·651	29·375	71	45	96	42·5	NW N	5·21	
12	29·520	29·174	68	41	90	39·0	SW N NW	7·81	0·11
13	29·418	29·228	62	45	70	41·5	SW SE W	3·64	0·04
14	28·924	28·885	58	38	85	34·5	N NW	·78	0·04
15	29·416	29·130	55	39	78	35·5	SW	8·07	0·23
16	29·737	29·654	58	45	90	40·0	W SW SE	·52	
17	29·912	29·812	60	42	90	38·5	W SE S	·26	0·08
18	30·137	30·034	57	39	80	35·0	NW N SW	·52	0·07
19	30·164	30·159	67	38	96	34·0	NE NE NW	·52	
20	30·239	30·186	68	35	92	31·5	NW N SW	0·	
21	30·291	30·248	65	45	90	30·5	W NW	·52	
22	30·336	30·316	67	36	95	32.5	NW SW	0·	
23	30·388	30·328	68	44	92	42·5	NW W SW	0·	
24	30·333	30·228	64	41	87	37·0	NW W	·26	
25	30·166	30·012	61	38	86	35·5	NW	3·12	
26	29·929	29·907	58	50	60	47·0	NW N	·26	
27	29·569	29·467	67	50	85	49·0	NW	13·02	
28	29·433	29·391	62	46	82	35·0	NW SW	·52	0·02
29	29·800	29·664	60	40	68	35·0	NW S	1.04	0.34
30	29·900	29.850	56	45	64	40·0	S	1.56	0·70
31	29·928	29.909	55	44	78	40·0	SW S	·78	0·06
							Total force	60·38lbs	1·88

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 Guage. 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:—

7th First Medlar ripe.
15th Coronilla glauca commencing to flower.
20th Diosma alba commencing to flower.
25th Ailantus trees bare of leaves.
28th Photima serrulata commencing to flower.
30th Spirœa prunifolia commencing to flower.

Barometer mean, 29·820in., being 0·008in. below the average.
Temperature mean. 49·95°, being 0·55° ditto.
Solar intensity mean, 84·29°, being 7·71° ditto.
Dew point mean, 41·8°, being 1·59° ditto.
Humidity of air mean, ·79, being 0· per cent.
Elastic force of vapor mean, ·283, being ·026 per cent. below the average.
Total amount of rain, 1·88in., being 0·03 above the average.
Mean amount of ozone, 8·18, being 1·69 of chromatic scale above the average.
Increase of rain fall on spontaneous evaporation, 0·25 inches.
Lightning on the 26th and 27th.
Frequent and fresh deposits of snow on Mount Wellington.
Electricity active on the 2nd, 4th, 10th, 27th, and 28th.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR MAY, 1865, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c.

By E. Swarbreck Hall.

The fluctuations in atmospheric pressure, with the frequent and extreme variations in temperature, this month, had an extensively fatal influence on aged and diseased persons, and, together with the unusually numerous accidental deaths, caused a total mortality slightly beyond the average of the previous eight years, though, still, considerably fewer than May, 1864, had. On the other hand, the pure state of the air, consequent upon its free movement, the moderate rain-falls, and abundance of electricity, preserved the community from Zymotic diseases ; and infantile deaths were not half the number that May, 1864, had.

Atmospheric pressure had a mean (29·820), so nearly that of the average of the 20 years adopted standard, that it was only —·008 less; nevertheless the range, 1.503 inches, had never been nearly so great in May since 1865, when it was 1·649. The maximum was recorded on the 23rd, being 30·388, and the minimum 28·885, happened on the 14th. The greatest movement of the barometer in any 24 hours, was a fall of —·447 of an inch on the 27th. The greatest rise was +·407 on the 15th ; and from that day the rises were great and continuous up to the 23rd. The 14th had a fall of —·401. Altogether there were variations of pressure exceeding one-fifth of an inch, on ten days in the month. However, in comparison with May, 1864, this month's atmospheric pressure was more favorable to life.

Wind force had a total of 60·38lbs., being +11·04lbs. above the May average of the previous 8 years. S.W., N.W., and S. winds were above the average both in frequency and force. East had a slight excess in force, but all the rest were below the mean in both respects. The strongest winds had a pressure of 5·21lbs. to the square foot, and were recorded six times. *Calms* were noted at 38 of the observations, being slightly below the average for May.

Mean temperature, 49·95 degrees, was —00·56 below the average for May, and —2·19 degrees less than May, 1864, had. By the maxima and minima self-registering thermometers, the mean deduced was 52·65 degrees. The difference between these two modes of ascertaining mean temperature is unusually great. The hottest day of the month, the 11th, attained 71 degrees of shade temperature, which is higher than any May of the three preceding years. The coldest night was the 20th, when the thermometer marked 35 degrees. In 1864 the minima thermometer fell two degrees lower, and the extreme range was one degree more.

The daily range of temperature mean was 19·94 degrees, being + 4·64 degrees above the 20 years' average, and + 2·78 higher than May last year. Since 1857 no May has had a temperature so variable in its daily changes. The greatest range in any 24 hours was 33 degrees on the 20th, and the lowest was 8 degrees on the 26th May. 1857 had two degrees higher extreme range, but no other of the 24 years recorded have been so high. European medical practitioners usually ascribe the variations in daily mortality (in the absence of epidemic diseases) solely to fluctuations of temperature. An able article, in the last number of the *Popular Science Review*, "On the Wave of Temperature, and the Wave of Death," adopts this view. Tasmanian experience however, does not confirm it. Possibly in our purer air, with the better feeding and clothing of the great mass of the community, the constitution is more able to resist the injurious influence of rapid changes of temperature. Even the very young do not succumb to it; it is only the aged and diseased who sink under it.

Solar temperature mean, 84·29 degrees, was +2·68 degrees above the average of the previous nine years, though one degree less than May 1864 had. Nevertheless, as the present month exceeds last year's in its cloud mean, it is evident that the sun while shining was hotter. Indeed the maximum of this month, 104, on the 10th, is four degrees above the highest in 1864, and is the hottest on record in May.

Terrestrial-radiation mean was 38·56 degrees, which is —·83 of a degree below the average of the previous nine years, and —2·57 degrees less than May 1864 had. The extremes were 49 on the 27th; 30·5 on the 21st.

Rain fell on 14 days to the aggregate amount of 1·88 inches, which only differs from the 20 years' average for May, by +·03 above. At the same time, the number of wet days is —1·10 less than the average of the previous ten years. Until the 12th day of the month, no rain fell sufficient to scour the surface drains, but on that day, and again on the 15th, 29th and 30th, this effect, so important to the sanitary condition of the city, was produced. Frequent deposits of *Snow* took place on Mount Wellington, but it was not persistent throughout the month. Last year, less than one-half of the present month's rain fell in May. In the mortality comparisons of months, the rain-fall is always an important condition in Tasmania.

Spontaneous evaporation, notwithstanding the hot sun and free aerial movement, did not equal the rain precipitated, being only 1·63 inches. In May last year it was the reverse.

Elastic force of vapor mean, 283, was —26 below the 20 years' average. The previous May was only —11 less.

Humidity mean was 79, being exactly that of the 20 years' standard. May 1864 was —3 below this.

Cloud mean was 6·47 being +·77 more than the 20 years' average, and +·47 above May 1864.

Ozone mean, 8.18, was +1.56 above the average of the previous eight years' Mays, and the highest of any of them. It is also +.78 more than May 1864 had. Being accompanied with a moist state of air, and little elastic force of vapor, it did not, as otherwise it is apt to do, produce inflammatory affections of the air passages—catarrah, bronchitis, &c. Never was a month so free from deaths, from acute, or zymotic diseases.

The *electrometer* recorded 16 positive indications with maximum tension of 6. The negatives were 41, with maximum tension of 6. Nil was recorded 5 times. In May 1864 there was one more positive with same maximum tension, three more negatives, with maximum tension half a degree higher, and only one nil record.

The *deaths* in May 1865 were 43 in number, being +3$\frac{3}{8}$ more than the average of the preceding eight years, but —5 less than May 1864 had. The tables following will show, that the conclusions deduced from the analysis of the meteorological conditions of the month, are accurately substantiated.

May, 1865.	Ages.	April, 1865	Mays, 1864	1863	1862	Max. 1861	1860	Min. 1859	1858	1857	Avg. 8 yrs. Mays, 1857–1864.
5	Under 1	5	9	4	7	12	9	7	12	8	8 4-8
2	1 to 5	2	6	6	2	16	4	5	7	7	6 5-8
4	5 to 20	4	2	3	3	9	1	1	2	1	2 6-8
8	20 to 45	7	11	11	12	5	13	7	7	10	9 4-8
12	45 to 60	7	12	3	8	3	8	5	10	7	7
12	60 and above	13	8	8	4	5	4	4	5	5	5 3-8
43		38	48	35	36	50	39	29	43	38	39 6-8

The deaths, under five years of age, 7, are less than half the average of the preceding eight years, as also of May 1864. Moreover, they are less than those in any one of the eight Mays tabled. They are also less than one-sixth of the total deaths at all ages. At 5 to 20 deaths were above the average and were only exceeded by one year of the eight, 1861. At "20 to 45," the deaths were below the average, and only three years had fewer. At "45 to 60," the eight years' average was greatly exceeded, and only May, 1864, had as many deaths. At "all ages above 60" the mortality was more than double the average, and no one of the eight years' approached to it nearer than by one third less. The oldest person that died this month, was an inmate of the Brickfields Invalid Asylum, and was 91 years old.

May, 1865	Classes of Disease	April, 1865	Mays. Max.							Min.	Avg. of 8 yrs. Mays, 157-1864.
			1864	1863	1862	1861	1860	1859	1858	1857	
1	1. Zymotic	5	7	6	3	23	9	2	8	7	8 1-8
12	2. Constitutional	7	12	6	11	7	8	9	2	3	7 2-8
21	3. Local	20	24	16	13	14	18	13	25	21	18
3	4. Developmental	5	4	4	3	4	3	2	4	2	3 2-8
6	5. Violent &c.	1	1	3	6	2	1	3	4	5	3 1-8
43		38	48	35	36	50	39	29	43	38	39 6-8

Zymotic diseases had only one death, a baby of six weeks old, from congenital disease. No year of the eight, had less than double this number, and the highest had twenty-three. Nothing could more clearly indicate the general purity of the air, and propitiousness of the weather to healthy persons, than this. In the *Constitutional Class* of diseases, the deaths were greatly above the average, though precisely the same in number as recorded for May, 1864. Eight of the twelve were from *Consumption*, at ages from 6 to 50 years, and the two youngest were Tasmanians by birth. Two of the others were from *Hydrocephalus*, and *Cancer* and *Dropsy* had each one. All were old standing diseases brought to a fatal termination by the sudden variations of pressure and temperature. Indeed this remark is applicable to all the deaths of the month, except the six accidents, and one other. The *Local Class* of deaths exceeded the eight years' average, by the same number that it was less than May, 1864. The 1st order, *Diseases of the Brain and Nervous System*, had six deaths, while May 1864, had 10. The 2nd order, *Diseases of the Heart and Circulatory System*, had five deaths, May 1864 the same. The 3rd order, *Diseases of the Lungs and Respiratory System*, had four deaths, the same in number as 1864. The 4th order, *Diseases of the Stomach and Digestive System*, had four deaths, May 1864 had only one,—all were chronic diseases. The 5th order, *Diseases of the Urinary system*, had one death, while May 1864 had three. The 7th order, *Diseases of the Locomotive system*, had one death, but 1864 had not any, though it had one in the next order which was not the case in the present month. In the *Developmental class* of diseases the deaths were slightly below the average, and 25 per cent. less than 1864 had.

The class of *Violent and Accidental* deaths, had nearly double the average, while 1864 had only one-sixth of the number. Three of the six were from *burns*; one, internal injuries by a fall from a dray, was brought to Hospital from a country district and lingered some time; the fifth died in gaol from *suffocation* in swallowing a piece of meat; the sixth committed suicide by *hanging*.

Inquests on deaths occurring during the month were seven, while May last year had only four. In the *Hospital* sixteen deaths took place, exclusive of those on which inquests were held. Of these, four were received from country districts. Two others died on the day of their admission. In May 1864 the number of deaths in Hospital, including one inquest case, was ten. For a long time past, deaths in Hospital have formed a larger proportion of total deaths than used formerly to be the case, and it is to be accounted for from two causes:—first, the greater incapability of the lower classes of paying for private medical attendance; and second, the less repugnance there is to going into Hospital, now that its provisions for suffering humanity have been so much improved. At the *Brickfields' Invalid Asylum* five deaths took place, aged 57, 64, 67, 80, 91, respectively. In May 1864, only one death was recorded in that establishment. The remarks made on the hospital, are equally applicable to the Male Invalid Asylum, which under the able management of its Superintendent and the vigilant oversight of its Board, has improved so much. For a long time past every bed has been constantly occupied, and many applicants awaiting every vacancy.

Of the 43 deaths this month, 31 were males, 12 females, an unusually large share for the former. Two died in the Glenorchy division of the registration district, the rest in the city. In the first week of the month, 12 died ; in the second and third, 9 each ; in the fourth, 8 ; in the last three days, 5. Six days of the month had not a death. The greatest number on any two consecutive days, was 5, on the last two days of the month, which were remarkable for a sudden extensive increase of atmospheric pressure, decrease of temperature, absence of electricity, fresh southerly wind, and copious fall of rain.

The *births* registered during the month were 73, being 3 more than in May, 1864.

ROYAL SOCIETY.

JUNE, 1865.

The monthly evening meeting of the Society was held on Tuesday, the 13th June. T. Giblin, Esq., in the chair.

H. Hopkins, Jun., Esq., having been previously nominated by the Council, was, after a ballot, declared to be duly elected a Fellow of the Society.

The SECRETARY (Dr. Agnew) laid on the table the usual monthly returns, viz. :—

1. Visitors to Museum during May, 353.
2. Ditto to Gardens, ditto, 1,610.
3. Plants and Seeds received at Gardens :—From Messrs. Handaside and McMillan, Melbourne, 24 plants. From H. Hull, Esq., 9 papers of seeds from New Zealand. From Col. Chesney, 1 paper of grass seed from England.
4. Plants, &c., sent from Gardens :—To Messrs. Handaside and McMillan, 84 plants. To Colonel Chesney, for decoration of ground at the Macquarie-street entrance to Queen's Park, 147 plants.
5. Books and Periodicals received.

Meteorological Returns :—

1. Hobart Town, from F. Abbott, Esq.
   (a) Table for May.
   (b) Summary of Observations for ditto.
2. Port Arthur, from J. Boyd, Esq.
   (a) Table for April.
   (b) Reading of Government schooner's Barometer for ditto.
3. Tamar Heads, from R. Henry, jun., Esq.
   (a) Table for May.
4. Ross, from M. Duncanson, Esq.
   (a) Table for May.

The SECRETARY read the usual Analysis of the Meteorological Observations, with a Health Report for the month by E. S. Hall, Esq.

The presentations were as follows :—

1. A monkey, from Batavia. Presented by Mrs. McMinn.
2. Specimen of Calc Spar, from Lime Hill, Western District, Southland, New Zealand. Presented by Captain Brown, of the Eucalyptus.
3. Pair of buffalo horns, and two Indian fans. Presented by A. Moses, Esq.
4. Fifty prepared bird-skins, 9 specimens of reptiles, and 108 of fish. Presented by Dr. Möbius, of the Hamburgh Museum, per L. Susman, Esq.
5. Long-billed Cockatoo *(Licmetis nasicus)*. Presented by H. Hopkins, jun., Esq.
6. Crustacean found in the kelp at Tinder-box Bay.
7. Gold in quartz, obtained at Spring River, near Port Davey (?) Presented by Mr. H. McDonagh.
8. A woollen mask (knitted work) worn as a protection from the cold by travellers over the Andes. Presented by Mrs. T. Giblin.
9. Skin of Tiger-cat *(Dasyurus maculatus)*. From M. Allport, Esq.
10. A block of the bituminous substance from which the paraffine oil of commerce is distilled. From the Hartley Coal Mines, New South Wales. Presented by Mr. W. Johnston, for Mr. McRae.
11. Nest of English Thrush *(Turdus musicus)*, built in one day in Mr. Propsting's aviary. A family two of were reared in this nest. Presented by Mr. Propsting.

The nest was built of shreds from a soogee bag which had been ravelled out by Mr. Propsting and placed in a locality to which the birds had access, and it was lined with clay which had also been provided for them. It was of interest not only on account of the very short period which was occupied in building it, but also from the fact of its being the first nest in the colony in which a young brood of the English songster had been reared.

A vote of thanks (moved by Mr. NICHOL and seconded by Mr. FACEY) to the donors of presentations was agreed to.

Agreeably to the resolution passed at last meeting, the Museum and Library were now thrown open for a Microscopical Exhibition, and as each Fellow had the privilege of introducing two ladies, the rooms were soon crowded with visitors.

Seventeen microscopes were arranged on tables, and to each instrument a card was attached containing the name of the exhibitor with a list of the objects for examination. The instruments were by Smith and Beach, Ross, G. Oberhauser, &c. Of the Fellows of the Society, Mr. Abbott, Mr. Abbott, junr., Dr. Agnew, Mr. M. Allport, Dr. Butler, Col. Chesney, Mr. H. Johnston, Mr. T. Giblin, Dr. Turnley, and Mr. Roblin (Curator), exhibited instruments, and Dr. Bright, Mr. Stone, and Mr. Legrand kindly acted as volunteers for the occasion. The microscope belonging to Mr. Stone (by Smith & Beck) attracted attention as being the only one present of the binocular construction.

With so many good instruments, and with powers ranging from 50 up to 1000 diameters, a great variety of objects were submitted for examination. Amongst others might be noticed the circulation of the blood in animals (tail of Tadpole); circulation of the sap in plants (Nitella); animal tissue; vegetable tissue; method of measuring accurately microscopic objects; diatoms in great variety from this colony, and from England and elsewhere; infusoria; crystals; photographs; and many other objects of a miscellaneous character.

The evening was far advanced before the various objects were exhausted, and on retiring the visitors expressed so much satisfaction with the exhibition, that it is probable a similar meeting will be held at the close of the session, at which period of the year (summer) many natural objects which cannot be now procured will be obtainable.

METEOROLOGY FOR JUNE, 1865.

Private Observatory, Hobart Town.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced. Highest.	Lowest.	Self-registering Thermometers. Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind. Direction from three daily registers.	Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	30·019	30·000	58	38	80	34·0	NW S	·52	
2	29·980	29·829	55	33	77	31·0	NW N NW	0·	
3	29·678	29·493	56	36	72	32·5	NW W NW	·26	
4	29·370	29·308	58	34	84	35·0	NW N NW	·52	
5	29·640	29·480	57	32	80	28·5	NW NE W	·52	0·14
6	30·150	30·022	62	37	85	33·5	NW W	·26	0·30
7	30·282	30·225	59	44	76	29·5	SW NW	·26	
8	30·294	30·241	63	35	84	32·0	W S	0·	
9	30·277	30·231	60	34	85	29·5	NW N	0·	
10	30·203	30·116	62	37	87	34·0	NW SW	·78	
11	30·335	30·289	60	32	80	29·0	NW	·26	
12	30·314	30·232	61	34	82	30·5	W NW W	·52	
13	30·317	30·275	70	45	94	39·5	NW	·52	
14	30·390	30·338	66	49	70	44·0	NE NW	·26	
15	30·367	30·340	63	40	73	38·0	NW E	0·	
16	30·380	30·352	60	38	75	32·0	NW	·26	
17	30·349	30·252	58	34	70	32·5	NW	·78	
18	30·176	29·992	56	39	59	37·0	NW	·52	
19	30·082	30·061	62	38	88	37·0	NW N	·26	
20	30·092	29·963	69	50	83	47·5	N	1.4	0·06
21	30·125	29·982	72	52	92	44·0	SW NW N	·26	
22	30·114	29·976	69	41	86	37·0	NW W	·78	
23	29·840	29·757	72	50	93	44·0	NW N	·52	
24	29·538	29·425	68	45	78	40·5	NW N NW	3·38	0·14
25	29·491	29·319	64	41	76	43·0	N SW S	·78	0·10
26	29·906	29·804	61	41	60	38·5	W S W	·26	0·06
27	29·874	29·646	58	36	79	33·5	NW	·78	
28	29·564	29·478	55	39	65	33·5	NW S	·52	0·29
29	29·858	29·768	57	36	75	33·0	S SW	·78	0·10
30	30·092	29·855	57	40	81	36·0	W SW	2·86	0·01
							Total force	18·46lbs	1·20

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 Guage. 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 :—

3rd. Maclaura aurantiaca leaves commencing to fall.
6th. Early Narcissus commencing to open.
10th. Privet shedding leaves.
15th. Snow Flake in flower.
25th. Leaves of Mulberry (Black) all shed.
30th. Pyrus japonica commencing to flower.

Barometer mean, 29·982in., being 0·115in. above the average.
Temperature mean. 48·44°, being 1·31° ditto.
Solar intensity mean, 78·98°, being 1·98° ditto.
Dew point mean, 39·6°, being 1·59° below the mean.
Humidity of air mean, ·77, being 6·5 per cent. ditto
Elastic force of vapor mean, ·263, being 0·11 per cent. ditto.
Total amount of rain, 1·20in., being 0·69 in. below the average.
Increase of spontaneous evaporation on rain fall, 0·03 inches.
Mean amount of ozone, 8·19, being 2 28 of chromatic scale above the average.
Electricity active on the 6th, 10th, 12th, 29th, and 30th.
Lightning on the 24th.
Snow never absent from Mount Wellington during the month.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR JUNE, 1865 IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c.

By E. Swarbreck Hall.

Warm, sunny days, cold nights, with consequent high mean of daily-range of temperature, very gentle ærial movement, high atmospheric pressure, small rainfall, and abundance of electricity and ozone, was the prevailing character of the weather this month. Only once in the previous eight years was there as small a mortality numerically (— 32) *i.e.*, in 1857, but in the comparison, both of ages, and classes of disease, the present month exhibits the healthiest character of any June on record.

Atmospheric pressure mean was :—29·982, being + ·115 more than the average of the 20 years' adopted standard, though — ·049 less than June 1864 had. The extremes were, 30·390, maximum, on the 14th; and 29·308 minimum, on the 4th; being a range for the month of 1·082 inches. 1864, in this respect, differed in a scarcely appreciable amount. The greatest movement of the barometer on any day, was a rise of + ·539 of an inch on the 26th. On nine other days the movements exceeded one-fifth of an inch. The perturbations of this instrument were much greater in June, 1864.

Wind force was only 18·46lbs., being — 6·80 below the average of the eight preceding years, and less than any of them, except June 1860, which had only 13·26lbs. The *calms* were 46, being exactly the average. From every point of the compass, except S.W., W., and N.W., the winds both in force and frequency, were below the average. N.W. greatly predominated in frequency by the vane in Hobart city, yet other places had more from the W. and S.W. Even a place so near us as Mount Nelson evinced this prevalence from the pure ocean quarters. The strongest wind recorded had only 2·60lbs. pressure to the square foot, and was registered at the 7 a.m. observation on the 24th, and at noon on the 30th. Pure, genial, gentle breathings of air, enjoyable by everybody, marked this month with a note of admiration in the weather calendar, and established its claim to having been the most delicious winter month ever recorded.

Temperature mean 48·44 degrees, was + 1·31 above the 20 years' average, and about a degree higher than June, 1864, had. By the self-registering maxima and minima thermometers, the mean was 50·47 degrees. A peculiar phenomenon, however, is entitled to special remark, this is the wide and unusual difference between the mean of all the maxima and all the minima; the former being 61·60 degrees, and the latter only 39·33 degrees. The hottest days were the 13th, 21st, and 23rd, having the maximum temperature of 70·, 72·, ·72, respectively. No June in the previous 24 years had so warm a temperature as the latter. It is remarkable too that the barometer on these days was very high also, being a very unusual accompaniment. The coldest nights were the 5th and 11th, when the minima thermometer registered 32, or freezing-point. The mean day-temperature in June last year was nearly five and a half degrees colder, while the night-temperature was more than one and three-quarter degrees warmer.

Daily range of temperature had the mean of 22·27 degrees, being + 6·97 degrees above the 20 years' mean, and + 7·14 more than June, 1864, had. This, with the high atmospheric pressure, told heavily on aged and debilitated persons, though innocuous to the young and healthy. The greatest range for any day was 28 degrees, and was noted three times;—on the 8th, 11th, and 22nd. The smallest range was 15 degrees, registered on the 7th. The corresponding records of last year were 22 and 6.

The *solar thermometer* had a mean of 78·98 degrees, which is + 4·49 degrees more than the average of the previous nine years; 1855 was the only year that had a higher mean. 1864 had less by — 6·52 degrees. The highest temperature noted was 94 degrees on the 13th. Only 1856 had a higher maximum. 1864 was five degrees less.

Terrestrial radiation mean, 35·65 degrees, was — 1·09 degrees below the 9 years' average, and only 1862 was colder, having a mean of but 34·71 degrees. The extremes of the present month were 28·5 on the 5th, 47·5 on the 20th. Singularly enough these extremes are precisely the same as in June, 1864, while the mean for that month was more than two degrees higher than for this.

Rain fell on the 5th, 6th, 19th, 24th, 25th, 26th, 28th, and 29th. On the 5th, 24th, 25th, 28th, it was sufficient to scour the surface channels. The aggregate amount, however, 1·20 inches, is — .69 below the 20 years' average for this month, and was less than one-third of what was guaged in June last year. On the morning of the 29th the roofs of the houses and all the low hills around the city were coated with *snow*, and frequent snow squalls occurred; during the day. This was one of the few really wintry days in the month. *Snow* was never absent from Mount Wellington during the month, though diminished for some days about the middle of the month to a few scattered patches, as visible from the city.

Spontaneous evaporation only slightly exceeded precipitation, being 1·23 inches, and—·19 less than last year.

Elastic force of vapor mean, was 263, being — 11 less than the 20 years' average, and — 10 less than last year had.

Humidity mean, 77, was — 6½ below the 20 years' mean, and only 1858 had so low a mean; 1864 had a mean 5 degrees higher.

Cloud mean, 5·58, was + ·09 above the 20 years' mean, but — ·59 less than June 1864.

Ozone had the highest mean for June ever noted during the 8 years for which records have been made, *i.e.*, 8·19, being + 1·90 above the average, and + 1·29 above last year. Saturation, 10, was recorded five times; the minimum was 4, on the evening of the 17th. The 16th, 17th, and 18th had the smallest quantity in the month, and on all these days electricity was nil. N.W. winds marked at every observation and atmospheric pressure very high. The mortuary records show the lethal influence distinctly. A baby of 9 days old, with congenital heart disease, and men of 79 and 86 years old succumbed to it.

Electricity had 18 records of Positive with maximum tension of 6; 1864 had only 3 with maximum tension of 5. Negative was registered 34 times, with maximum tension of 5. June last year had 41, but with only 4·5 maximum tension. Nil was recorded 8 times, being only half the number noted in 1864. *Lightning* was observed on the evening of the 24th.

Thirty-two *deaths* have been registered for this June, being 11 less than occurred in May, and 15⅛ less than the average for June of the previous eight years. It is, moreover, 22 less than died in June last year. The first year of the eight, 1857, had the same in number, but from the analysis of "ages at death," and "diseases causing death," it will be evident that the present month is the healthiest June on record.

June, 1865.	Ages.	May, 1865.	Junes. 1864	1863	1862	Max. 1861	1860	1859	1858	Min. 1857	Avg. 8 yrs. Junes, 1857–1864.
7	Under 1	5	14	6	10	9	12	11	7	9	9 6-8
2	1 to 5	2	10	6	3	20	5	5	8	8	8 1-8
4	5 to 20	4	4	3	5	4	0	4	3	2	3 1-8
4	20 to 45	8	7	9	14	14	11	14	15	8	11 4-8
3	45 to 60	12	9	10	11	5	3	9	9	2	7 2-8
12	60 and above	12	10	14	10	7	5	5	5	3	7 3-8
32		43	54	48	53	59	36	48	47	32	47 1-8

At *all ages under one year* the deaths were considerably below the eight years' average. 1863 had one less, 1858 was the same in number, but all the other six years were much more numerous, last year having exactly twice as great a mortality. At "1 to 5 years of age" the deaths were not one-fourth of the eight years' average, and not one of the eight had so small a number. Last year had five times as many. At all ages under five years old, the present month has much fewer deaths than any one of the eight years tabled, and but little more than one-third of last year. At "5 to

20" the deaths were slightly above the eight year's average, three of the eight, including 1864, having the same number, 1862 one more, but the other four less. At "20 to 45," the mortality was little more than one-third of the average, and very much less than any one of the eight years. At "45 to 60" the deaths were considerably less than one-half of the average. 1862 had the same in number, 1857 one less, but the other six years all very much more. At "all ages above 60" the deaths were not only much above the average, but considerably exceeded every year, except 1863 which had two more. The high proportionate rate of mortality in old people, so often of late recorded, is significant of two facts; one of interest to the meteorologist and sanitarian, but the other of greater moment to the statesman. The first is:—that meteorological changes that hurry old and infirm people to the grave has little or no influence on the young and healthy; the second is:—that the changes for a long time going on, in the constituent elements of the Tasmanian population is rapidly increasing the number of the old and dependent, as well as the young and helpless. Nevertheless, as I remarked in the "Report" for January last, the population last year was increased by 666 more male adults "arrived" than "departed." For a long series of years previously the reverse was the annual return.

June, 1865	Classes of Disease	May, 1865	Junes. Max. 1864	1863	1862	1861	1860	1859	1858	Min. 1857	Avg. of 8 yrs. Junes, 1857-1864.
2	1. Zymotic	1	5	4	9	23	2	11	8	9	8 7-8
3	2. Constitutional	12	6	5	8	7	9	10	10	3	7 2-8
19	3. Local	21	33	29	26	25	20	21	17	14	23 1-8
6	4. Developmental	3	6	8	4	3	4	6	7	4	5 2-8
2	5. Violent &c.	6	4	2	6	1	1	0	5	2	2 5-8
32		43	54	48	53	59	36	48	47	32	47 1-8

Zymotic diseases only caused two children's deaths, one from croup at 6 years old, the other from diarrhœa, aged 8 weeks. This number is less than one-fourth of the June average for eight years. Only one year of the eight—1860—having so few. 1864 had more than twice the number.

Constitutional diseases had much less than half the average, and exactly half of 1864. One of the three, only, was from consumption, a Tasmanian child $4\frac{1}{2}$ years old. Last year the deaths from this disease were four, one a Tasmanian.

Local diseases caused less than the average number of deaths, and but little more than half of what occurred in 1864. Nevertheless, the two first years of the eight recorded, had fewer deaths than the present. Of the 19 deaths, 6 were from *diseases of the brain and nervous system;* there being 8 in 1864. *Diseases of the heart and organs of circulation* had 4 in 1865, to 6 in 1864. *Diseases of the lungs and organs of respiration* had 4, while 1864 had 14. Of *diseases of the stomach and organs of digestion* this year had only one, while 1864 had 3. The *urinary organs* contributed 4 to the mortuary record this year, but only 2 in 1864. No other of the orders in the local class gave any deaths to the list either in this month or June, 1864.

Developmental diseases had slightly above the average of June deaths, but exactly the same that 1864 had.

The *violent and accidental class* had less than the average, and only half of the number in 1864. One was a death from burns in a girl 7 years old, the other a young man of 19 died from the effects of an injury caused by a tree falling on and tearing off his foot. The *inquests* on deaths in this report were 2; while in 1864 there were 3. The deaths in *hospital*, including both those on which inquests were held, were 8, last year they were one more. One of the present month's deaths was a case sent from a country district. At the

Male Asylum for Invalids 5 deaths took place, aged respectively 54, 69, 75, 76, 79; June 1864 had only one.

Of the 32 deaths, one died in the Glenorchy, one in the Queenborough, and the rest in the city districts, 23 were males, 9 females, a disproportion nearly as great as occurred in May. In the first week, 13 died; in the second, 4; in the third, 5; in the fourth, 6; in the last two days, 4. The most fatal period was the first four days of the month, when 10 died; the last two days of the previous month having also been themost fatal in May. On one-half the days of the month no deaths took place, the longest interval without a death being the four days, 8th to 11th.

The *births* registered were 78, being 7 more than in June, 1864.

ROYAL SOCIETY.

JULY, 1865.

The monthly evening meeting of the Fellows was held on Tuesday, the 11th July, the Hon. R. Officer, Esq., V.P., in the chair.

The following gentlemen (who had been previously nominated by the Council) were, after a ballot, declared to be duly elected as Fellows of the Society:—Messrs. R. S. Bright, M.R.C.S.L.; J. Doughty, M.R.C.S.L. H. J. Buckland; and C. G. Greig.

The usual monthly returns were laid on the table, viz.:—

1. Visitors to the Museum during June, 424.
2. Ditto Gardens ditto, 1,023.
3. Plants received from Botanic Gardens, Melbourne, 118.
4. Plants sent to Botanic Gardens, Melbourne, 163, and 27 papers of seeds.
5. Plants sent to Messrs. Handaside & McMillan, Melbourne, 54.
6. Books and Periodicals received.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.
   (*a*) Table for June.
   (*b*) Summary of observations for ditto.
2. Port Arthur, from J. Boyd, Esq.
   (*a*) Table for May.
   (*b*) Reading of Government schooner's barometer for ditto.
3. Swansea, from Dr. Story.
   (*a*) Table for April.
   (*b*) Ditto for May.
4. Tamar Heads, from R. Henry, Esq.
   (*a*) Table for May.
   (*b*) Ditto for June.
5. Ross, from M. Duncanson, Esq.
   (*a*) Table for June.

The presentations to the Museum were as follows:—

1. A collection of Australian reptiles, &c., from the Australian Museum, Sydney. Presented by G. Krefft, Esq.
2. Australian Egret *(Herodias syrmatophorus.)* From Dr. Officer.
3. Bittern *(Botaurus Australis.)* From G. C. Smith, Esq., Ouse.
4. Nightjar *(Podargus Cuvieri.)*
5. Brown Hawk *(Ieracidea berigora)*, and Black-cheeked Falcon *(Falco melanogenys)*. From M. Allport, Esq.
6. Specimens of *Sphœria Gunnii* from Longford. From Col. Chesney.
7. Lamprey caught at Risdon. From A. B. Jones, Esq.
8. Mandibles of the Moa *(Dinornis sp.)* from New Zealand. Presented by H. M. Hull, Esq.
9. Indigenous Flax grown on the Glebe at Sorell, prepared and presented by Master Frank Norman.
10. Fibre of New Zealand Flax *(Phormium tenax)* grown in Tasmania, dressed and prepared by Mrs. Gough of Glenorchy. From A. Nicholas, Esq.

In a letter accompanying this presentation Mr. Nicholas remarks that the sample of flax is a "very fair one, and worth in the English market fully £50 per ton, and that by Mrs. Gough's process an industrious person could clean 5 cwt. per diem." He also believes from his own observation that the plant if cultivated in proper localities (exposed to sea air) will thrive even better here than in New Zealand, and would be a very valuable addition to the products of the colony.

A letter from Mr. Krefft was read specifying the names of the collection of fish and reptiles received from the Sydney Museum.

The SECRETARY read a letter from Colonel Chesney, enclosing the following extract from a home paper in reference to a newly discovered grass which is said to afford a very profitable crop. Colonel Chesney states that "a small packet of seed has been sent me overland, of which a portion has been handed to the Superintendent of the Society's gardens, and some I have sown. Should any Fellow of the Royal Society desire to try the qualities of this new description of fodder on a small scale this season, I shall be happy to supply him with a few seeds, if he will notify his wish to me. I may remark that the seed of Schrœder's brome is as yet very scarce and dear in England."

Extract from the *Worcester Journal*:—

THE SCHRŒDER BROME.

The 'Schrœder Brome,' to quote a French paper, is a perennial grass of extraordinary productive power, lately introduced into France. A Frenchman speaks of having experimented upon it for six years, during which time it never fell off, either in its constitution or its yielding properties. The early period at which it comes forward is an important qualification. The first cut will be ready in March, if the last crop of the preceding year has been taken in good time; it comes even before rye. Four and in some years five cuts may be obtained in the season, and either in the green or dry state it is superior to any other kind of fodder, especially for milch cows, but all graminivorous animals are fond of it. This grass forms the ear and the seed with great rapidity; this is the case with every cutting, when the ear and seed are fully developed, though not quite ripe, and the ears of the first crop have been able to be taken off sufficiently forward to be used as seed when dry, and afterwards to mow the herbaceous part. Any soil almost seems to suit Schrœder brome, but it appears to do best on fresh land. Without doubt the best land will produce the heaviest crops, but it would be difficult to tell on what kind of soil this brome will not grow. This brome lasts about six or eight years without diminution of produce or appearance of dying out. One of the peculiar merits of this plant is that no weeds will thrive under its culture; it comes up quickly, and grows very rapidly; it does not require to be sown thick, but rather deep. It is as green food that this plant is especially useful, but when converted into hay it retains all the valuable properties of the plant when in its green state, but it is greatly decreased in weight. It is no longer in making than meadow hay. The straw is very heavy, and, although a little tough, cows and pigs will eat it without being cut. The Schrœder brome seems to be very desirable food for cows, as it greatly increases the quantity of milk and makes the cream very thick, and the butter made from it has a finer flavor and keeps well, even if the weather be very warm.

The attention of the Fellows was directed to two specimens on the table, one of the bituminous substance from the Hartley mines, New South Wales, which yields on distillation the paraffine oil of commerce; the other of the Dysodyle from the North of Tasmania, or *Tasmanite* as it is now called.

The SECRETARY observed that some weeks ago one of the local newspapers, in a notice of the Hartley mineral, had suggested if the Dysodyle were treated in a like manner it might be found to yield somewhat similar products. He had therefore placed them together, in order that the Fellows might see how great the difference was between them. Both when held to a flame burned readily, but while on combustion the former almost disappeared, leaving only a very small residue of fine powdery carbon, the form and size of the latter remained unaltered. It consisted, in fact, of a fixed earthy Matrix holding the inflammable material in its interstices. When treated chemically in England it has hitherto been found impracticable to purify its products sufficiently to render them available for any useful purpose in science or art.

The SECRETARY read some "Notes on the Geological Structure of the North-east Coast of Tasmania," which had been addressed to him by Mr. Gould. After the paper conversation ensued, in which the Lord Bishop of Tasmania, the Venerable the Archdeacon, Dr. Officer, and others took part, and it was finally agreed that further discussion should be postponed until next meeting, when it was hoped Mr. Gould himself would be present.

Mr. WINTLE read some "Notes on the shaft sunk for coal at the Cascades."

The usual vote of thanks terminated the proceedings.

NOTES ON THE GEOLOGICAL STRUCTURE OF THE NORTH-EAST COAST OF TASMANIA.

Dear Sir,—I forward a few notes on the Geological structure of the North East Coast, they are briefer than I had intended, as in consequence of my having been so fully occupied with my visit to the Fingal district, I have been unable to attend to other matters,—I regret that I cannot as yet lay before the Society my completed Geological map of the district, this I hope to do at the next meeting, and in the meanwhile shall confine myself to a few points which do not necessitate illustration.

At several meetings of the Society attention has been directed to the controversy maintained among Geologists as to the age of Australian coal,—and it will doubtless be within the recollection of the members that I expressed my opinion as to the coal in Tasmania belonging to two distinct periods, assigning a later date to the age of Fingal, and Douglas River coal than to that of the Mersey,—a subordinate point in the argument, was the relative age of the Coal and the Greenstone,—and on this point I expressed an opinion different from that of other Geologists.

My own impression being that the Coal formation was of anterior origin to the Greenstone, and had been penetrated by the latter, subsequent to its formation,—this opinion was supported by the faulted nature of the formation, its general disturbance near the Greenstone, and the mode of occurrence of the latter in several instances in small isolated masses on the very summit of some of the loftier ranges of the upper Palæozoic formation, the other view was that the Greenstone was the older rock, and had formed a bold and rugged Coast outline, jutting out into points and promontories affording protection to bays and estuaries, within which the coal had been accumulated.

I am glad now to be able to furnish evidence corroborative of my own view, and enclose a sketch of a Coast Section exhibited near the mouth of the Tomahawk River, upon the North East Coast. In this interesting locality we find in close proximity no less than four formations, viz., Granite, Greenstone,—an old Palæozoic formation, and what I take to be Carboniferous or later Palæozoic Sandstones.

The granite is of a kind very common upon the coast—porphyritic in structure, and exhibiting large and distinct crystals of pink and white felspar.

It is traversed by porphyry elvans. Near the junction with the Greenstone these belong to two periods, in the sketch appended, the direction of one of the elvans is from S. 55 W., to N. 55 E., and where visible upon the beach it is broken by a succession of faults. One of these faults is caused by elvan No. 2,—which is from 6 to 8 feet in width, and consists of a very intimate mixture of Quartz, Felspar, and Mica—weathering perfectly smooth, and traversed by three strings of Cherty Quartz, the direction is N. 30 W. Elvan No. 1 is about three feet in width at the one end, gradually diminishing, and breaking up with a number of strings at the other.

The Greenstone is of a coarsely crystalline structure similar to that so widely distributed over the Colony,—I have but little doubt, therefore, that it is identical in point of age, as well as in general characters, with the Greenstone forming the elevated tiers at Fingal and Mount Nicholas,—the older Palæozoic rocks likewise bear internal testimony, from their structure and composition, as well as from their strike, cleavage, &c., as to their age,—the only question remaining, and in this case the important question is as to the age of the associated Sandstone,—which I shall, therefore, consider in more detail. These Sandstones occupy the shore for the distance of some few hundred yards, and they are separated from the older Palæozoic formation and the Granite, by a kind of fault running in the direction 10 N. of W., and S. of E.—they lie to the northward of the fault, and upon the Tomahawk Point, a little beyond the opening of the river, they may be traced as far as Tomahawk Island, but only along the beach,—they have but a slight inclination, and form a sort of pavement on the beach, they are friable and coarse, buff colored, speckled with brown, presenting the variegated appearance so characteristic of the sandstones forming so large a portion of the coal measures at Fingal and Killymoon,—some traces of vegetable impressions remain, and to a small extent carbonized wood. In fact, in general aspect they so closely resemble the coal measures of other parts of the colony, that I think no person, after a careful comparison, would feel inclined to doubt their identity. It is also a remarkable fact that upon the beach adjoining, and upon the headland on the west of Tomahawk Point, fragments of coal are constantly thrown up, I myself discovered many, all within the span of a few hundred yards, and satisfied myself that they could not have resulted there from any accidental occurrence.

Having said thus much upon the age of the Sandstone and the Greenstone, I would call your attention to sketch No. 2, which represents the relations of the two as actually exhibited upon the coast, the overhanging masses of Greenstone and underlying bed of Sandstone passing underneath the Greenstone at an angle of a few degrees, altered at the point of contact, and for the distance of a few feet from it into a ferruginous sandstone, which has evidently been subjected to great heat. There can be no question, therefore, as to the relative age of these two rocks, and the only point open to doubt is as to that of the Sandstones, which I myself believe, and have endeavored to point out my reason for believing, to be the equivalent of the Fingal formation, and it may be remarked that even should this not be the case, and the rock be of later date than that which I have assigned to it—and I think no one after examination would credit it with an earlier age—the point which I have submitted would be the more certainly proved,—for the Greenstone, if of later date than this, would necessarily be the same with the Coal formation, which would, upon this supposition, be of older formation than the one described.

Another point of interest upon the coast is the existence, in the neighborhood of Cape Portland, of a limited area of the Fenestella bearing beds of the upper Palæozoic formation, these occur near the head of Muscle Roe Bay—in a creek running from between some Greenstone Hills and traversing the sandy flats round the head of the bay—the country in this direction is so depressed and covered by drifts, that but little evidence of its internal structure can be obtained, and it is, therefore, interesting to find in this locality and in this position, a formation, which is not represented in any way in the higher ground in the neighborhood, and in fact is not met with in any direction for many many miles,—this, as well as the little outliers of the coal formation at Cape Portland, represent the last traces of the upper Palæozoic formation upon the Coast, but still are sufficient evidence of their having been as widely distributed at as late date over that portion as they are generally over the centre and south of the island. I believe that their entire destruction resulted from their having been subjected to the influences of marine action during a longer period, and possibly in consequence of a different rate of depression and elevation to that extended to other parts of the colony.

The attention of the Society has been directed at various periods to the tertiary deposits flanking the shores of this island—perhaps in no district could they be studied more effectually, or with greater advantage, than in the one to which my present remarks apply.

The low sandy wastes, commencing near George Town, and alternately expanding and contracting in width as they extend round the coast, attain their maximum development in the North Eastern point of the island. In fact an area of about 200 square miles, lying south of Cape Portland, appears to have been almost and totally submerged during the period when these Tertiary deposits were formed. The coast line then consisted of Mount Cameron, Bayleny Hill, and the other highlands intervening between these and the Blue Tier, the few elevated ridges such as the Ringarooma Tier, the Long Marsh Tier, and other highlands scattered sparingly throughout the district, were thus probably but little elevated above the level of the sea,—they are all capped with Basalt or Greenstone, and probably are indebted to that fact for their immunity from destruction. A feature common to all sandy coast lines is strikingly shown, at various points along the beach between the mouth of the Ringarooma and Cape Portland, viz., the progress of a sort of wave or avalanche of sand, from the line of sand hills upon the beach across the flat low land behind it. They are often of no considerable with, but simply progress forward, steadily, invariably, covering over, and burying everything which lies in their course, one of these drifts nearly embraced the dwelling house at Cape Portland, by good fortune it passed a little on one side, and the house was thus preserved from destruction, which would otherwise have been inevitable in the course of a few years. With this fact so prominently brought under one's notice upon the beach, and with regard to existing sand dunes, it is interesting to find its counterpart upon the hills, and with regard to those of a Tertiary period, this is the case along the flanks of the Ringarooma Tier, where the practised eye will recognize the presence of long ridges of drifted sand overlying and concealing the mass of rock constituting the hill below, and evidently referable to the cause alluded to.

I am at present engaged upon a manuscript map of all the North East part of the Colony, which I hope to be able to submit to the Society at the next meeting. This will embrace all the rich basaltic land lying in the vicinity of the Ringarooma, and a large extent of country previously unvisited. I shall reserve my remarks upon the general Geology of the district till that occasion, and trust that these few will not be unacceptable to the Society.

I am,

Yours very truly,

CHARLES GOULD.

J. W. Agnew, Esq., M.D.,
Hon. Secretary to the
Royal Society.

NOTES ON THE SHAFT SUNK FOR COAL AT THE CASCADES.

[By S. H. Wintle.]

Having heard that a shaft was being sunk by Mr. Newman on the property of Mr. Degraves, at the Cascades, with the view of finding coal, I seized the first opportunity of visiting the spot, in the hope that the *debris* of the shaft would be a safe clue to the actual age of the sandstone of that locality,—and which I believe to be a continuation of the sandstone of this city. Calling upon Mr. Newman on my way thither, he kindly allowed his son to act as my guide to the spot. I found the shaft situated on the side of a hill looking about N.W. to the left of the residence of Mr. Degraves, and about three-quarters of a mile beyond it in the direction of Mount Wellington. This shaft has been opened at the base of an old sandstone quarry, which was formerly worked, I understand, by Mr. Newman.

I never entertained the hope that coal would be found in that locality in a payable seam, on account of the carboniferous limestone being seen *in situ* in the bed of the rivulet, and which formation, according to Professor Selwin, constitutes the base of the coal measures, as a rule, in Tasmania.

Upon arriving at the shaft, I found the mouth of it to be about 300 feet above the limestone in the bed of the rivulet, the dip of which is nearly S.E. I therefore considered it highly probable that after sinking, say 150 feet, there would still be room for even one or two good seams of coal, with the usual strata, before the limestone would be reached, the dip of the sandstone being the same as that of the carboniferous limestone.

Upon examing the *debris* of the pit, I found unmistakable evidence of the strata already passed through being of carboniferous age; but although a depth of 92 feet had been reached, there was an absence of those striking indications which characterize the existence of good seams of coal.

The bed of sandstone that underlies the fire-clay is thickly studded with fossil plants, from one of which I obtained a small quantity of coal—being, in fact, the mineralized stem of a plant or shrub—about three inches in diameter. It has the appearance of a highly bituminous coal, but upon putting it to the test it turned out to be anthracite. I, therefore, concluded that if coal were eventually reached it would be anthracite. But of such a desideratum being realised I have but little hope.

I have on former occasions expressed an opinion that the sandstone at the Cascades was of Triassic age. That opinion was based upon the best evidence within my reach. The strata which the shaft in question has pierced have completely overturned that theory, the rocks exposed thereby being strictly carboniferous, as may be seen by reference to the diagram. The sandstone on the north side of the rivulet is without doubt of carboniferous age (see Fig. 1), since it reposes immediately on the crystalline limestone, which teems with the typical fossil shells of the mountain limestone,—such for instance as *Spirifera leptenæ* (syn. *productæ)*, *Leminulæ*, *Pectenidæ*, and *Eurydesma*, with Bryozric remains, the most characteristic of which are *Fenestella*, *Polyparia*, and *Stenopera*.

The cherty or impure limestone (Fig. 2), and into which the crystalline limestone may be said to pass, is also fossilliferous, but to a much less extent than the latter. If, therefore, as I am inclined to think is the case, from the *debris* of the lowest stratum of the shaft, this stratum has been reached, then there is an end to all expectation of finding coal, for the upper portion of the base of the carboniferous system has been reached.

In looking at the sinking of this shaft from a practical point of view much credit is due to Mr. Newman for setting a worthy example of private enterprise to his fellow-colonists; and although he may fail in discovering the object of his search, it may be a source of some satisfaction to him to know that he has already made an important contribution to science, and which it is more than probable the keenest superficial observation, extending over several years, would not have afforded.

METEOROLOGY FOR JULY, 1865.

Private Observatory, Hobart Town.

Day of month.	Bar. 37 feet abv. sea level. cor. & reduced: Highest.	Bar.: Lowest.	Self-registering Thermometers: Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind: Direction from three daily registers.	Wind: Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	30·129	30·103	68	45	89·0	41.5	NW	·52	
2	30·153	30·099	68	45	80·0	45·5	N NW	2·60	
3	30·061	29·932	64	41	89·0	37·5	NW W N	·78	
4	29·950	29·926	65	48	90·0	44·5	NW W NW	3·64	0·02
5	30·034	29 932	70	50	92·0	46·5	N W E	2·86	
6	30·264	30·241	65	39	84.0	34·0	NW SW	0·	
7	30·339	30·286	61	38	83·0	33·0	NW N NW	·26	
8	29·964	29·679	58	37	59·0	32·0	NW	3·38	
9	29·803	29·764	57	42	65·0	36·0	W SW	5·21	
10	29·836	29·816	55	30	77·0	27·0	W E SW	0·	0·03
11	29·864	29·826	57	38	68·0	36.0	SE S	13·02	0·11
12	29·818	29·802	49	44	50·0	40·0	SE S	·78	1·00
13	29·898	29·848	52	41	71·0	40·0	SW E SW	0·	0·07
14	29·880	29·825	56	39	80·0	39·0	NW N NW	·78	
15	29·666	29·627	56	39	85·0	35·0	NW	·78	
16	29·811	29·777	52	37	75·0	32·0	NW N NW	1.04	
17	29·712	29·655	61	40	84·0	35·5	N NW	1.04	0·02
18	29·923	29·803	58	45	72·0	43·5	NW S SE	0·	0·11
19	30·156	30·092	55	33	76·0	32·0	NW NE S	0·	
20	30·294	30·280	58	33	83.0	29·5	NW SW	0·	
21	30·382	30·331	60	34	82·0	30·0	NW S	0·	
22	30·363	30·148	57	35	79·0	31·0	NW N W	·26	
23	29.972	29·816	54	38	60·0	36·5	NW E S	0·	0·08
24	29·716	29·601	52	41	73·5	39·0	NW NE SW	0·	0·06
25	29·591	29·546	60	40	83·0	40·0	NW E SW	·26	
26	30·034	29·910	61	37	85·0	34·5	NW NE	0·	0·04
27	30·127	30·102	58	35	78.0	34·0	NW	0·	
28	30·121	30·049	60	43	77·0	40·0	NW N NE	0·	
29	29·820	29·772	56	40	67·0	36·5	NW SW NW	·26	0·01
30	29·892	29·756	57	45	85·0	39·5	W	15·62	0·05
31	30·010	29·984	55	40	66·0	38·0	N NW	1·04	
							Total force	54·13lbs	1·60

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 guage. 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:—

1st. Garrya elliptica commencing to flower.
2nd. White mulberry buds commencing to break.
5th. Almond commencing to flower.
16th. Crocus commencing to flower.
25th. White Hyacinth commencing to flower.

Barometer mean, 29·947in., being 0·089in. below the average.
Temperature mean, 47·09°, being 1·27° above the average.
Solar intensity mean, 77·00°, being 1° ditto.
Dew point mean position, 38·5° being 1·33° below the average.
Humidity of air mean, ·78, being 4·5 per cent. ditto.
Elastic force of vapor mean, ·251, being ·008 per cent. ditto.
Total amount of rain. 1·60in. being ·13in. ditto.
Mean amount of ozone, 8·55 of chromatic scale, being 2·12 above the average.
Increase of spontaneous evaporation on rainfall 0·32in.
Electricity active on the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, and 30th.
A very high wind, a.m. on the 30th, velocity from 24 to 48 miles per hour.
Snow on Mount Wellington copious all the month.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR JULY, 1865, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c.

BY E. SWARBRECK HALL.

No July of the previous eight years was so favorable to health and life, as the present month, for though 1862 had the same number of deaths, 36; yet both the "diseases causing death" and the "ages of the deceased" prove that July 1865 was the most auspicious. The weather generally, too, was most agreeable, and many days were more like temperate summer ones, than such as might be expected in this mid-winter month.

Atmospheric pressure mean was 29·947, being only +·089 above the twenty years' average for July. The maximnm 30·382, occurred on the 21st, and the minimum, 29·546, was recorded on the 25th, being a range of only ·836. as the extreme for the month, though happening within five days. The extreme range in 1864 was much more, though a much great number of days intervened between the highest and lowest records. The greatest movement of the barometer on any day was noted on the 8th, being a fall of —·494 of an inch. Two men at the Invalid Asylum, aged respectively 72 and 71, succumbed to it. On only seven other days of the month did the perturbations exceed one-fifth of an inch. The highest rise +·422 of an inch on the 26th, followed by a rise of +·135 on the following day, caused 4 deaths on the latter day.

Wind force total was 54·13 lbs., which is +16·40 lbs. more than the July average of the previous 8 years, and was only exceeded by 1863. Nevertheless the number of calms registered was very high, exceeding the eight years' mean by more than 18. The very fatal July of 1860, however, had two more. East, South, South-West, West, North-West, were all above the average in frequency; while North, South-East, South, South-West, and West were above the mean in force, but particularly the latter. It must, however, be noted that it was the storm on the 30th, which prevailed from this quarter, that alone gave the high amount to this point.

Temperature mean, 47·09, and +1·27 more than the 20 years' average, though more than two degrees colder than July, 1864, was. The self-registering maxima and minima thermometers gave a mean of 49·15 degrees, which is but ·67 of a degree less than what the same instruments gave in July, 1864. The extremes of temperature this month, however, were greater than was ever before recorded in July. The maximum, 70 on the 5th, the minimum 30 on the 10th. Last year they were 63 and 34 respectively. 1857 and 1863 had both the maximum of 70, but 34 and 32 were their respective minima. The mean of all the maxima of the present month, 58·55, exceeded 1864 by a scarcely appreciable amount; but the mean of all the minima, 39·75, was less by nearly one and a half degrees; so that while the days were nearly equally warm on the whole, the nights of the present month were very much colder.

Daily range of temperature mean, 18·81 degrees, is + 3·46 more than the 20 years' average, and + 1·49 higher than 1864 had. The greatest range was 26 deg., recorded on the 6th and 21st, and the lowest was 5 deg. on the 12th July, 1864, had the same extremes, though the mean was so much less.

Solar intensity had a mean of 77 degrees, being + 1·65 higher than the average of the previous nine years, though nearly three quarters of a degree less than 1864 was. The greatest heat recorded was 92 degrees on the 5th, and the smallest was, 50 on the 12th. 1864 had the same maximum, but a minimum 4 degrees higher.

Terrestrial-radiation mean was, 36.76 degrees which is +1.34 more than that of the previous 9 years, though —59 less than that of July 1864. The maximum was, 46.5 on the 5th, the minimum was, 27 on the 10th. The latter was 3 degrees less than the minimum of July 1864. On the morning of the 10th, there was ice on all still-water in the open air and even within doors at the outskirts of the city. Several other mornings exhibited a copious deposit of hoar-frost, but very transient in duration.

Rain fell to the aggregate amount of, 1.60 inches being —·13 less than the 20 years' average for July, and —2.84 inches less, than fell in July last year; though in both months there were the same number of wet days, *i.e.* 12. This number is —1.94 less than the average, of the previous ten years. On no one day, except the 12th, was there rain enough precipitated, to cleanse the surface drains, and sewage channels of the city. *Snow* was persistent on Mount Wellington throughout the month, and received several additions.

Humidity mean, 78, was — $4\frac{1}{2}$ less than the 20 years' average, and 2 less than July 1864.

Elastic force of Vapor, had a mean of 251, being — 8 less than the 20 years' average, and 31 below the mean of 1864. No doubt this compensated, to some extent, for the low humidity mean. The maximum record was, 318 at noon on the 17th, and the minimum, 174, was registered at 7 a.m., on the 10th. Last year these extremes were, 403 and 193 respectively.

Spontaneous Evaporation amounted to 1.92 inches, therefore, but slightly exceeding rain-fall.

Cloud mean, 5·90, was all but identical with that of July, 1864, though + ·63 above the twenty years' average.

Ozone mean, 8.55, was higher than that for any July of the eight years' records, and above the mean of the whole, by +1·65, and exceeding 1864, by +1·24. The maximum was at the point of saturation —10— at eight of the morning and evening observations. The amount registered never fell below 7. So much ærial purity, with so little electric-force of vapor, and warm sunny days, was highly conducive to health.

Electricity had 21 positive indications, with maximum tension of 6; and 34 negative with maximum tension of 7. Nil was recorded at 7 observations, being all the records on the 12th, 13th, 23rd, and evening of the 24th. In July 1864, there were only 6 positives, with maximum tension of 5·5. Negatives 42 with maximum tension of 5, and 14 "nils." To a great extent this abundance of electricity accounts for the high *ozone* mean. No *lightning* was observed during the month.

The 36 *deaths* in the present month contrast most favorably with the 70 in July 1864, and indeed with any July of the previous eight years; for though 1862 too had only 36 deaths, yet comparing the "causes of death" and the "ages at death" of the two, 1865 had much the most favorable aspect. The average of the eight years exceeds the present month's mortality by $+11\cdot\frac{3}{8}$.

July, 1865.	Ages.	June, 1865	Julys.								Avg. 8 yrs. Julys, 1857–1864.
			1864	1863	Min. 1862	1861	Max. 1860	1859	1858	1857	
7	Under 1	7	16	6	3	10	8	7	7	16	9 1-8
2	1 to 5	2	4	5	8	13	9	9	9	6	7 7-8
3	5 to 20	4	7	3	2	10	4	2	0	1	3 5-8
6	20 to 45	4	13	10	9	13	22	8	11	20	13 2-8
7	45 to 60	3	18	14	11	3	22	5	8	4	10 5-8
11	60 and above	12	12	10	3	10	49	8	6	5	12 7-8
36		32	70	48	36	59	114	39	41	52	57 3-8

"Under one year of age" the deaths were below the eight years' average, and less than half the number in July 1864. At "1 to 5" the mortality was but little above one-fourth of the average, and only half of what occurred in July 1864. At all ages under five years old—the usual standard for infantile mortality—the deaths were only one-quarter of those at all ages; very little more than half the average of the eight years, and less than any year of the eight, inclusive even of 1862, which had the same numerical total as the present year. At "5 to 20" the deaths were less than the average, and not half of those at the corresponding ages in 1864, though four years out of the eight had a still smaller number than the present month. At "20 to 45" no one year of the eight had so few deaths, and 1864, as well as the eight years' average, had above double the number. At "45 to 60" the deaths were considerably below the average, though three out of the eight years had less than the present month. At "all ages above 60" the mortality was under the average, though more than all the eight years, except the last, and 1860, when the epidemic influenza carried off so many old people. The oldest death was that of a male invalid at the Brickfields Asylum, aged 88.

July, 1865	Classes of Disease	June, 1865	Julys. 1864	1863	Min. '62	1861	Max. '60	1859	1858	1857	Avg. of 8 yrs. Julys, 1857-1864.
3	1. Zymotic	2	0	3	8	19	38	4	6	6	10 4-8
9	2. Constitutional	3	13	7	7	6	10	8	7	9	8 3-8
17	3. Local	19	42	29	16	21	44	20	24	26	27 6-8
4	4. Developmental	6	11	9	1	5	11	3	2	5	5 7-8
3	5. Violent &c.	2	4	0	4	8	11	4	2	6	4 7-8
36		32	70	48	36	59	114	39	41	52	57 3-8

The *Zymotic class* of diseases had three deaths, being less than one third of the July average. One, a baby 10 months old, died from the effects of *Scarlatina*, from which no death has been recorded since February last. A girl of 13, in a healthy suburban district, died from *Quinsy*, and a boy of 10 years old, died at the Queen's Asylum, registered "*Pericarditis and Pyæmia.*" He had abscesses in several parts of the body, the most extensive one arising probably from an accidental local injury. He had a strongly marked tubercular diathesis, formerly so prevalent and fatal in this Institution before the dietary was improved. This case offers a significant warning against any tampering, in the way of reduction, with the dietary, on which the children have so much improved of late years. On an average of nineteen years, with a much less strength, the deaths were nearly 16 per annum. In the present year the above is only the second death.

The *Constitutional class* of diseases had a slight excess above the average deaths, though less than 1864 had. Four were from various forms of *cancerous* disease, one from *scrophula*, only three from *consumption*, and none of them Tasmanians by birth; 1864 had three times as many in number and four of them were born in the island, one death arose from *Hydrocephalus*. The *local* class of diseases had very much less than the eight years' average of deaths, and much less than half of what occurred in 1864. In 1862, however, this class had one less death than the present month. The *nervous system* had 6 deaths, to 9 in 1864. The *circulatory system* had only 2 deaths, while 1864 had 5. The *respiratory system* had 6 deaths, in old people from 63 to 82 years of years of age, from *chronic bronchitis*; and two infants, 8 and 9 months old respectively, from *acute inflammation*. In 1864, this order furnished 23 deaths—10 of which were under 12 months old, 3 from 1 to 5 years old, 8 from 5 to 60, and only 2 above 60. The *digestive system* had 2 deaths being half the number in 1864. The *urinary system*, had the same number—1 in both years. The *developmental* class had 4 deaths, two 72 and 88 years old respectively, one two years old, and one that lived but one hour after birth. In 1864 this class had 11 deaths.

The class of *accidental* and *violent* deaths, had 2 deaths of infants *suffocated* by being *overlaid* in bed, and one girl of 8 years old, from *burns*, 1864 had one more death in this class.

The *inquests* this month were 5, last year had only 4. The deaths in *hospital*, exclusive of one of the inquest cases were 9, four of them admitted from country districts. In 1864 the deaths in this institution were 24. At the male Invalid Asylum the deaths were four, aged respectively 41, 71, 72, 88. In 1864 there were only 2. Of the 36 deaths the Glenorchy division of the

Registration district had 2 deaths, Queenborough 1, and the city 33. Males and females were alike in number, 18, being an exceptional occurrence. On eight days of the month—two of them consecutive—not a death occurred. In the first week of the month 9 died; in the second, 6; in the third, 11; in the fourth, 9; in the last three days, 1. For any two consecutive days the greatest number of deaths was 5, on the 27th and 28th. For any four days, 7, on the 1st to 4th, and 18th to 21st.

The *Births* registered were 73, being five more than in July, 1864.

For all the registration districts in the island, in the second quarter of this year ended 30th June, 725 births were registered, being + 11 more than for the corresponding three months of 1864. The deaths in the same period this year were 346, being—44 less than were recorded for the same months in 1864, and — 22 less than in the same quarter of 1863. It is evident, therefore, that the whole colony has been as healthy, as the monthly reports have shown the registration district of Hobarton to have been.

ROYAL SOCIETY.

AUGUST, 1865.

The monthly evening meeting of the Fellows took place on Tuesday, the 8th August. The chair was taken by His Excellency, the President, at half-past seven o'clock.

Mr. William Stone, who had been previously nominated by the Council, was after a ballot declared to be duly elected a Fellow of the Society.

The SECRETARY (Dr. Agnew) laid on the table the usual monthly returns, viz. :—

1. Visitors to Museum during July, 541.
2. Ditto to Gardens ditto, 1,140.
3. Plants, &c., received at Gardens :—From Messrs. Handaside and Mc Millan, Melbourne, one box containing 13 plants. From A. Verschaffelt, Ghent, Belgium, 186 papers of seeds.
4. Plants supplied from Gardens for decoration of grounds of General Hospital, 126.
5. Books and Periodicals received (the usual).

Meteorological Returns :—

1. Hobart Town, from F. Abbott, Esq.
   (*a*) Table for July.
   (*b*) Summary and analysis of observations for ditto.
2. Port Arthur, from J. Boyd, Esq.
   (*a*) Table for June.
   (*b*) Reading of Government Schooner's Barometer for ditto.
3. Swansea, from Dr. Story.
   (*a*) Table for June.

The usual analysis of the Hobart Town Observatory Records, together with those of Births, Deaths, &c. for July, by E. Swarbreck Hall, Esq., was read by the Secretary.

The following presentions were brought under the notice of the meeting :—

1. Two Black Opossums (*Phalangista fuliginosa*). From M. Allport, Esq.
2. Lamprey caught in the Coal River, near Jerusalem. From the Rev. Mr. Marum, per Dr. E. S. Hall.
3. Fœtal Ray, in its case. From A. B. Jones, Esq.
4. Tasmanian Kingfisher (*Alcyone azurea*). From Mr. J. Lumsden, New Norfolk.
5. A collection of mineral specimens from Victoria, presented by Professor Irving per M. Allport, Esq:—Silver Ore, Chloro-bromide of Silver, from St. Arnaud. Cassiterite from the Ovens. Ditto from Beechworth (3 specimens). Cassiterite with Iserine, from Strathbogie, Euroa. Oxide of tin. Large grained Titanic iron sand. Octohedral Chromite. Gem sand, principally Zircon and Sapphire.
6. Sample of prepared tobacco, grown at the Carlton. Presented by A. Steel, Esq.

Mr. W. Johnston exhibited, on behalf of Mr. J. Risby and Mr. R. J. Edwards, several specimens of gold-bearing quartz obtained by them from their claim at Fingal at a depth of about 80 feet. On trial it had been found to yield seven grains of gold to ten pounds of quartz. The manager of the Company is very sanguine of success, but does not wish to say anything definite until ten tons of the quartz are crushed.

A paper was read by Mr. E. Swarbreck Hall on the Lamprey (presentation No. 2) which was before the meeting. The specimen presented the peculiarity of being furnished with a large pouch, capable of holding about 1½ ounces of fluid, on its ventral surface immediately behind the mouth, and extending as far backwards as the second gill opening. The parieties of the sac were altogether membranous and cutaneous, no trace of muscular fibre could be detected, nor could any opening into the gullet or elsewhere be discovered. It may possibly act in the same manner as the swimming bladder of other fish, which is absent in the Lampreys, but as additional specimens are expected from the same locality it is intended to have a more minute dissection before forming any positive opinion on the subject.

The proceedings were closed by the usual vote of thanks.

ON A PROBABLY NEW SPECIES OF LAMPREY FOUND IN TASMANIA.

By E. Swarbreck Hall, Fellow of the Royal Society of Tasmania, &c., &c., &c.

The singular fish I have the honor to lay before this monthly meeting of the Society, was transmitted to me by the Rev. E. C. Marum, of Jerusalem, with the request that I would present it to the Museum, if worthy of acceptance. It was caught by Mr. John Ibbott, near Stockdale, six miles south of Jerusalem, whilst netting for rock-roach, in the Coal River. This part of the river is entirely fresh water, and far above tidal influence. When removed from the net it was living, and firmly adhering by its sucker-like mouth to a rock-roach fish. "When placed in a dish of water," says the Rev. Mr. Marum, "he at once adjusted his pouch charmingly, reminding me of the days when I used a set of bladders in learning to swim; he seemed to sink and rise then as a boat or ship does when at anchor as the waves or ripples move them."

I submitted this fish to the inspection of the members present at the last meeting of the Physical Section of the Society, and it was thought advisable to refer its further examination, and the discussion of its peculiarities, to this monthly meeting of all the Fellows.

In comparing it with one of the specimens of a marine-lamprey caught in the Tasmanian seas, it is apparent that, in comparison to length, it is much thicker and has a larger head. The special distinctions, however, are the large pouch it has beneath the gill openings, and the two ridges on its back, near the caudal extremity. In none of the descriptions of lampreys, either fresh-water or marine, that I have read is there any account of the singular and very capacious bag beneath the gill openings that I have alluded to. The Rev. Mr. Marum would seem to infer that it is of the nature of an air-bladder or float, but if so it is of very unusual thickness. At first we were inclined to consider this curious appendage as an abnormal growth, and not a natural portion of the Coal River lamprey. But I find that all caught there have been similarly characterised. One was caught last week, several at different times before in the previous five years. I have deferred opening this pouch and examining its anatomical structures until this meeting. As far as my scanty knowledge of the natural history of fishes enables me to judge, I believe this specimen to be a new and hitherto undescribed species of fresh-water lamprey. I am promised the next specimen caught, and I shall transmit to my old fellow-student at St. Bartholomew's Hospital, in London,—Professor Owen, now of the British Museum—as I am sure I could not submit it to an authority higher in general estimation than this world-famed naturalist.

METEOROLOGY FOR AUGUST, 1865.

Private Observatory, Hobart Town.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced: Highest.	Bar. 37 feet abv. sea level, cor. & reduced: Lowest.	Self-registering Thermometers: Highest in shade.	Self-registering Thermometers: Lowest in shade.	Self-registering Thermometers: Highest in sun.	Self-registering Thermometers: Lowest on grass.	Wind: Direction from three daily registers.	Wind: Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	30·084	30·065	58	45	68·0	41·0	NE NW SW	3·12	0·04
2	30·119	29·987	60	38	85·0	34·0	NW SW	·52	
3	30·228	30·177	62	34	85·0	31·5	NW SW	·26	0·01
4	30·365	30·330	60	34	87·0	31·5	NW SE	·52	
5	30·345	30·278	62	38	90·0	33·0	NW NE S	0·	
6	30·313	30·291	62	39	90·0	36·0	NW N S	·26	
7	30·510	30·480	65	40	98·0	40·0	NW SE	·26	0·03
8	30·566	30·475	66	38	92·0	34·5	NW N	·52	
9	30·492	30·417	65	40	90.0	37·5	NW SW	·26	
10	30·397	30·234	66	39	91.5	35·5	NW W	·78	
11	30·100	30·018	62	46	70.0	40·0	NW SW	·52	
12	29·992	29·821	66	40	92.0	34·5	NE NW	1·04	
13	29·491	29 385	62	47	89·0	43·5	S W NW	5·20	0·06
14	29·785	29·648	58	37	90·0	37·0	SW S SW	·52	1·10
15	29·985	29·942	60	32	86·0	28·5	E N NW	·26	0·05
16	29·719	29·683	57	39	84·0	32·5	NW	·52	
17	30·060	29·911	54	38	78·0	33·0	SW S	·52	0·20
18	30·172	30·135	62	37	88·0	32·5	NW N SE	·78	
19	30·169	30·129	62	38	90·0	34·0	NW SE	·26	
20	29·961	29·821	61	43	73·0	39·0	NW	·52	
21	29·806	29·567	66	43	95·0	37·5	N	·78	
22	29·454	29·410	62	44	95·0	38·0	NW W	·52	0·03
23	29·749	29·716	64	40	95·0	36·0	W SE NW	·52	
24	30·006	29·853	61	43	87·0	40·0	NW SW	5·72	0·06
25	30·082	29·934	59	32	90·0	27·5	NW SE S	·26	
26	29.632	29·435	56	39	58·0	36·5	NW W NW	3·38	0·02
27	29·376	29·245	61	41	84·0	37·0	N NW N	1.04	0·05
28	29·343	29·264	57	41	89·0	38·0	N NW	3·64	0·05
29	29·448	29·364	55	42	85·0	40·0	W SW NW	5·72	0·38
30	29·500	29·444	52	41	67·0	37·5	NW	1.30	0·13
31	29·792	29·699	52	39	75·5	34·5	NW SE	·78	0·02
							Total force	40·30lbs	1·23

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 guage. 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:—

9th Horse Chestnut buds commencing to break.
10th Sambucus niger commencing to leaf.
12th Poplar commencing to break.
15th Gooseberry bushes commencing to break.
16th Elm commencing to flower.
28th Apricot commencing to break.

Barometer mean, 29·919in., being 0·136in. above the average.
Temperature mean, 49·31°, being 0·61° ditto.
Solar intensity mean, 85·08°, being 4·08° ditto.
Dew point mean, 40·7°, being 0·17° below the average.
Humidity of air mean, ·76, being 3·5 per cent. ditto.
Elastic force of vapor mean, ·265, being .012 per cent. ditto.
Total amount of rain, 1·23in. being 0·83in. ditto.
Mean amount of ozone, 7·75 of chromatic scale, being 0·58 the above average.
Less rainfall on spontaneous evaporation, 1·28in.
Aurora Australis brilliant on the 3rd.
Lightning on the 30th.
Mount Wellington copiously mantled with snow all the month, with frequent fresh deposits.
Electricity active on the 10th, 12th, 14th, 15th, 16th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 28th, and 31st.

FRANCIS ABBOTT.

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

This month was characterised by mild, dry, sunny, and agreeable weather, with enough of wind movement and electricity to produce a high state of ærial purity, and consequently the community at large enjoyed a better state of health than is usual in August, and the deaths were below the average of the previous eight years. Children, and adults up to 50 years of age, furnished an unusually small proportion of the deaths; more than two-thirds of the total mortality being from 50 to 85 years old.

Atmospheric pressure mean, 29·919 is +·136 above the 20 years' adopted standard, and also higher than that of either 1864 or 1863. The maximum of the month was registered at 7 a.m., of the 8th, being 30·566. This was the most fatal day to life in the month. The minimum, 29·245, was recorded on the 27th. In the previous 24 years, only August 1860 had a greater maximum, but the minimum was frequently much lower. The extreme range, 1·321 inches, was considerably greater than August 1864 had, though less than that of 1863. The greatest movement of the barometer in any 24 hours from 1 p.m., to 1 p.m., was a fall of—·564 of an inch on the 26th, and its influence is marked in the mortuary records :—Two persons above 70 years of age, and another nearly 40—long suffering from heart-disease—, succumbed to it. On fourteen days of the month, the barometrical movements exceeded one-fifth of an inch. It is remarkable, that of the 33 observations recorded on the first eleven days of the month, the atmospheric pressure was only once below 30,000 inches and so steadily was this high pressure maintained that only on the 11th did the perturbation in the 24 hours rise to one-fifth of an inch. The daily movements, therefore, in the remaining 20 days of the month were unusually numerous and extensive. This condition of atmospheric pressure told heavily on aged and enfeebled persons. and produced a remarkably abnormal proportion of deaths of persons above 60 years of age, but was innocuous to those of all ages below.

Wind-force in the aggregate, amounted to 40·30lbs., being + 1·94lbs., above the 4 years' average given in the standard tables, but —5·71 below the average of the last eight years,—the three last years very windy Augusts, having raised the average very considerably. The *calms*, 36, were exactly the four years' average,—but + 1·57 above the mean of the last seven years. The highest wind-force registered was only 2·60lbs., pressure to the square foot, and was recorded eight times. So much moderate wind-movement, so equally distributed, is not usual in August, for the records hitherto, exhibited either very little ærial movement, or very boisterous ones. The prevailing winds were, *south-west*, *west* and *north-west*, all of which exceeded the mean both in frequency and force. From the other five points of the compass, the winds were all below the average in frequency, and with the exception of *north-east*, also less than the mean in force.

Temperature mean, 49·31 degrees, is + 00·61 above the 20 years' average, but much warmer still than 1864 and 1863 were. The mean of the self-registering maxima and minima thermometers, was 50·03 degrees, being an unusually small difference between the two sets of instruments. The extremes of temperature this month were, 66 degrees recorded four times, and 32 registered for the nights of the 15th and 25th. The range was somewhat less in the August of the two previous years, but the extremes for August in the last 24 years were, 82 maximum in 1862, and minimum of 30·20 in 1846. The meanof all the maxima for the present month is, 60·48 degrees, while that of 1864 was only 57·84 degrees. The mean of all the minima for this August is only 39·58 degrees, while that of last year, was 41·38. So that the August of 1865 had warmer days and colder nights than the August of 1864. Eminent Sanitarians have compiled tables showing the hour at which death takes place, and it is found that the deaths are by far most numerous in the coldest hours of the night. I have no doubt the mortuary records of the present month would show this very clearly had I the means of ascertaining the details.

Daily range of Temperature mean was, 20·90 degrees, being, +4·51 degrees higher than the 20 years' mean, and nearly the same above 1864 and 1863. Only in August 1861, and 1862, did the mean daily-range of temperature exceed that of the present month. The greatest range on any day was 28 degrees, recorded on the 3rd, 8th, and 15th; the lowest was 11 degrees on the 30th. The Registrar-General of England in his admirable quarterly reports often refers to the "deadly effects of a rapid depression of temperature on persons of low vital powers." In this climate, however, variations of pressure seem to have a more lethal influence on such persons.

Solar-intensity mean, 85·08 degrees, is + 3·66 degrees above the August mean of the previous nine years, and higher than any one of them except 18 56, which had a mean of 92 degrees. Last year's August, was nearly 6 degrees below the mean of this year's. The maximum record was 98 degrees on the 7th. In three years out of the nine, there were greater maxima than this, 1858 was the same, and the other five had all much less. The minimum record was 58 degrees on the 26th. The corresponding records of 1864 were. 93 and 60.

Terrestrial-radiation mean was, 35·85 degrees, which only differs from the nine years' mean, by an excess of + ·05, but is — 1·68 below the mean of August 1864. The extremes were, 43·5 on the 13th and 27·5 on the 25th.

The total *Rain-fall*, amounted to 1·23 inches, being — ·83 of an inch below the 20 years' mean, and nearly one and a half inches less than fell in August last year The rain fell on 15 days in the month, being + 1·70 in number above the ten years' average. Only on the 29th was there enough precipitated to thoroughly cleanse the surface drains.

Snow was never absent from Mount Wellington during the month, and frequent fresh deposits took place.

Humidity mean, 76, was — 3½ below the 20 years' average.

Elastic-force of Vapor had a mean of, 265, which is — 12 less than the mean of the 20 years.

Spontaneous-evaporation amounted to, 2·51, inches.

Cloud mean, 5·58, was so nearly that of the 20 years' that it only differed by being — ·01 less, though it was much below the average of 1864 and 1863.

Ozone had a mean of, 7·75, being + ·26 more than the average of the previous eight years, but was — ·79 less than August 1864 had, and — ·87 less than was noted in August 1863. The maximum 10 (saturation) was recorded on the 1st and 15th. The minimum 6 was registered on the 10th.

Electricity was more abundant and stronger than was ever before recorded. There were 38 positive indications to 24 negative, and the maximum tension of each was 8, — no "nils" were registered. In August last year the first had only 13 records with maximum tension of 5·5, and the second 37 with maximum tension of 5 and 12 "nils."

Lightning was observed on the evening of the 13th and 30th. Aurora Australis on that of the 3rd.

The 42 *deaths* this month, were — 6⅝ below the average of the previous eight years, though both the Augusts of 1864 and 1863 had each one less; nevertheless, when the "ages at death," and the "causes of death," are compared for the same years, it will be found that the August of 1865 was by far the most favorable to health and life.

August, 1865	Classes of Disease	July, 1865	Augusts. 1864	1863	1862	1861	Min.'60	1859	Max58.	1857	Avg. of 8 yrs. Augusts, 1857-1864.
1	1. Zymotic	3	9	4	3	15	10	9	7	7	8
3	2. Constitutional	9	4	6	8	6	4	7	9	15	7 3-8
20	3. Local	17	21	23	24	21	19	28	49	29	26 6-8
12	4. Developmental	4	6	3	4	6	6	3	4	2	4 2-8
6	5. Violent &c.	3	1	5	4	0	1	1	5	1	2 2-8
42		36	41	41	43	48	40	48	74	54	48 5-8

"Under 1 year old" the deaths were less than half the eight years' mean, and though one more than 1864 had, yet below all the other seven years of the series. Moreover, two of the deaths only survived the birth by half an hour, and seventeen hours respectively; while last year the youngest of the four deaths in this group, was 18 days old. At "1 to 5" the deaths though below the eight years' average were more numerous than three out of the eight, and the same as two others, but two of the number were accidents on which inquests were held, and one of the two did not belong to the registration district, but died *en route* to hospital from the other side of the Derwent. At "5 to 20" there was less than one-fourth of the eight years' average of deaths, and though the child died in hospital, it came from the other side of the river, being sister to the girl last alluded to. At "20 to 45" the deaths were considerably less than the average, and no year of the eight had fewer, though three of them had an equal number. At "45 to 60" the mortality was also below the average, though three of the eight years had less, and one the same number. At "60 and above" the deaths were nearly double the average, and very considerably above any year of the eight. Ten of the eighteen deaths in this group, had passed beyond the three-score and ten of the Royal Psalmist, the oldest being 85 years old.

Aug. 1865.	Ages.	July, 1865	Augusts. 1864	1863	1862	1861	Min. 1860	1859	Max. 1858	1857	Avg. 8 yrs. Augusts, 1857–1864.
5	Under 1	7	4	7	7	9	11	6	28	11	10 3-8
4	1 to 5	2	3	4	7	3	4	8	16	2	5 7-8
1	5 to 20	3	4	5	3	10	1	4	4	3	4 2-8
7	20 to 45	6	9	7	7	14	7	8	12	14	9 6-8
7	45 to 60	7	11	8	7	1	6	14	6	16	8 5-8
18	60 and above	11	10	10	12	11	11	8	8	8	9 6-8
42		36	41	41	43	48	40	48	74	54	48 5-8

Zymotic diseases never before caused such a trifling mortality in the month of August. Only one death, of a child of a year old, being recorded. August 1864 had nine times as many. In the *constitutional class* of diseases, the deaths were less than half the average and below any year of the eight. Two of the deaths were from *consumption*, one being registered as born in Hobarton. The *local class* was also considerably below the eight years' average in its total deaths. Only 1860 had less. In the 1st order, *diseases of the brain and nervous system*, the deaths were 9, one from *apoplexy*, two from *paralysis*, two from *convulsions*, and four from *brain diseases*, 1864 had only 3. The 2nd order, *diseases of the heart and circulatory system*, the deaths were 4; 1864 had 5. The 3rd order, *diseases of the lungs and respiratory system*, had only 2 deaths, one from *chronic bronchitis* aged 51, the other from *pleurisy*, aged 65. In 1864, there were 7 deaths in this order, three of them under 50 years old. In the 4th order, *diseases of the stomach and digestive system*, only 2 deaths were recorded, while 1864 had 5. In the 5th order, *diseases of the kidney, &c.*, there were 2 deaths this year to one only in 1864. Another of the orders had a death this month, balanced by one in a different one last year. The *developmental class* had nearly three times the average deaths, 8 of the twelve deaths being from 67 to 83 years of age, and the other 4, all below one year, *i.e.* :—12 months, 4 months, 6 weeks, and half an hour. 1864 had only 6 deaths in this class. The class of *violent and accidental deaths* had also considerably more than the average mortality, and 6 times as many as 1864, the deduction of this difference from the total deaths from all causes numerically, would establish the fact of the more generally healthy character of the weather this year. *Inquests* took place on 6 of the deaths this month, being three on bodies found drowned, one on a child of 4 burnt, two on children from Bellerive, on the other side of the Derwent, believed to have died from eating poisonous fungi. In 1864 there was only one inquest. The deaths in *hospital* were 8, including two of the inquest cases. Two were from country districts, and one a Chinese cook. Last year the hospital deaths were 10. At the *Male Invalid Asylum* 5 deaths took place, aged respectively :—65, 66, 67, 79, 83. In 1864 there were 4. A female invalid aged 72 died at the Cascade Establishment. Of the 42 deaths, not one occurred in the Glenorchy division of the registration district, 3 died in the Queenborough, and the rest in the city. 30 were males, only 12 females. In the first week of the month, 6 died; in the second 14; in the third, and fourth, each, 9; in the last three days, 4. The greatest number of deaths on any day, was, 5 on the 8th; and on any two consecutive days, 6 on the 12th and 13th. On nine days of the month no deaths occurred.

The registered *births* were 68, being 6 less than in August 1864.

ROYAL SOCIETY.

SEPTEMBER, 1865.

The monthly evening meeting of the Fellows was held at the Museum, Macquarie-street, on Tuesday, 12th September. The chair was taken by his Excellency, the President, at half-past seven o'clock.

Among the Fellows present were the Ven. Archdeacon Davies, Captain Steward, Dr. Agnew, (hon. sec.), Lieut.-Colonel Chesney, Messrs. F. Abbott, J. Doughty, W. Stone, G. R. Napier, G. P. Adams, W. Pitt, W. Johnston, T. Stephens, F. Abbott, jun., &c. The Rev. M. Lalley, of New Zealand, Capt. Armstrong, H. M. 14th Regiment, and Capt. Cox, of the Indian Army, were also present as visitors.

The Secretary laid on the table the following returns, viz:—

1. Visitors to the Museum during August, 591.

2. Ditto to Gardens ditto, 1,418.

3. Plants received per Grasmere from Messrs. Backhouse & Sons, York, England, fruit trees, 58, of which 41 were dead on arrival. From Mr. M. Allport, seeds of *Sapindus Indicus,* and *Cynodon Dactylon.*

4, Plants, &c., supplied for decoration of the Franklin Square, Public Buildings, Hobart Town and Launceston, &c., &c., 1067, and 65 dozen bulbs. For decoration of grounds at salmon ponds, River Plenty, 135. To Mr. Marwedel, 50 papers mixed seeds.

6. Books and Periodicals received.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.
   (*a*) Table for August.
   (*b*) Summary of observations for ditto.
2. Port Arthur, from J. Boyd, Esq.
   (*a*) Table for July.
   (*b*) Reading of schooner's barometer for ditto.
3. Swansea, from Dr. Story.
   (*a*) Table for July.
4. Tamar Heads, from R. Henry, Esq.
   (*a*) Table for July.
   (*b*) Ditto for August.
5. Ross, from M. Duncanson, Esq:
   (*a*) Table for July.
   (*b*) Ditto for Augnst.

A communication from E. Swarbreck Hall, Esq., was read, to the effect that owing to accidental circumstances he had not been able to prepare, in time for the meeting, the usual "Analysis of the Hobart Town Meteorological Records," but "that the month (August) was characterised by mild, dry, sunny, and agreeable weather, with enough of wind movement and electricity to produce a high state of ærial purity, and consequently the community at large enjoyed a better state of health than is usual in August, and the deaths were below the average of the previous eight years. Children and adults up to 50 years of age, furnished an unusually small proportion of the deaths, more than two-thirds of the total morality being from 50 to 85 years old."

The following presentations to the Museum during the past month were brought under the notice of the meeting:—

1. Four skulls, with horns, of Indian buffalo, and two ditto of deer. From F. J. Cockburn, Esq., of Calcutta.

2. Two skulls, (male and female), of Tasmanian Aborigines. From the Colonial Government.

3. Four copper coins. From R. Hallam.

4. Specimen of *Teredo navalis,* and wood bored by the same, taken from a pile removed from Franklin Wharf. From A. Nicholas, Esq.

5. A stuffed specimen of rabbit. From W. Kermode, Esq.

Also the undermentioned books :—

1. History of the Discovery and Exploration of Australia, 2 vols. bound. By the Rev. J. E. T. Woods, Penola, South Australia.

Geological Observations in South Australia, 1 vol. bound. By the same.

Three pamphlets, "Physical Geography, &c., of North Australia," "Geology of Portland," and "Not quite as old as the hills." By the same. Presented bythe author.

2. Builder,the, Jany. to June, 1861, complete for 1862 and 1864, Jan. March, April, and May, 1865. FromDr. Agnew.

3. Bound volume of maps and (13)sections of Geological Survey of Tasmania. From M. Allport, Esq.

The SECRETARY, after intimating that he had had the great pleasure within the last few days of receiving a communication from Dr. G. Bennett, of Sydney, who is a corresponding member of the Society, proceeded to lay it before the meeting. It was entitled "Observations on the Rice Paper Tree (*Tetrapanax papyriferum*) now naturalised in Sydney, New South Wales. By George Bennett, M.D, F.L.S., &c."

In the discussion which followed, Archdeacon Davies observed that one of these trees had been growing for some time in front of the Telegraph office, a fact which confirmed Dr. Bennett's opinion as to its hardy character. The height of this plant was about five feet. Mr. Abbott, Junior, remarked that the tree also grew well in the Society's Gardens where there was a specimen about six feet in height. Its age was five years.

Lieut. Colonel CHESNEY read a paper "On the futurehome of the Waikato settlers." In the words of the writer the paper contained "a brief account of the interior of the North Island of New Zealand—a review of the causes that led to the campaign in the valley of Waikato and Bay of Plenty—a glance at the proposed scheme of military occupation, and a description of the future homes of the Waikato settlers."

Conversation having ensued, the PRESIDENT remarked in reference to the sulphur springs of New Zealand, that the deposit of sulphur on the East Coast of the North Island was most extensive. Unlimited quantities of it could be obtained, but not without extreme risk to the shipping required for the service, owing to the exposed and inhospitable character of the Coast. Another fact which His Excellency thought worthy of notice was the singular circumstance that of the entire territory of New Zealand only one solitary spot, the Province of Canterbury, was subject to the visitation of hot winds. It was a phenomenon of which he had never heard any satisfactory explanation. He had also been informed that the northern seaboard of Tasmania was scarcely ever touched by these winds, whilst here on southern shores, we were all well aware, they were occasionally felt, though in a far less degree than on the neighbouring continent.

The Rev. M. LALLEY corroborated the President's statement as to the Province of Canterbury being alone subject to these winds.

Mr. STEPHENS believed Strzelecki's idea was that the hot winds progressed in a wave like, or undulatory manner, and, therefore only impinged upon the earth's surface at distant and isolated spots. He (Mr. Stephens) thought it just possible that the wind might pass across Bass's Straits at such an elevation in the atmosphere as not to touch the surface till, passing over the Northern Districts of the Island, they struck the high midland ridge about Oatlands, whence they were precipitated, as it were, towards the lower levels between this and the Southern Ocean.

[The cause, origin, and progress of these winds are still mysteries. No explanation hitherto given is quite satisfactory, and the entire subject presents a most interesting field for further investigation.]

The SECRETARY reported that for some time past the English sky-lark had been heard singing every morning in the Society's Gardens.

A vote of thanks having been passed to Dr. Bennett, Lient.-Colonel Chesney, and the donors of presentations, His Excellency left the chair.

OBSERVATIONS ON THE "RICE PAPER TREE" *(TETRAPANAX PAPYRIFERUM)* NOW NATURALISED IN SYDNEY, N. S. WALES,

By George Bennett, M. D. F. L. S., &c.

The tree which produces the pith which is manufactured into that delicate material known as "Rice Paper," belongs to the *Araliaceæ*, or ivy worts, and is the *Tetrapanax papyriferum*, or *Aralia papyrifera*, of botanists. It is a native of the island of Formosa, and was supposed to be procured only from the northern part of the island, but it has recently been ascertained that it is found wild, and is also cultivated abundantly in different parts of the island, where it grows on the hills. In N. S. Wales it thrives luxuriantly on low land, and attains a greater and more rapid growth when planted in good soil. It was found that when a tree cultivated in the Botanic Garden at Sydney, had been planted in poor soil, the trunk was of small diameter, and a greater length of time was required to develope the pith to a size sufficient for use; whilst a tree planted in the garden of Mr. Wildman, at Paddington, near Sydney, in a clay and loam soil well manured, in one year and ten months had attained the elevation of two feet ten inches, from the base of the main trunk to the crown of foliage, the whole of which would, to all appearance, be available for pith, the circumference of the trunk of the tree was equally the same in every part of the stem, and measured seven and a half inches. The tree had just produced (May 26th, 1865) twelve fine flowery spikes for the first time, but the blossoms were not yet expanded. The cellular tissue or pith in the main stem, is the portion of the tree used in the preparation of the exquisitely beautiful substance named "Rice Paper," so well known in Europe as an excellent material for drawings of specimens of natural history, more particularly butterflies and other insects.

For many years the popular opinion that prevailed respecting this peculiar substance was that it was manufactured from Rice, hence it became known as "Rice Paper;" but when it was submitted to microscopic examination, the question was decided against the commonly received opinion by the delicate medullary portion of a Dicotyledonous stem being displayed. The Rice Paper Tree is named Tong-Shue by the Chinese, and is extensively cultivated on the island of Formosa in large plantations, and is propagated principally, if not entirely, from suckers, which every year—as we find in the trees growing in Sydney—are thrown up in great numbers.

The names of the places where this plant is chiefly cultivated on the island of Formosa are Ke-lung-Shan, and the three districts named Fung, Shan, Kea-e, and Chang-Kwa, all within two hundred miles of the chief-prefecture city, Taiwanfoo, the capital of the island; the furthest being Ke-lung-Shan. It is also stated that it forms "a main source of revenue to the population engaged in its cultivation, and the inhabitants depend chiefly upon it for their maintenance." According to the Chinese account of this plant it is of a delicate nature, "suffering from a cold or damp air, and withering in a bleak wind, a warm mild temperature appears to be a chief condition of its thriving;" whereas in Sydney it is always observed to be very hardy, enduring in full luxuriance of foliage the intense heats and hot winds of the summer season, and the bleak cold winds and sharp frosts of the winter, even when exotic trees have suffered severely, and some of them had even been destroyed.

In forming a plantation of these trees it will be necessary to remove the suckers from the parent stem when they are a few inches high, and place them in pots; when they have attained about a foot in height they ought to be removed to the land prepared for them, and planted in rows about five feet apart. Respecting the method adopted by the Chinese for removing the pith and manufacturing it into "Rice Paper," I extract an account sent by Mr. Sinclair to Sir William Hooker:—"When the plants have attained their full growth, which is said to be in the tenth month, they are cut down, the twigs and leaves removed, and the stems left to soak for some days in running water, to loosen the bark and wood, and facilitate the removal of the pith. This last, after being cleaned and made into a cylindrical shape, is cut into convenient lengths, and is now ready for the hand of the paper-cutter, who performs his part as follows: Taking a sharp broad-bladed knife, he makes a slight longitudinal incision in the cylinder of the pith, which is then turned round gently and regularly on the edge of the knife, until the whole available material is planed off in thin slices. Much care and dexterity are required to produce sheets of even thickness; if the operation is performed too hastily, and the motion of the hand not properly regulated, the sheets will not take the required curl, and will come off in wrinkled masses. If, on the other hand, the paring is done too slowly, the paper is liable to come out of uneven thickness. This is the blunder which the Fuh-chow artisans are too apt to commit, as they are far behind the Formosa cutters, whose skill is truly admirable; one or two workmen at Amoy have, however, done wonders in this line, and deserve considerable praise." The sheets as they are cut are placed one upon the other, and pressed for some time, and then cut into squares of the required size. The small sheets of this material are dyed of various colors, and sold at a very cheap rate, and are extensively used in the manufacture of artificial flowers; the larger sheets are sold at a much higher price, in proportion, from the greater difficulty attending their preparation.

As far as I have yet been able to ascertain in plants grown at Sydney, it would be useless to cut them down after ten months' growth for the purpose ef procuring the pith, as that portion of the plant is not sufficiently formed in that space of time; but I have found that, by careful cultivation, in about twenty months, when the tree has commenced flowering for the first time, the pith is sufficiently formed for all the purposes for which it is required. This I ascertained by cutting down some plants grown in the Botanic Gardens at Sydney, by permission of my friend, Mr. Charles Moore, the Director of that establishment, and the result was that I was able to exhibit at one of the meetings of the Acclimatisation Society specimens of the pith of plants grown in Sydney, measuring one inch and a quarter in diameter, and which in comparison with specimens of pith brought from China was considered fully equal to it both in size and quality.

The spare shavings and cuttings which remain after the preparation of Rice Paper are used for stuffing mattrasses and pillows, and it is also used by the Chinese as a medicinal remedy; the properties of the Ivy worts, to which family this tree belongs, are generally described as being aromatic, tonic, and stimulant. The famous Chinese medicine, the Ginseng *(Panax quinquefolium)*, belongs to this family; to it the Chinese physicians ascribe such extraordinary virtues, for they allege "that it nourishes and strengthens the body, stops vomitings, clears the judgment, removes hypochondriasis, and all other nervous affections, in a word gives a vigorous tone to the human constitution even in old age."

The first engraving of the Rice Paper Tree was published in my *Wanderings in New South Wales, Singapore and China*, (vol. 2 p. 77), in the year 1834. The engraving was made from a large colored drawing, executed by a Chinese artist, and was procured for me by the exertions of the late Mr. Beale, of Macao, who interested himself in my enquires respecting the tree producing the material known as "Rice Paper," but at that time all my efforts to procure specimens of the plant or tree producing it failed. The Chinese name for the tree, Tong-shue, has since been found to be correct with a slight difference in the orthography, being Tong-tsau, signifying "hollow plant." Specimens of the pith in the unprepared and prepared state and the drawings were all that I could procure respecting it during my visit to China. When living plants were procured by Sir John Bowring, in 1852, the Chinese drawing was found to be an accurate representation of the plant. On submitting, on my arrival in England in 1834, the drawing of the tree to Mr. David Don and Mr. A. B. Lambert, they both considered that if it was an accurate drawing of the tree from the pith of which the Rice Paper was prepared, it would probably prove to be a species of Aralia, and their conjecture has since proved correct.

About the termination of the month of May and in June, the early winter months in N.S. Wales—the Botanic and other gardens in the vicinity of Sydney are enlivened and adorned by the beauty of these trees, exciting the attention at that season of the year, not only for their luxuriant and wide-spreading canopy of broad dark green foliage, but from the beautiful head of large leaves being surmounted with from eight to twelve panicles of blossoms, three to four feet in length, crowning the tree in fine style, the magnificent drooping wand-like plumes waving over the dark green palmated leaves; the panicles of blossoms when closely examined consist of numerous small flowers of a pale yellowish white color, but which, when seen in certain directions, appear of a greenish, or greenish yellow hue, probably arising from reflected light, either from their own foliage, or from that of the trees growing in their vicinity. Although the flowers when examined in single clusters were very inconspicuous, yet when clustered on their white flowering stems they have a beautiful appearance, agreeably contrasted by the dark green palmated foliage, the latter being so widely extended, that when the tree had attained the elevation of eight feet, it was capable of affording an agreeable shade to persons standing under the leafy canopy. Although the tree when in bloom does not attract from brilliancy of color, yet it will always be admired for its fresh, elegant, and agreeable appearance.

The first Rice Paper Tree introduced into N. South Wales was sent to Sydney by Mr. Veitch, of the Royal Exotic Nursery at Chelsea, London, to Mr. Charles Moore, the Director of the Botanical Gardens, and by whom, shortly after its arrival in November, 1857, it was planted out in the open air in the Gardens. It soon grew very rapidiy, and commenced early to develop a number of suckers. On the 26th of April, 1858, the plant had attained the height of three feet eight inches, and still continued to throw up suckers in such numbers, that it was quite clear that there would be no difficulty in propogating so prolific a plant in the colony; and this has since been proved to be correct, as from this specimen the whole of the numerous Rice Paper Trees now growing luxuriantly in the colony of N. S. Wales have originated. This tree attained the elevation of six feet, with a circumference of foliage of twenty-six feet, and about the year 1859, it first bore flowers, and died soon after. From the habits of the tree at that time not having been coreectly known, it was considered that the tree died soon after flowering, leaving a numerous progeny of suckers, by which it could be propagated to a great extent, but on subsequent experience with other trees, it was found the death of this plant, immediately after flowering, was an accidental circumstance, as they regularly flower every year. I have already described the foliage as very fine, one of the leaves measured as follows:—

	feet	inches.
Length of stem	2	10
Diameter of stem	0	1
Breadth of leaf from across the third section	3	0
Greatest length	2	0
Thickness of leaf	0	0 $\frac{1}{4}$
Greatest length to the dichotomal division	0	9 $\frac{1}{2}$

The under surface of the leaf is white and downy, the upper green, the ribs of each digitation strong, the middle one the strongest. The branching mid-ribs of the leaf are very prominent, and the lamina is detached from them, like the swimming webb from the phalanges of water-fowl.

I will now proceed to give the measurement of four trees growing in the Botanic Gardens at Sydney in April, 1862. The first tree had the main trunk, six feet high, which then divided into two branches, from each of which during the flowering season there issued six spikes of blossoms. The total height of the tree was ten feet, with a circumference of foliage of twenty-four feet, and any person could stand upright under the broad and long leaves of this tree perfectly sheltered from the sun's rays. This tree was then four years old, and bears flowers regularly every year. The circumference of the trunk at the centre was eight inches. The second tree had the trunk six feet high clear of foliage, and a circumference of eight and a half inches, it then divided into two branches, the total height was eight feet, with a circumference of foliage of twenty feet. The third tree had the trunk four and a half feet high, and then like the others divided into two branches, the circumference of the trunk was ten inches, and the total height of the tree was eight and a half feet, with a circumference of foliage of twenty-two feet. The fourth tree was very irregular in growth, the main trunk clear of foliage was four feet nine inches high, with a circumference of nine inches, and then divided into two branches, the total height of the tree was seven feet, with a circumference of foliage of eighteen feet. The usual length of the leaves when full-grown, including the long foot-stalk, was four feet ten inches to five feet; the base of the long foot-stalk of each leaf clasp the trunk, in a similar manner to the fronds of the palm, and on being detached when dead, leave a mark on the trunk. The trees when young grow straight, and have a handsome and highly ornamental appearance, and are of very rapid growth, but after six or seven years, judging from the trees in Sydney, they for the most part lose their beauty, and throw off straggling branches, by which the tree is deprived of its elegant, graceful, and shady foliage, which forms so luxuriant a crown of leaves in the young trees; every year after flowering new branches are formed, and the foliage diminishing in size is the cause of the beauty of the tree being lost, but as the tree is very prolific in suckers, and is of very quick growth,—being a handsome shrub in less than twelve months,—after a few years when they cease to be ornamental, I should recommend the old trees to be removed and give place to young plants. The Rice Paper Tree flowers once every year, about the end of the months of May and in June, and at that season imparts great beauty to the gardens, attracting a number of bees and other insects, no doubt for the nectar secreted by the flowers. As the tree increases in size, it loses all its value for the pith as an article of commerce, and can then only be regarded as an ornamental tree for the garden or shrubbery for a few years. In the young bifurcated branches, the pith was also found to be well formed, and some prepared measured one inch in diameter. The bark of the tree is rough, and the wood, which is of a white color, is close grained, hard, heavy, and apparently durable, there is a mucilaginous substance secreted between the bark and the wood, which emits a strong smell resembling that of hemlock It has been remarked that after the suckers are removed from the parent tree, not potted, but at once planted into the ground, they will not again bear transplanting, those removed under these circumstances having perished.

The stem near the junction of the foot-stalk, as also the foot-stalk of the leaves, is densely covered with a kind of down of a rich brown color, and which is readily removed on the slightest touch; the young foliage just beginning to expand is also abundantly covered with this material. This down when placed under the microscope at 200 diameters exhibits a a stellate form with rays of unequal length.

The pith produced in this colony may be usefully applied to the manufacture of solar hats, now so much worn during the sultry summer months, and would form a new article of economic value for the colony.

In making this communication to the Society, I am desirous of popularising scientific knowledge, and making it bear as much as possible on the every-day pursuits of life.

THE FUTURE HOME OF THE WAIKATO SETTLERS.

[By Lieut. Col. Chesney].

Although some twenty-six years' have elapsed since the first English colony was founded in New Zealand, but little is known of the interior of those beautiful islands which now form part of the scattered empire of Great Britain. A few travellers have crossed some of the rivers, ascended the hills and skirted the lakes; missionaries have fixed themselves in places where native population invited their residence; and traders were located in spots easily accessible from the settlements: but, owing to the rugged nature of the Middle Island and to the jealousy of the natives in the North Island, the English race are to be found chiefly at the seaports and near the Coast line. To the bulk of the colonists the interior of the islands has been hitherto a *terra incognita.*

Discoveries of gold combined with the explorations of Dr. Hector and others are making us acquainted with the Middle I., and the campaign of 1864 against the native races has opened a highway into the centre of the Northern Island. Whether that highway will be again closed by the action of the present ministry of New Zealand is partly a political, partly a military question and is therefore not a fit subject for discussion within these walls, but, inasmuch as many people have left Tasmania and the Australian colonies to become military settlers in New Zealand, a short account of the the physical and geographical features of the territory recently acquired may be of interest to many of the Fellows of the Society.

It is proposed to lay before you a brief account of the interior of the North Island of New Zealand, to review the causes that led to the campaign in the valley of the Waikato and Bay of Plenty, to glance at the proposed scheme of military occupation, and to describe the future home and prospects of the Waikato settlers.

Near the centre of the island the volcano of Rua-pehu rises from what is evidently the water-shed. Its snow-clad summit, and that of the neighboring mountain, Tongariro, which rises to a height considerably greater than that of Mont Blanc, may be seen from Cook's Straits in clear weather. South of Tongariro the country is of a singularly broken and difficult character, and through it winds the river Wanganui, carrying quantities of pumice floating like balls of froth upon its surface. At first a swift shallow stream, after a course of about 50 miles it enters a cleft in the rock, and for about double the distance is bounded on either side by perpendicular walls of rock, so that the traveller has some difficulty in finding sufficient ground to camp on without climbing one of the root-ladders that form the communication between the native villages and the river. There are occasional rapids here, but the general course of the stream is quiet, in some places the current being quite imperceptible on account of the great depth of the water. Gradually the country becomes more open, and the walls of basalt are replaced by fertile banks. About 20 miles from the mouth the last rapid occurs, whence the river is navigable for small craft, and here the traveller finds the settlement of Wanganui in the province of Wellington, the town being about four miles from the bar. An attempt was formerly made to call the place Petre, but the more euphomious one of Wanganui has become the one by which it is known.

Ducks and teal abound on the upper Wanganui, amongst which a duck with a spoon bill is occasionally found. It is a shy and rather rare bird.

The river Wanganui is admirably adapted for salmon. These fish would have a run of 150 to 170 miles to their upper spawning-beds, the deep pools affording ample shelter on their way. Eels, a kind of small mullet, and a freshwater crayfish are at present the only fish in this fine stream.

Returning now to the centre of the island, we will take a northerly course. The Waikato river rises at the foot of Rua-pehu and flows into the south of lake Taupo, which is some 30 miles long by 25 broad and is surrounded by a fine, park-like country. Leaving the north end of Taupo the Waikato meanders through rugged, difficult ground, and, tumbling over a couple of cataracts, becomes navigable for steamers at Maungatautari. Thirty miles further down the rapid stream absorbs the quiet Waipa, and the joint river, still called the Waikato, flows onward swiftly in a wide channel over a sandy bottom, and is so shallow as to be almost unnavigable for boats or canoes in certain seasons. The Waikato empties itself on the West Coast and is accessible to craft of moderate size in fine weather. A township has been recently laid out within the heads.

The shores of Taupo and of the other lesser lakes to the North are of it are peopled by fine tribes of Maories, mostly heathens. The chief, Te Heu Heu, dismissed a missionary from his dominions on the ground that he interfered with his authority, and he consistently refused to be called by the English name Matene (Martin), by which he was known in the settlements. Very few of the natives in this district can speak a word of Euglish, notwithstanding which their agriculture is extensive and well carried on. The Waikatos have been more in contact with the Europeans. As long ago as 1852 a watermill was finished at Maungatautari, ploughs were busy between the two rivers Waikato and Waipa, and the Maoris were large growers of wheat, maize, and potatoes for the Auckland market. The Waikato tribes are physically a fine race of men and had always been considered to rank among the most warlike of the race; many of them had been trained to the use of firearms in the Auckland police force; and, although for years it had been illegal to sell arms to the natives, they never had any real difficulty in procuring muskets and powder. The causes that led to the recent campaign in the Waikato are too complex to be treated of at length in this paper, yet it is necessary to touch slightly upon them. The Maories were nominally subjects of the Queen and amenable to the law, but were virtually as free from its power as any dweller in Connemara a hundred years ago. If an Englishman offended against a Maori he was sure to be heavily fined or otherwise punished by his countryman the magistrate, whereas when the Maori happened to be the offender, he either did not appear as defendant or ignored the decision of the bench. The few scattered English residents in the Waikato valley were there on sufferance, and the natives enforced their old custom of *utu* (*i.e.* payment, or revenge) at the will of their chiefs. They even became so insolent as to have formed a project for the attack and plunder of Auckland. Sundry of them went down to join the Taranaki tribes in arms against the Government, and they set up Te Whero Whero, a noted old warrior, as king over them at Ngaruawhia, the confluence of the Waipa and Waikato. All acknowledged the old chief under the name of King Potatou.

It became necessary to hold these restless warriors in check and to protect the scattered settlers of the province of Auckland from outrage. The valley of the Waikato approaches within forty miles of the city, from which it is separated by steep hills covered with dense forest. Two plans of defence seem to have presented themselves, the first and simplest would have been to have established a chain of defensive posts from the east to the west coasts on the accessible country between Auckland and the Forest ranges. This plan would have been no punishment to the turbulent Waikatos, who could muster at their pleasure in unknown force close to our lines; it was not entertained, and was replaced by a comprehensive scheme of conquest which was submitted by ministers on 5th August 1863. In Mr. Domett's memorandum it was proposed to open up the country by making roads, to establish military posts where necessary, to introduce 20,000 settlers from the Australian Colonies and England, to borrow $3\frac{1}{2}$

millions, the estimated cost of the project, which was to be repaid by the confiscation of part of the natives' land and by the increased customs and other revenue. Owing to the presence of a large body of troops a road was made across the ranges without serious opposition and a redoubt (called after our gracious Queen) established on the plain beyond. Nobly did the Maories fight at Kohiroa, Rangiriri, and Orakau, but they were no match for superior numbers and discipline, and eventually they retired to their mountain fastnesses, leaving the whole valley a prey to their conquerors.

It was necessary to complete the first part of the plan the Waikato conquest should be connected with the Bay of Plenty, but what was to be done? The natives were loyal, and, with some exceptions, well-behaved. Orders were sent for the troops to march over their land occasionally. They resented this, and built a strong pa at the gate or entrance to their property. Reinforcements were hurried to Tauranga, and the position was taken after a desperate resistance. The Maories made one more effort to entrench themselves at the Bay of Plenty, but were defeated with great loss. The conquest sufficient for the chain of posts was complete. Unfortunately for the settlers, the Whitaker Fox-Ministry were replaced by men of Southern proclivities, the money was not forthcoming, the government steamers which supplied the transport on the Waikato are to be sold, and the pledges made to the military settlers by one set of ministers have been ignored by their successors. They might at least have built them the promised blockhouses to enable them to hold their land in troublous times. At present their only defences are slight works of earth and fern here and there, and their arms. In such situations they are to be left with their diminished numbers: we may therefore expect to hear of disasters, and either a warfare like that which was carried on with the North American tribes, or that the object gained by the exertions of our troops has been abandoned.

The soil Tauranga is of a deep volcanic nature and the settlers who have land there so near a good harbor are fortunate. The country of the upper Waikato is curiously formed, consisting of a series of plains or flats at different levels. The upper level at Cambridge, our farthest advanced post, is very good, rich soil. The river is rapid between Cambridge and Alexandra, at the confluence of the Waipa and Waikato. By the way the river is often erroneously named Horatiu in maps. Horatiu is the name of a district, not of the river. The soil below the junction of the rivers is not so good it being sandy in places.

There is a mine close to the river producing coal fit for steam purposes. Everywhere there is sufficient wood without the ground being encumbered by dense forests. The foliage of this part of New Zealand is very beautiful, for although the kauri is not found so far south, there are other handsome pines, and the eye is refreshed by the laurel-like green of the karaka *(Corynocarpus levigata)* and other handsome shrubs, such as the *Cordiline stricta* and the bright green *Pittosporum Eugenoides.*

The banks of the Waikato and some of its islands are ornamented with the waving flowers of the Toi-toi *(Arundo conspicua)* which resembles the pampas grass, but is yet more graceful.

When peace shall have been restored to this unhappy land, the hot springs that I brought under your notice on a previous occasion, will probably become the Saratoga of these colonies, and prosperous cities and smiling villages will spring up around the homes of the Waikato settlers.

METEOROLOGY FOR SEPTEMBER, 1865.

Private Observatory, Hobart Town.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced. Highest.	Lowest.	Self-registering Thermometers. Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind. Direction from three daily registers.	Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	29·622	29·435	63	37	90.0	35·5	NW N	5·46	0·08
2	29·617	29·486	62	46	93·0	43·0	NW W N	3·38	0·26
3	29·776	29·752	66	48	97.0	43·5	NW	1·04	0·02
4	29·800	29·782	64	46	98·0	44·5	SW SE	·52	0·04
5	29·972	29·929	60	36	80·0	34·5	NWNENW	·78	
6	29·714	29·575	60	39	75·0	38·5	N NW	·78	
7	29·708	29·522	58	40	58·0	39·5	S	3·38	0·80
8	30·124	30·022	56	39	84·5	38·0	SW S SE	3·64	0·15
9	30·149	29·957	54	38	86·0	34·5	NW NE N	1.04	0·03
10	29·922	29·746	60	36	82.0	31·5	NW N S	·26	0·08
11	29·647	29·275	63	38	94·0	35·5	NW	·26	0·01
12	29·513	29·282	59	39	82·0	36·5	N SW	1·28	0·07
13	29·687	29·670	62	39	92·0	33·5	NW	·26	
14	29·865	29·826	66	47	101·0	41·5	NW W	·52	
15	29·900	29·843	64	46	98·0	42·0	W NW W	·78	0·02
16	30·037	29·895	61	47	88·0	40·0	SW S	·78	0·06
17	30·124	30·087	63	35	95·5	30·5	NW	·26	
18	30·050	29·877	65	47	98·0	42·5	NW	1·04	
19	30·098	29·879	67	44	99·0	35.5	NW SW	·52	
20	29·765	29·620	74	45	102·0	43·5	NW E	5·20	
21	29·807	29·771	70	50	79.5	48·0	SE	·26	0·15
22	29·626	29·439	70	49	102·0	45·5	NW SW	·52	
23	29·588	29·448	67	50	99·5	45·0	NW SW	·52	
24	29·500	29·326	63	46	99·5	40·5	NW	3·12	0·04
25	29·656	29·551	67	45	102·0	42·5	NW W NE	5·99	
26	29·784	29·747	67	53	111·0	49·5	NE NW	1·04	
27	29·380	29·317	66	54	88·5	48·0	NW	1.30	0·06
28	29·643	29·571	63	44	78·0	43·5	S W S	3·38	0·63
29	29·662	29·423	61	39	97·0	35·5	NW N NW	·52	
30	29·357	29·316	57	47	83·0	43·0	NW N NW	·78	0·05
							Total force	48·63lbs	2·55

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 guage. 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 :—

8th Ash commencing to flower.
10th Vines commencing to break leaf.
14th Oak commencing to break.
16th First Montan Peony flower open.
20th Horse Chestnut commencing to flower.
25th Robina Pseudo-Acacia commencing to break.

Barometer mean, 29·705in., being 0·073 in. below the average.
Temperature mean, 52·32°, being 1·40° above the average.
Solar intensity mean, 91·10°, being 4·10° ditto.
Dew point mean, 48·63°, being 3·58° ditto.
Humidity of air mean, ·71, being 5·5 per cent. below the average.
Elastic force of vapor mean, ·277, being .003 per cent. ditto.
Total amount of rain, 2.55in. being 0·68in. above the average.
Increase of spontaneous evaporation, on rainfall 0·52in.
Mean amount of ozone, 7·99 being 0·23 of chromatic scale above the average.
Electricity active on the 5th, 13th, 14th, 15th, 17th, 19th, 20th, 22nd, 23rd, 24th, 26th, 28th, 29th, and 30th.
Mount Wellington copiously mantled with snow throughout the month, with frequent additions.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR SEPTEMBER, 1865, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

The weather generally this month was favorable to health and life, beneficial to agriculture and horticulture, and agreeable to the feelings; being warmer and less boisterous than usually characterises this vernal month of the southern hemisphere. Nevertheless in some of the atmospheric phenomena, conditions existed for brief periods, which had a lethal effect on individuals enfeebled by sickness or old age. On the average of eight years, September is sixth on the list of the twelve months, in its rate of mortality. Many persons erroneously imagine that it is one of the most fatal to life. The present month's deaths were below the September average numerically.

Atmospheric pressure mean, 29·705, is—·073 below the September average of the twenty years' standard tables. Last year's September was about the same in excess above the mean. The extreme range was, however, much less in this month, than in that; being only ·874 of an inch, though it occurred within two days, the maximum, 30·149 being registered at 7 a.m. on the 9th, and the minimum, 29·275, at the evening observation of the 11th. No September in the previous five years had so small a range. On the other hand the daily perturbations were both extensive and frequent. The greatest variation in any twenty-four hours, was a rise of +·494 of an inch on the 8th, and a fall of nearly as much, —·478, was recorded on the 20th. On thirteen days of the month, movements exceeding one-fifth of an inch were noted. These changes have always a marked effect on chronic diseases particularly of the circulatory, respiratory, and nervous systems.

Wind force total was, 48·63 lbs., which is —·26·79 lbs. less than the September average of the previous eight years, at the same time, September last year had a few pounds less than the present month. The strongest wind had a pressure of 5·21 lbs to the square foot, but was only registered once, *i.e.*, at noon of the 25th, being a west gale. This month had somewhat of the character which the English March bears, in "coming in like a lion, and departing like a lamb." South-west and north-west winds had more than the average in frequency, while all but the *South* were below the average in force. *Calms* were recorded 21 times, which is —3·57 less than the mean of the previous seven years.

Temperature mean was, 52·32 degrees, being + 1·40 above the 20 years' average, though more than a degree below that of last year. The self-registering thermometers gave a mean of 53·45 degrees, the variation being about what is usual between these distinct modes of observation. The maximum was 74 degrees on the 20th, being from one to five degrees higher than in any September since 1857. The minimum was 35 degrees, registered on the night of the 17th. Last year's minimum was higher by three degeees, though its maximum was one less. The extreme range, 39 degrees, exceeded any of the previous four years by two to four degrees. The mean of all the maxima or high-day temperatures was, 63·27 degrees, curiously enough showing warmer days than September 1864 had; while the mean of all the minima or low-night temperatures was 43·63 degrees, and exactly one degree less than was noted last year. The analysis of the daily observations and still more of the hourly,—as recorded for eight years night and day at the Ross Bank observatory—give abundant proof of the little reliance that can be placed upon general means, in deducing effects on health and life.

The *daily-range of temperature* had the very high mean of 19·63 degrees, being + 1·61 above the 20 years' average, and above any of the three previous Septembers, exceeding that of last year, by nearly two degrees. From the remarks in the previous paragraph on day and night temperatures, this result of course was obvious. Nevertheless, it is remarkable, that the extreme range of the present month, 29 degrees on the 20th, was the same as for last years' September. On the other hand the minimum range in the present month is two degrees less (8) than last year. It used to be the prevailing belief in England, that rapid transitions of temperature were the principal cause of diseases and death,—and "took cold" became the ready explication of every death not accidental, Tasmanian experience by no means confirms the English aphorism.

Solar-Intensity mean was, 91·10 degrees, being + 2·84 more than the average of the previous nine years, and even + ·40 more than September 1864. The maximum temperature happened on the 26th and was 111 degrees, which is higher than any ever before recorded in September. The maximum of 1864 was 60 degrees less.

Terrestrial-radiation had a mean of 40·17 degrees, which is +1·98 degrees above the average of the previous nine years, but —·56 of a degree less than the mean of September last year. The extremes were 30·5 degrees on the 17th, 49·5 on the 26th.

Rain fell to the aggregate amount of 2·55 inches, which is + ·68 of an inch more than the 20 years' mean for September. It also exceeded September 1864 by more than one-half. At the same time it must be remembered that August, July, and June were all below their respective averages. 17 days were recorded on which more or less rain fell, being +1·90 above the average of the previous ten years. The greatest quantity was precipitated on the 7th, —80 of an inch; but on four other days, equally distributed as to intervals, enough fell to scavenge the city streets, and drainage-channels. On the 7th snow and hail were mixed with the rain as it fell in the city. *Snow* was abundant on Mount Wellington during the whole month.

Humidity mean, 71, notwithstanding the large rain-fall was —·5½ below the 20 years' average.

Elastic-force of vapour had a mean of 277, which is—3 less than the 20 years' standard. It ranged from minimum 182 on the morning of the 5th to maximum 369 on the evening of the 22nd. It was continuously high from the 20th to 27th and on 14th and 15th. Both were periods of excessive mortality.

Cloud mean 6·76 was +1·01 higher than the September average of the 20 years' standard. With so high a mean of sunshine this is remarkable, and indicates an unusual warmth of the solar rays.

Ozone had a mean of 7·99 which though + ·04 above the mean of the previous eight years, is considerably less than any of the three preceding Septembers. The maximum 10 (saturation) was recorded four times. The minimum was 6, registered on the 20th and 22nd.

Electricity was very abundant, "Nil" was not noted at any one of the 60 observations. Positive was registered 33 times, with a maximum tension of 7·5; and Negative 27 times, with maximum tension of 8·5. September 1864 had not nearly so large an amount. No *lightning* or *thunder* was observed in Hobarton.

43 deaths occurred this month, being 3⅜ less than the average for September of the previous eight years. One half of the eight had considerably more, and the other half somewhat less. Last year had six less, but a minute examination of the details shows that the present month was not less healthy to the popuation at large, but that the excess arose from the greater number of accidental and violent deaths, and the greater number received into and dying in the Hospital from the other districts.

Sept., 1865	Ages.	Aug. 1865	Septembers. 1864	1863	1862	Min. 1861	Max 1860	1859	1858	1857	Avg. 8 yrs. Septs., 1857–1864
9	Under 1	5	6	5	12	5	8	15	8	7	8 2-8
2	1 to 5	4	1	4	5	2	12	4	4	4	4 4-8
6	5 to 20	1	4	4	3	2	8	4	0	1	3 2-8
3	20 to 45	7	14	8	17	7	12	8	12	10	11
9	45 to 60	7	6	13	10	8	10	8	10	13	9 6-8
14	60 and above	18	6	8	9	11	15	11	8	9	9 5-8
43		42	37	42	56	35	65	50	42	44	46 3-8

"Under one year old" the number of deaths was slightly above the eight years' average, and one third more than in September, 1864. But 7 out of the 9 deaths were under two months old, and four of these did not survive birth more than five days, At "1 to 5" the mortality was less than half the eight years' mean, six of the eight having twice, or more, as many. 1861 had the same in number, and last year had only one. At "5 to 20" the deaths were nearly twice the average, and one third more than last year; but three of these were violent deaths, on which inquests were held. At "20 to 45" the deaths were but little above one fourth of the average, and only a trifle more than one fifth of the mortality at the corresponding period in 1864. At "45 to 60", also, the deaths were considerably less than the average, though one third more than in 1864. At "all ages above 60" the mortality was very much above the average, and more than twice as many as in September last year. August also had a more than usual mortality in this group. The analysis of the meteorological phenomena has given a cause for this. Very young children and very old debilitated persons, therefore, have been the principal sufferers this month while weaned childen and adults in general have escaped with much smaller losses than usual.

Sept, 1865	Classes of Disease	August, 1865	Septembers. 1864	1863	1862	Min. '61	Max 60.	1859	1858	1857	Avg. of 8 yrs. Septembers, 1857-1864.
6	1. Zymotic	1	5	4	4	5	11	12	3	3	5 7-8
5	2. Constitutional	3	9	9	15	3	18	12	10	5	10 1-8
22	3. Local	20	20	23	26	17	32	16	25	25	23
6	4. Developmental	12	3	2	2	9	2	7	1	8	4 2-8
4	5. Violent &c.	6	0	4	9	1	2	3	3	3	3 1-8
43		42	37	42	56	35	65	50	42	44	46 3-8

Zymotic diseases had a fraction more that the average mortality; *Croup* caused the death of a girl aged 3 years; *Diphtheria*, a boy 6 weeks old; *Erysipelas*, a girl only a month old; *Diarrhœa*, one at 4 months, and another nearly 3 years old; a man aged 58 died from *Delirium Tremens* in the Hospital. In the opinion of many nosologists, this cause of death, ought not to be included in the Zymotic class.

The *Constitutional class* of diseases had less than half the eight years' average, and but little more than half of what September 1864 had. Two were from *Cancer* and three from *Consumption*, two of the latter females, aged respectively 14 and 25, were born in the island. Last year had seven from consumption, two of them also females, and Tasmanians by birth.

The *Local class* had one less than the eight years' average, but two more than last September had. In the 1st order diseases of the *brain and nervous system* the deaths were 11, *i.e.*;—1 from inflammation of the membranes of the brain; 3 from apoplexy; 1 from paralysis; 4 from convulsions—all under two months old; and 2 from disease of the brain. In 1864 the total in this order was only 6. The atmospheric causes influencing the deaths in this group have been previously alluded to.

The 2nd order, *Diseases of the Heart and Circulatory System*, had three deaths 1864 had two more. The 3rd order *Diseases of the Respiratory system*, had but one death, and that from long standing disease, while 1864 had eight deaths, and most of them of an acute character in adults in the prime of life. Nevertheless, as I have before observed, the daily ranges of temperature were much greater this September than last. The present month, however, had fewer winds from the ocean quarters, and also less ozone. The records in Hobarton show that while a great abundance of ozone is a most potent purifier of the air we breathe; and consequently adverse to the generation of the miasmatic division of the Zymotic class of diseases, and therefore preservative of the general health of a community; yet, that its very stimulating effects is apt to cause inflammatory affections of the respiratory organs:—Catarrh and its sequences. Popularly this is most erroneously confounded with influenza, which in all the epidemics of it we have had here, has been always heralded with, and accompanied by a deficiency of ozone.

In the 4th order, *Diseases of the Stomach and Organs of Digestion*, the deaths were 2. September 1864 had the same number.

The 5th order *Diseases of the Urinary Organs*, the deaths were 4, all chronic, and above 47 years old. Last year had not any.

In the 7th order, *Diseases of the Bones, &c.* this month had a death in a boy, of 14, who died in Hospital some time after an operation by which it was necessary to remove the upper jaw and adjoining bones of the right side, owing to a formidable tumor in the antrum. It is believed that this—one of the most triumphant and important operations of modern surgery,—was never before performed in Australasia. Dr. Bright was the operator, and most of the medical practitioners in Hobarton were present. We were all sanguine of the result. The patient had however, been reduced to a very low state by previous suffering and hæmorrhage, and unfortunately the weather subsequent to the operation was inauspicious. On the day of his death the barometer fell suddenly nearly half an inch, [while on the two previous days it had risen nearly as much. All that surgical skill and medical science could do, had been done, but the elements they cannot control at pleasure.

The *Developmental class*, had considerably more than the average of deaths, one of the number died five days after birth, the other 5 were all from old age, being 60, 71, 76, 78 and 90 years old, respectively. September last year had only half the number.

In the class of *Violent and Accidental Deaths*, the number was slightly above the average. Two were children ruthlessly murdered; one a boy of 10 died from a fracture of the skull some days after receiving a kick from a horse; the fourth was a case of accidental gun shot wound in the thigh, brought to Hospital from a country district. It was followed by tetanus. Some of the atmospheric phenomena were unfavorable at the time. The day before his death the elastic force of vapour, was at its maximum 369, and that and the two preceding days were the hottest in the month. Another case of accidental injury in which amputation of the thigh was performed has also suffered in a lesser degree from lock-jaw, but was still surviving on the last day of the month (since dead.) This frightful affection, though common enough elsewhere, is of rare occurrence in Tasmania.

Four *inquests* were held on persons dying in September, the causes of which have already been commented upon. Last year there were only two.

The deaths in *Hospital* were 13, inclusive of one of the inquest cases. Of these five were received from other registration districts. Last year the total was only nine.

At the *Male Invalid Asylum*, men aged respectively 50, 72, 78, died. There was only one last year.

Of the 43 deaths, 27 were males, 16 females, one died in the Glenorchy, 3 in the Queenborough electoral divisions of the district, the rest in the city.

On six days of the month there was not a single death. In the first week 10 died; in the second, 12; in the third, 10; in the fourth, 9; on the last two days, two. The greatest number of deaths on any two consecutive days, was six, on the 14th and 15th. The most fatal period was the four days, 12th to 15th, when 11 deaths occurred, but these include the two murdered children. The next in number were the five days, 19th to 23rd, when ten deaths were recorded.

The *births* registered were 76, being one less than in September, 1864.

ROYAL SOCIETY.

OCTOBER, 1865.

The usual monthly evening meeting of the Society was held on Tuesday, the 10th October, the Hon. R. Officer, Esq., V.P., in the chair.

Among the Fellows present were the Ven. Archdeacon Davies, Dr. Agnew, (hon. secretary), Lieut. Lloyd, R.E., Messrs. W. L. Dobson, F. Abbott, T. Stephens, H. Butler, J. Doughty, R. S. Bright, M. Allport, A. G. Webster, W. Stone, H. S. Wintle, E. S. Hall, &c. Dr. Brooke was also present, as a visitor.

The Secretary laid on the table the usual returns, namely :—

1. Visitors to Museum during September, 650.
2. Ditto to Gardens ditto, 1,779.
3. Plants supplied. To M. Allport, Esq., for planting on Franklin Island, 25 white Mulberry.
5. Books and Periodicals received.

Meteorological Returns :—

1. Hobart Town, from F. Abbott, Esq.
   (a) Table for September.
   (b) Summary of observations for ditto.
2. Port Arthur, from J. Boyd, Esq.
   (a) Table for August.
   (b) Reading of schooner's barometer for ditto.
3. Swansea, from Dr. Story.
   (a) Table for August.
4. Tamar Heads, from R. Henry, Esq.
   (a) Table for September.
5. Adelaide, S.A., from C. Todd, Esq.
   (a) Tables for July.

The Secretary read the usual Analysis of the Hobart Town Meteorological Table, and Health Report for the month by E. S. Hall, Esq.

The presentations to the Museum were as follows :—

1. Four specimens of Corallines, from Chapell Island. Presented by Mr. Babington.
2. Black Cormorant *(Phalacrocorax Carboides)*. From Mr. Oakley, New Norfolk.
3. Ditto. From Mr. Cawthorne.
4. Pelican *(Pelecanus conspicillatus)*. From Mr. Fulton, Hobart Town.
5. A curiously-twisted root of she-oak (?) Presented by J. Hayes, Esq., M.H.A.
6. Medal, Victoria and Albert, 1851. From L. W. Dessaur, Esq.
7. A Japanese coin. From W. Pitt, Esq.
8. Native tiger *(Thylacinus cynocephalus)*. From W. A. B. Gellibrand, Esq.
9. Forester kangaroo *(Macropus major)*. From M. Allport, Esq.
10. Geological Map and Sections of Province of Wellington, New Zealand. From His Honor the Superintendent, Wellington.

Mr. M. Allport brought under the notice of the meeting the fact that the

Black Cormorant (*Phalacracorax carboides*) had lately been seen in unprecedented numbers about Hobart Town and the country districts in its vicinity. Many had even visited the pond in the Society's gardens. Of these two had been shot, and on opening their stomachs, a number of Tench were found. They were very troublesome in the vicinity of the salmon ponds, where upwards of ninety had already been shot. Many other rare water birds, the Nankeen Night Heron, (*Nyctororax Caledonicus*,) the Maned Goose, (*Bernicla jubata*), the Tippet Grebe, (*Podiceps Australis*,) and the Australian Egret, (*Herodias syrmatophorus)*, had also made their appearance in very unusual numbers. These visitations were probably due to the long continued dry weather in the centre of the Australian continent, and Mr. Allport thought it was advisable to place the matter on record, in order to see if in future years a drought of this character should be followed by similar phenomena.

Dr. OFFICER corroborated Mr. Allport's statement, as to the trouble which the Cormorants gave at the salmon ponds, where the greatest vigilance was necessary on the part of Mr. Ramsbottom and others to guard the Trout and Salmon from their felonious attempts.

Mr. ALLPORT also exhibited eggs of the common Land Snail *(Bulimus sp.)* so frequently met with on Mount Wellington, and elsewhere. The eggs were about the size and shape of those of the Humming Bird, and white in color.

Archdeacon DAVIES presented samples of the hair of the Angora Goat, and also of the cross between it and the common Goat. The former is a beautifully white silky staple of eight and a half inches in length, the latter of about the same length, but dark in color, and presenting more the appearance of wool. Both samples were from flocks belonging to Mr. John Swan, of Avoca.

Mr. M. ALLPORT reported that the English Perch *(Perca fluviatilis)* introduced by him (after several failures) four years ago had at length spawned. These fish were placed on their arrival in a small artificial pond, in Mr. J. Allport's garden, constructed so as to resemble as nearly as possible a weedy pool in a rivulet, 15 feet long by 12 wide, 3 feet 6 inches deep at one side, and gradually sloping to a few inches at the other. The spawn is hung in a ribbon like mass amongst the weeds, upon close inspection it is resolved into a net work of beads 18 inches long by 2 inches broad. That from one fish probably contains 300,000 ova. The labour involved in keeping the parent fish supplied with tadpoles (their favorite food), worms &c., has been at times very great. Besides the fish this pond has been instrumental in thoroughly establishing the English White Waterlilly, and other waterplants, and two species of the larger English pond snails of which our own streams are singularly deficient. The habits of several interesting Crustaceans and the metamorphoses of a large number of Ephemeral flies have also been observed, the pond thus furnishing a very efficient Aquarium on an extensive scale.

Mr. F. ABBOTT read a paper (supplementary to a former one on the same subject) on the best mode of establishing a system of Time Signals in Tasmania.

The importance of the subject was fully recognized by the meeting, and it was hoped that in time further action would be taken in the matter.

Mr. STEPHENS regretted that he had not had leisure to prepare a paper on the subject which he had to bring before the society, but would offer some general remarks on the origin of drift gold, with special reference to the probability of the existence of deep leads at Fingal. The original matrix of all loose gold, whether in the form of minute scales, crystallised masses, or waterworn nuggets, was to be looked for, as all were probably aware, in the quartz veins or dykes intersecting the old silurian rocks. Where, therefore, these were absent, or deeply buried below upper palæozoic or carboniferous rocks it was idle to search for gold. The silurian rocks consisted chiefly of slates, grits, and sandstones, almost always more or less beat and contorted, and generally exhibiting well defined cleavage. The immediate source of the gigantic pressure which had produced these remarkable contortions of the strata could not always be pointed out. In Victoria, where the main axis of elevation runs from East to West, the silurian rocks do not appear to have been affected by the disturbing agency to which the present watershed of the country owes its origin, the line of strike preserving a general meridional direction. Through these rocks, but never passing upwards into the Upper Palœozoic rocks, run the auriferous quartz dykes or reefs usually inclined at high angles, and maintaining in almost all cases a direction parallel to the general strike of the primary rocks. In the course of time by the process of denudation deep valleys and ravines were excavated. The softer parts of the rocks were first washed away, next the quartz reefs and veins, which broken up and rolled together in the course of ages produced the vast accumulations of waterworn boulders, pebbles, and gravel which now cover extensive areas in all the known auriferous districts. At a later period commenced the filling up of the hollows which had thus been formed on the earth's surface, but not before the larger portion of the gold, liberated from its rocky matrix, had quietly settled down in the deepest portions of these ancient valleys and river beds, there to be concealed for ages by the deposits of sand, clay, and gravel which now form the Tertiary beds of the greater part of the interior of Victoria. Igneous or volcanic agency assisted in the levelling process. Vast sheets or layers of basalt (popularly known as *bluestone*) occur, sometimes interposed between successive deposits of drift; sometimes covering the whole surface of the country, and frustrating all conjecture as to the position or course of the old valleys deeply buried beneath. To trace out and work these deep leads of gold was now the chief business of alluvial mining, the more accessible portion of the gold-fields having been practically worked out. (Mr. Stephens explained the difference between 'surfacing,' 'shallow sinking,' and 'deep sinking,' by means of diagrams, and illustrated his further remarks by reference to a sketch map showing the chief physical features of the Fingal district). Geological conditions similar to those described in Victoria might be recognised, he said, in the silurian rocks and quartz reefs of certain portions of the Fingal district, and it was this circumstance which chiefly justified the hope of paying returns whether from quartz reefs or deep leads. The presence of tertiary deposits had not, however, been ascertained, and, if these at all, were probably concealed by the alluvium and post tertiary drift which now occupy the valley of the South Esk, and the bottoms of the valleys and ravines which open into it. It was a question whether these extended separately across the main valley, underneath the present bed of the South Esk, or were simply tributaries leading ages ago to some old river bed following the general course of the modern river, but perhaps hundreds of feet below the present surface of the ground. The latter theory appeared the most probable, but in either case the lowest part of the valley might be safely regarded as covering the chief part of the gold, which has been washed out of the surrounding hills, in the course of the extensive denudation to which they have been subjected. That no important accumulations of gold now existed in the upper portions of the tributary valleys and gullies the experience of the past few years had shown. By degrees, when once the reputation of the quartz reefs of Fingal has been satisfactorily established, companies might be formed for the purpose of testing the deeper grounds in the slopes which lead from near Mangana to the S. Esk, and it was quite possible that indications might be met with sufficiently favorable to justify the extension of operations under the bed of the river itself. But such undertakings required a larger amount of capital, confidence, and judgment, than are likely to be available at Fingal for some time to come. In working deep leads at Ballarat and elsewhere companies were sometimes engaged five years in bottoming a single shaft, and many thousands of pounds had to be expended before any returns could be obtained. This, too, when the general course of the deep leads had been ascertained. Here there was nothing known with certainty as to the existence of a deep lead, and only a charlatan would attempt to speak positively of its precise situation. The present duty of every one interested in the prosperity of Fingal was steadily and perseveringly to push forward the development of her quartz reefs; to look to Victoria as a place where quartz mining has been more efficiently and successfully prosecuted than in, perhaps, any other part of the world, and therefore to be regarded as our best guide; and above all to beware of adventurers who profess to have discovered new processes for the extraction of gold which throw all former discoveries into insignificance: It was for others to try experiments in critical affairs of this kind. The people of Tasmania ought to have learnt by this time that in mining matters it was cheaper to profit by the experience of others, than to buy their own. Mr. Stephens remarked, in conclusion, that a good deal of misapprehension prevailed as to the per centage of gold required to constitute a 'paying' reef. It depended, of course, entirely upon the cost of extraction, and this varied according to the size of the reef, the facilities for quarrying the quartz; the chemical conditions attending the distribution of the gold, &c. &c. In some mines in Victoria a yield of 3dwt to the ton paid a handsome dividend; in others, where the quartz was known to contain gold at the rate of several ounces to the ton the work had to be abandoned on account of the difficulty and cost of extraction. What would be the average yield of the principal reefs of Fingal was not yet known, nor what proportion of the returns would be absorbed by the working expenses; but there was every reason to suppose that the quartz, which is already known to contain more or less gold, will yield remunerative returns to skilful and judicious manipulation.

A vote of thanks having been accorded to Mr. Abbott and Mr. Stephens, and also to the donors of presentations, the meeting broke up.

TIME SIGNALS.

[By F. Abbott, F.R.A.S.]

At the May meeting of the Society, some notes were read and a discussion took place as to the desirability of establishing time signals in the colony. In the opinion of that meeting further information was required on the subject, and a committee was appointed to make inquiry as to the size of gun necessary, the distance at which a report could be heard, and the amount of expense that would be incurred.

Part of this duty the committee has been relieved from, through the kindness of Colonel Chesney, who partly for this purpose and partly for military service, has caused three guns to be fired at 4 p.m., on the first Thursday in every month, provided the weather was fine, and if not on the first fine day following. Through the Horological Institute of London, I am now in possession of further information on the subject, especially on the method adopted for obtaining and transmitting correct time, and have therefore thought it desirable to bring the practical portion more fully before the Society, as Time Signals are now held to be of great importance in all manufacturing or commercial towns, in which either public or private works are carried on.

It will appear that much greater accuracy, with considerable ingenuity and cost, both in obtaining and transmitting correct time, has been adopted in other places, than at present we can hope for here, notwithstanding one uniform time, to one or two seconds, may be kept with the means we have from one end of the island to the other. In a letter from Dr. Hirsch, the Director of the Cantonal Observatory at Neuchatel, there is described a very ingenious contrivance for appreciating the fractions of seconds in the reception of time signals. It will be unnecessary to give a full description of the means used for the reception of time at the several stations, and only necessary in this instance to note, that by most careful sideral observations it will give an accuracy that reduces any possible error to less than one tenth of a second. The signals are established at Berne, Chauz-de-fond, Locle, Ponts, and Flurier, as well as at several private houses.

To give anything like a full and correct description of the system of time signals as established at, and in connexion with the Royal Observatory at Greenwich would not in this case be desirable, suffice it to say that the whole of the system is automatic. The apparatus is distributed in various places, but works together as one complete whole. Time signals pass from a clock in the Observatory to several points in London,from which they become again distributed to different stations, and by means of the various telegraphic lines, they are again extensively transmitted throughout the country ; the clocks of many important lines of railway being constantly regulated by them. The signal passes as far as Brighton in the south, Lowestoft in the east, Cardiff in the west, and Glasgow in the north ; as well as to Manchester, Birmingham, Liverpool, and other important places. These signals are distributed (when received from Greenwich) by the

International Telegraph Company, by means of a "Chronopher," designed and constructed by C. F. Varley.

To arrive at the correct mean time for the Greenwich normal clock, the error is found from the transit clock that has been previously rated by astronomical observations from certain clock stars, the positions of which are known with great accuracy; one of these stars being observed by aid of the chronograph, an apparatus that has been in use at Greenwich since the year 1854, and part of which consists of a revolving cylinder attached to a clock, on which is fixed a paper which is punctured at the time a star transits over each web of the telescope. This record is then extracted from the chronograph, and the mean of all the webs, or punctures taken; this mean when corrected for instrumental errors and personal equations, is the difference between the R.A. of the star and the sideral time clock; a comparison is then made (by the coincidences of beats) between the mean time clock, and sideral clock, from which the correct mean time is ascertained, as at the Cantonal Observatory at Neuchatel to one tenth of a second.

At Newcastle a clock which is kept adjusted to Greenwich time makes automaically the proper connections for allowing an electric current to arrive at Newcastle to act on relays which transmit currents to discharge the Tyne time guns, one of which is placed on the old Norman Keep at Newcastle, the other at North Shields. The gun at Newcastle is a 12 pounder gun, that at North Shields is a 24 pounder. Very general reference is made to these guns, not only by the public generally, but also by manufacturers and ship-building companies, for regulating their works, and not less important are the facilities they give for the rating of chronometers.

The first Glasgow time-gun was supplemented by a second one in St. Vincent's Place on the 29th of October, and these two by a third at the Broomielaw, on the 10th of November, while a fourth gun was added to the system at Greenock on the 21st of November, all four being simultaneously fired through the agency of the electric current from the Observatory.

At Madras, measures have been taken by the astronomer, Mr. Norman Pogson, with funds supplied to him by the Governor-in-Council, to convert no less than five guns, which are daily fired in and about that city, by connecting them electrically with the normal mean time clock of his observatory. Mr. Pogson says that "the smoke by day, and the flash by night of a time-gun, are far better and more conspicuous signals than any time ball."

I have collected and put together the foregoing facts in order to show that the system of time signals is becoming very generally adopted, and much ingenuity, expense and trouble has been brought to bear for economising time in well-regulated communities.

In the discussion which arose on this subject at the monthly meeting for May last, the object itself was approved of, the only objection raised was the expense, the estimated amount of which was in a great measure fallacious. The 32lb. guns fired on the first Thursday in the month at 4 p.m. were heard at Richmond, Sorell, and Prosser's Plains. It is however the opinion of the Military Officers that a 12 pound brass gun, with $1\frac{1}{4}$ or $1\frac{1}{2}$lb of powder such as the one used at Newcastle, would be heard, if not quite, nearly as far as a 32lb gun. This 12lb gun, with 1½lbs of powder, at 8d., for say three signals a week, Monday, Wednesday, and Friday, will amount to £7 16s. per annum. Now, in addition to this, it would be necessary to adopt a similar signal at Launceston, which, without any difficulty, could be switched by the telegraph from the report of the Hobart Town gun. By this means the time would be kept simultaneously from one end of the island to the other for £15 12s. per annum I may mention here that the difference of time between Hobart Town and Launceston, by known longitude, is 55.847 seconds, but the clocks frequently vary from ten to fifteen minutes, and sometimes more. The time occupied in switching the signal from Hobart Town to Launceston is inappreciable, as the estimated speed of the electric current, according to Wheatstone, is 286,000 miles per second; Walker makes it 18,000 miles per second, and Fizeau, 62,700, and 110,000, according to the material employed.

If the government expect to carry out the proposed railways, and other public works, a very large number of men will be required, and it is quite clear that if something approaching to correct time is not adopted, a few minutes loss for each man every meal will very soon amount to a much more considerable sum than the cost of a few time signals.

The system which I have now partly attempted to describe well illustrates the beneficial effects arising from the mutual co-operation of several parties to carry out a common object; and it is this joint action alone which maintains a system by which a country may unconsciously be benefited. I may tell you (says the Astronomer Royal) my friend, Mr. W. De La Rue, estimates the amount annually saved to his firm, by having exact time, and enforcing strict attendance on his work people, at £300 per annum, besides some saving of gas and coals, not taken into account. Think only, says Professor Airy, of £300 per annum being thus saved in one establishment alone, and then consider what would be the saving in London, if all establishments of a similar magnitude could save by this system a like amount.

The Astronomer Royal says in conclusion, that he hopes to see some day soon, an extension of the Greenwich system carried out in the exhibition of hourly time signals at the Start Point, and that he has prepared a complete scheme for the purpose; the signal by day being the drop of a ball or semaphore arm, and the signal by night a flash of gunpowder. The value of such a system for ships would be very great, since it would enable masters to obtain for their chronometers sea-going rates, which is a thing of great importance

METEOROLOGY FOR OCTOBER, 1865.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced		Self-registering Thermometers.				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	29·692	29·517	55	38	92.0	34·0	NW	3·64	0·05
2	29·922	29·864	59	38	97·0	36·0	NW SW N	·78	0·02
3	29·842	29·785	64	49	98·0	45·0	N NW W	8·33	
4	29·726	29·509	70	49	102·0	45·0	N NW	5·99	0·05
5	29·838	29·661	66	43	98.5	40·0	NWW NW	2·86	0·10
6	29·720	29·464	67	42	93·5	37·5	N W	7·81	
7	29·872	29·648	61	44	94·0	39·5	N W	5·72	0·08
8	30 100	30·044	68	38	91·5	34·0	NW SW S	1.30	
9	29·995	29·775	51	46	54·0	46·0	SW SE S	·52	1·22
10	29·942	29·848	60	47	86·5	46·0	S SE	1·30	0·61
11	29·944	29·826	63	43	101·5	41·0	SW W NW	·26	0·01
12	30·004	29·984	61	40	100·0	39·0	Nw Sw Nw	1·04	0·07
13	29·995	29·835	64	46	92·5	43·5	NW	3·12	
14	29·675	29·563	65	51	100·0	42·5	N W NE	5·73	0·02
15	29·795	29·626	62	42	88·0	39·0	NW SW	5.72	0·13
16	29·876	29·842	58	38	81·0	37·0	NW SE E	·78	0·02
17	30·011	29·953	56	44	91·0	41·5	N E	·52	0·03
18	30·027	30·014	59	42	90·5	39·5	N E NE	1·04	0·01
19	30·073	29·961	65	45	99·5	42·5	E NE NW	3·12	
20	29·921	29·864	65	49	98·0	47·0	NW SW W	1·04	
21	29·997	29·884	68	52	104·0	48·5	N NW	3·64	
22	30·160	30·136	76	46	112·0	45·5	NW SE SW	3·64	
23	30·184	30·105	72	52	107·0	51·5	SW SE	1·04	
24	30·132	30·113	68	52	109·0	50.5	NW SE	1·04	
25	29·960	29·821	79	49	115·0	46·5	NW SE	·52	
26	29·707	29·647	81	57	117·0	53·0	NW SE	1·04	
27	29·650	29·632	72	56	111·5	55·0	NW SE W	1·28	
28	29·729	29·617	67	48	109·0	42·5	N SW N	3·12	
29	29·956	29·922	63	44	85·0	42·5	N NW	1·56	
30	29·996	29·965	64	48	75·0	45·0	NW SE	1·04	
31	29·822	29·503	84	46	119·0	42·0	NW	8·33	
							Total force	86·89lbs	2·42

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 currentsmoving at a height of 192 feet, and the force according to Lind's Wind Guage. 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 underthe 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 Roya Society's Gardens during the month :—

1st Paulownia Imperialis commencing to flower.
2nd Carpinus Betulus commencing to leaf.
9th Ailantus glandulosa commencing to leaf.
16th Tilia Europea commencing to leaf.
17th Morus niger commencing to leaf.
20th Maclaura aurantiaca commencing to leaf.
22nd Ulmus campestris seeds commencing to fall.
26th Melia azederach commencing to leaf.

Barometer mean, 29·852in., being 0·127in. above the average.
Temperature mean, 53·67°, being 4·12° below the average.
Solar intensity mean, 97·18°, being 2·82° ditto.
Dew point mean, 46·01°, being 0·51° ditto.
Humidity of air mean, ·71, being ·0 same as the 20 years' table.
Elastic force of vapor mean, ·305, being ·022 below the average.
Total amount of rain, 2·42in. being 0·34in. ditto.
Increase of spontaneous evaporation, on rainfall 1·12in.
Mean amount of ozone, 8·88, being 1·67 of chromatic scale above the average:
Electricity active on the 2nd, 3rd, 5th, 7th, 8th, 11th, 12th, 19th, 20th, and 31st.
A lunar rainbow on the 5th ; thunder on the 9th.
Snow never absent from the summit of Mount Wellington during the month.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR OCTOBER, 1865, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

The weather generally during the month was favorable to health and life, and the mortality in consequence was below the October average of the previous eight years, and fell principally upon aged and otherwise enfeebled persons. In no month of any year since the purity of the air has been recorded by the ozonometric test, has the atmosphere ever before exhibited so large an amount of allotropised oxygen. Atmospheric pressure fluctuated but little; winds were more than usually moderate, and preponderated from healthy quarters. Shade temperature was below the average, while solar heat was above the mean. Daily ranges, however, were somewhat in excess; rain-fall was above the average, and electricity was abundant. The usual accompaniment of such weather, inflammatory affections of the respiratory organs, was not absent, but the effect on the mortuary returns is scarcely appreciable.

Atmospheric pressure mean, 29·852, was only +·072 above the 20 years' adopted standard mean, and was not so high as October, 1864, by —·035. The extreme range of the month was only ·720 of an inch, being very considerably less than that of any October of the previous ten years, and —·367 below that of last year. The extremes were noted on the 6th and 23rd, the former having the minimum 29·464, the latter the maximum 30·184. The greatest movement in any twenty-four hours, from 1 p.m. to 1 p.m., was a fall of—·411 on the 31st. The greatest rise was +·344 on the 2nd. Altogether there were twelve days on which the perturbations exceeded one-fifth of an inch, and though this is the same amount in number as occurred in October, 1864, yet the extent of the fluctuations was very much less.

Wind-force total was 86·89 lbs., being —12·64 lbs. less than the average of the previous eight years, but —22·12 lbs. less than October, 1864, had. *South-West*, *West*, and *North-West*, were all above the average both in frequency and force, and the other five points were all below. The strongest winds had a pressure of 5·21lbs. to the square foot, and were registered five times. *Calms* were noted at 17 observations, being the same in number as last year, but +1·43 more than the October average of the previous seven years. A *hot wind* blew on the 31st, and one approaching that character prevailed on the 4th.

Temperature mean, 53·67 degrees, is —·78 of a degree below the 20 years' mean, but is almost identical with that of October 1864. Indeed, the last three Octobers have all been much colder, than have been noted in other years since 1853. The self-registering maxima and minima thermometers, however, gave a much higher mean, *i.e.*, 55·76 degrees, which is +2·17 more than the same instruments gave last year. The extremes were 38 minimum, registered on the 1st, 2nd, 8th, 11th; 84 maximum on the 31st. The latter was only exceeded four times in the previous twenty-four years, *i.e.*, 87 in October 1861, 85 in 1855, 85·9 in 1854, 91·5 in 1845. The mean of all the high-day temperatures was 65·58 degrees, while last year's was only 63·29. On the other hand the low-night temperatures were almost alike, being respectively 45·95 for 1865, 45·51 for 1864.

Daily-range of temperature had the mean of 19·30 degrees, being +·30 above the 20 years' mean, and 3·00 above 1864. Thus, while the nights nearly corresponded in temperature in Octobers 1864 and 1865, the latter year had much warmer days, and consequently a much wider daily-range of temperature. The greatest range occurred on the 31st, and was 38 degrees, being +11 more than that of 1864. As high a range, however, was noted in 1862, though not in any other year of the 24 recorded. The lowest range was degrees on the 9th.

Solar-intensity mean was 97·18 degrees, which exceeds that of the previous ten years by +1·76, that of 1864 by +2·86, and that of 1863 by +3·39. The maximum was 119 degrees on the 31st. 1856 had a maximum of 120 degrees, but no other year since then has had so high a maximum as the present October. As the present month had a higher cloud mean than usual, the greater warmth of the sun's rays while shining is remarkable.

The *Terrestrial-radiation* thermometer gave a mean of 43·16 degrees, being +1.30 above the mean of the previous ten years, though only + ·08 above 1864. The extremes were 34, on the 1st and 8th, and 55 on the 27th, and in all respects differed remarkably from the extremes in 1864.

Rainfall total was 2.42 inches, which is + .65 of an inch more than the 20 years' average for October. Last year's October, however, had nearly a quarter of an inch more. There were 14 days on which more or less rain was precipitated, but on the average of the previous ten years, there ought to be 15 wet days to October. So that though a larger amount of rain fell than usual, yet it was restricted to a smaller number of days. In fact on only two of the days, the 9th and 10th, was the rain at all heavy, the quantity guaged being respectively 1.22 inches and .61 of an inch, Of conrse, this fall thoroughly soaked the soil, and flushed all the drainage channels. On the 15th the rain deposited was barely sufficient to cause the surface drains to run, but on no other days of the month, was there sufficient to effect this desirable result. *Snow* was never absent from Mount Wellington during the month, but none fell in the city as there did in October last year.

Humidity mean was 71, being — 2 below the 20 years' average, and — 3 less than 1864 and 1863 had.

Elastic-force of vapor had a mean of 305, which is +4 above the 20 years' mean. The extreme range was from 118 on the morning of the 15th, to 517 on the evening of the 25th: For the seven days, 21st—27th, the force was continuously high, never during the 21 observations having fallen below 295.

Cloud mean 6.75 was + 1.13 above the 20 years' average, and a little above that of last year.

Ozone had the highest mean ever yet recorded for any month since records were kept, being 8.88. October, 1864, very nearly approached to this amount. The October mean, however, of the eight years' records is — 1.08 less than that of the present month. Nine times, saturation (10 of the chromatic scale) was recorded, and the minimum was 7, only recorded at the evening observation of the last day of the month.

Electricity had 24 positive indications with maximum tension of 8, and minimum of 2.5. Negative had 36 records with the extremes of tension of 7 and 1.5. There 2 "nils." No lightning was observed, but thunder was were heard on the 10th. A lunar rainbow was seen on the evening of the 5th.

The number of *Deaths* this month is 39, being $4\frac{5}{8}$ less than in September, as well as that proportion below the average of the previous eight Octobers, 1857 to 1864.

Oct. 1865	Ages.	Sept., 1865	Octobers. 1864	1863	1862	Mn. 61	1860	1859	Max. 1858	Max. 1857	Avg. 8 yrs. Octs., 1857-1864
8	Under 1	9	8	4	2	8	6	9	9	10	7
0	1 to 5	2	3	6	3	3	10	3	15	7	6 2-8
2	5 to 20	6	4	2	2	0	4	6	4	3	3 1-8
11	20 to 45	3	8	8	9	12	10	7	12	10	9 4-8
6	45 to 60	9	8	13	4	2	8	9	6	22	9
12	60 and above	14	10	16	10	4	7	7	11	5	8 6-8
39		43	41	49	30	29	5	41	57	57	43 5 3

"Under one year old," the deaths were one more in number than the average of the 8 years, though precisely the same as those recorded for October, 1864. At "1 to 5," not a single death occurred, though the eight years' average is 6 2-8, and not one of the eight had less than three deaths in this group of ages. At "5 to 20," the deaths were more than one third below the avera ge. At "20 to 45," the average was exceeded by + 1 4-8, and only two years out of the eight had as many, that is 1861 and 1851, each 12, being one more each, At "45 to 60," the deaths were exactly one-third below the average. Last year had two more than the present. At "all ages above 60," the deaths were nearly one third above the average. Only 1863 had more; last year had two less. Every month of this year, so far, except July, has had a considerable excess above the average of deaths in this group, while under 5 years old, the deaths in every month have been very largely below the eight years' average. The year so far, therefore, has been most propitious to infantile life, though inimical to old people. The former, however, is the admitted test of the salubrity of any season, or climate.

Oct., 1865	Classes of Disease	Sept., 1865	Octobers.								Avg. of 8 yrs. Octobers, 1857-1864.
			1864	1863	1862	Min. '61	1860	1859	Max. '58	Max. '57	
2	1. Zymotic	6	2	6	3	1	12	4	11	6	5 5-8
8	2. Constitutional	5	6	10	9	2	9	5	13	9	7 7-8
16	3. Local	22	22	26	12	17	22	28	23	30	22 4-8
10	4. Developmental	6	6	2	5	7	1	3	7	4	4 3-8
3	5. Violent &c.	4	5	5	1	2	1	1	3	8	3 2-8
39		43	41	49	30	29	45	41	57	57	43 5-8

The *Zymotic class of diseases* had precisely the same number of deaths as in October 1864, though very considerably less than half of the eight years' average.

The *Constitutional class* had a fraction more than the average, and 25 per cent. more than 1864 had. Six out of the eight were deaths from consumption, of whom one was born in Tasmania, a female, aged 25. Another was a New Zealander brought to Hospital from a whaler in harbor. He only lived three days after admission. Of the others, two were born in Scotland, and one each belonged to England and Ireland. October 1864 had only two-thirds of this number of deaths from consumption.

The *Local class of diseases* gave a smaller number of deaths than any year of the eight, and were very considerably less than the average, as well as of those in October last year. The 1st order of this class, "*Diseases of the Brain and Nervous system,*" exhibits a striking contrast in its mortality this year to last, *i. e.* 5 to 12. The diminution this year is in accordance with the less disturbance of atmospheric pressure, the influence of which was alluded to in the "Report for October 1864." In the 2nd order "*Diseases of the Heart and Organs of Circulation*" the deaths this year were numerically the same as in October last year. The 3rd order *Diseases of the Lungs and Organs of Respiration*" the deaths this year were 5, to 3 last. Last year not one of the three was under 56 years old, this year three of the five were under 23 years old; and two of these were babes under four months old, who died from acute inflammation of the lungs. It will be remembered that a cause for this was shown in the unusual abundance of ozone.

The 4th order, "*Diseases of the Stomach and Organs of Digestion,*" had only half the number of deaths that October 1864 had. The 6th order "*Diseases of the Locomotive Organs*" gave one death, while 1864 had not any. The *Developmental class* had considerably more than double the average deaths, half of them, however, were from old age: and three out of the remaining five were all under nine months old. The class of *Violent and Accidental Deaths*" was slightly below the average, and considerably less than last year had. One died from tetanus after amputation of the thigh for injury to the limb that occurred at Spring Bay. It is alluded to in last month's report. A boy of 7 was killed by a blow from the derrick of a steamer when leaving the port. The third, a babe of 7 months old, fell into the fire from its nurse's arms, and died from the burns inflicted. The *Inquests* on cases dying within the month, were 4, last year had 7. In *Hospital,* inclusive of two of the inquest cases, the deaths were 15, October 1864 had only 10. Of these, seven did not belong to this registration district. In the *Male Invalid Asylum*, four died, aged respectively, 45, 64, 65, 74. October had the same number. In the *Cascades prison* two children died, each aged two months only. October last year had not any. Of the 39 deaths 20 were males, 19 females, an equality of the sexes very unusual. The Glenorchy division of the registration-district had not any deaths, the Queenborough had 3, and the rest died in the city. In the first week of the month there died 13; in the second, 8; in the third, 7; in the fourth, 4; in the last three days, 7. The last three days, and those from 2nd to 4th inclusive, were the most fatal periods of the month. The atmospheric disturbances, at both these times, were greater in most respects than any other three consecutive days during the month. On seven days of the month there was not a single death. The 4th and 31st had each three, being the minimum for the month.

The *births* registered were 65, being — 5 less than in October 1864.

ROYAL SOCIETY.

NOVEMBER, 1865.

The monthly evening meeting of the Fellows was held at the Museum on Tuesday, the 14th November, The Hon. R. Officer, Esq., V.P , in the chair.

The Secretary laid on the table the usual monthly returns, viz. :—

1. Visitors to Museum during October, 470.
2. Ditto to Gardens ditto, 1907.
3. Tench supplied ditto, 6.
4. Time of leafing, flowering, &c., of a few standard plants in Botanic Gardens.
5. Books and periodicals received.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.
   (*a*) Table for October.
   (*b*) Abstract of ditto.
2. Port Arthur, from J. Boyd, Esq.
   (*a*) Table for September.
   (*b*) Reading of schooner's Barometer for ditto.
4. Tamar Heads, from R. Henry, Esq.
   (*a*) Table for October.
5, Ross, from M .Duncanson, Esq.
   (*a*) Table for September.
   (*b*) Ditto for October.
6. From G. Smalley, Esq., Government Astronomer, Sydney.
   (*a*) Monthly Meteorological Tables from June 1857 to December 1858.
   (*b*) Ditto ditto for 1859.
   (*c*) Astronomical Observations, Sydney, for 1859.
   (*d*) Astronomical and Meteorological ditto, 1860.
   (*e*) Ditto ditto ditto 1861.
   (*f*) Ditto ditto ditto 1862.
   (*g*) Meteorological ditto 1863.
   (*h*) Diagrams (4) of Barometrical Curves at Stations in New South Wales.

The usual analysis of the Hobart Town Meteorological Table, with a Health Report for the month, by E. S. Hall, Esq., was read by the Secretary.

Dr. HALL called the attention of the meeting to the fact that during the prevalence of the hot-wind on Saturday last, (11th inst.,) the self-registering Shade Thermometer, at Mr. Abbott's observatory at 1 p.m. recorded a temperature of 95 degrees, and the Solar Thermometer 129½ degrees. In 33 hours afterwards the Shade Thermometer had fallen 50 degrees.

The presentations were as follows :—

1. Skeleton of Dolphin (*Delphinus Sp.*) Presented by M. Allport, Esq.
2. Specimen of Squid (*Loligo*). Presented by Captain Smith, barque Catherine.
3. Ditto of Holothuria, from Sandy Bay. Presented by H. M. Hull, Esq.
4. Ditto of Flounder, malformed. Presented by Mr. Cearns.
5. Four copper coins, one American cent; one 20 cash, East India Company; one half-penny token, St. Helena, and one token, unknown. Presented by Mr. J. Nathan.
6. Tippet Grebe (*Podiceps Australis*). Presented by J. G. Stansfield, Esq., Jericho.
7. "Volcanic Bombs," from Mount Talbot, Victoria. Presented by Dr. Officer.

A pamphlet by Col. Crawford (Richmond) entitled "A Letter to the Officers of H. M. Indian Services, Civil and Military," accompanied by a letter presenting it to the Society, was laid on the table.

The SECRETARY after reminding the Fellows that the Society had been honored by the presentation by Her Majesty (our patron) of a copy of "The principal speeches and addresses of His Royal Highness the Prince

Consort," reported that a letter of thanks from the Society for the donation had been transmitted to the proper authority by His Excellency the President, and that the following reply had recently been received from the Rt. Hon. the Secretary of State for the colonies.

TASMANIA—SEPARATE.

Downing-street,
July 24th, 1865.

SIR,- I have had the honor to receive, and duly to submit to Her Majesty your despatch, separate, of the 23rd December, 1864, enclosing the address of thanks from the Honorary Secretary of the Royal Society of Tasmania, for the copy of the principal speeches and addresses of His Royal Highness the Prince Consort, presented by Her Majesty to that institution.

I am commanded to express to you in reply that the Queen has been very much gratified and soothed by the expressions of loyalty and attachment to herself, and of veneration for the character of the Prince Consort, which are contained in that address, and in the addresses which Her Majesty has received from so many other distinguished and learned bodies throughout the colonies.

You will have the goodness to communicate this reply to the Royal Society of Tasmania.

I have the honor to be,
Sir,
Your most obedient, humble servant,
Signed) EDWARD CARDWELL.

Governor Gore Browne, C.B.
&c., &c., &c.

At the request of some of the members present, the following letter of thanks, above referred to, was read :

Royal Society of Tasmania,
Hobart Town, December 21st, 1864.

SIR,—I have been requested by the Council of the Royal Society to acknowledge the receipt from your Excellency of a copy of "The Principal Speeches and Addresses of His Royal Highness the Prince Consort," also of a despatch from the Right Honorable the Secretary of State for the Colonies, by which we are informed that the volume is presented to the Society by Her Most Gracious Majesty the Queen.

On opening it we find, affixed to the words of presentation, the autograph of Her Majesty.

It is difficult to give expression to the feelings of pride and gratification with which we acknowledge the honor thus conferred on us. And if in the presentation there is a tone of unceasing sorrow, it but deepens our reverence fo a beloved sovereign who, in the midst of her grief, can thus, by an attention to one of the remotest and smallest of her colonies, exhibit for our guidance a shining example of that devotion to duty which ever won the approval of His late Royal Highness, and was the great guiding principle of his life.

We, therefore, beg that your Excellency, as President, will be pleased to transmit our thanks to Her Majesty, not alone as our Gracious Queen, but as Patron of the Royal Society of Tasmania, and to convey our humble assurances that this copy of "The Principal Speeches and Addresses of His Royal Highness the Prince Consort" with which we have been honored, will for ever be preserved by us as an invaluable treasure.

I have the honor to remain,
Your Excellency's very obedient servant,
(Signed) J. W. AGNEW, M.D.,
Hon. Sec.

Mr. ABBOTT laid on the table an abstract of the Meteorological Observations taken at the Light Houses and other stations in Tasmania for the half-year ended 30th June, 1865. Mr. Abbott also read some notes in reference to various phenomena, recorded in the abstract.

A vote of thanks having been passed to Mr. Abbott and to the donors of presentations, the meeting broke up.

METEOROLOGY FOR NOVEMBER, 1865.

Private Observatory, Hobart Town.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced: Highest.	Lowest.	Self-registering Thermometers: Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass	Wind: Direction from three daily registers.	Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	29·657	29·636	77	49	110·0	44·5	N NW W	5·72	
2	29·759	29·618	71	47	98·0	42·5	NW W	5.72	0·04
3	30 062	30·043	68	42	108·5	39·5	NW N S	1.30	
4	29·980	29·835	70	44	105·0	40·5	NE E SE	1·04	
5	29·854	29·792	67	46	80·5	43·0	NW SE E	3·12	0·14
6	30·071	30·065	64	45	108·0	42·0	S SE E	1·30	0·02
7	29·937	29·612	68	49	100·5	49·0	N NE	·26	
8	29·498	29·425	75	58	115·0	53·5	N NW W	5·20	0·03
9	29·638	29·567	76	46	120·0	43·0	NW	8·07	
10	29·789	29·567	77	58	111·0	53·5	NW W S	13·62	
11	29·575	29·380	95	53	129·0	50.5	W NW NE	10.68	0·02
12	29·744	29·527	84	51	120·0	53·5	SE SW	1·04	0·75
13	29·758	29·671	73	45	113·0	42·0	NW W SW	8·33	
14	29·722	29·588	68	49	104·0	45·0	NW W	5·72	0·23
15	29·803	29·774	64	42	107·0	40·0	NE NW	1·30	0·13
16	29·343	29·280	63	47	99·0	46·0	NW W.	16·15	0·18
17	29·832	29·580	59	39	97·0	39·0	W NW	10·41	0·43
18	30·051	29·898	71	51	113·0	49·0	E SW	15·18	
19	30·072	29·913	68	45	110·0	47·0	N NE NW	·78	
20	29·901	29·883	64	51	90·5	49·5	NW SE	3·38	
21	29·882	29·679	72	45	114·0	42·5	NW SE	·26	
22	29·729	29·666	73	58	114·0	56·0	N W	3·38	
23	30·732	29·595	69	50	106·5	46·5	NW W	8·07	0·04
24	30·002	29·995	68	52	116.0	42·0	NW SW E	·78	0·02
25	30·145	30·048	67	42	113·0	40·5	NW SE	1·30	
26	30·182	30·137	63	50	71·0	50·5	S SE	1·04	
27	30·236	30·194	73	49	115·0	47·0	NW SE	1·04	
28	30·183	30.027	81	49	120.0	49·5	NW SE	·78	
29	30·039	30.013	76	55	109·0	54·0	SE	·78	
30	29·847	29·601	81	56	115·0	53·5	NW SW SE	1·04	
								Total force 136·90lbs	2·03

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 Guage. 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 :—

15th First ripe Strawberry gathered.
18th First ripe Cherry gathered.
21st Black Mulberry in full blossom.
28th Pomegranate commencing to flower.
30th First ripe Raspberry gathered.

Barometer mean, 29·808in., being 0·083in. above the average.

Temperature mean, 59·23°, being 1·44° ditto.

Solar intensity mean, 107 73°, being 7·73° ditto.

Dew point mean, 45·80°, being 0·72° below the average.

Humidity of air mean, ·66, being ·05 per cent. ditto.

Elastic force of vapor mean, ·332, being ·005 per cent. above the average.

Total amount of rain, 2·03in. being 0·73in. below the average.

Increase of spontaneous evaporation on rainfall 3·43in.

Mean amount of ozone, 8·46, being 1·25 of chromatic scale above the average.

Electricity active on the 1st, 2nd, 3rd, 4th, 13th, 14th, 15th, 17th, 18th, 23rd, 24th, 26th, and 27th.

Thunder and lightning on the 11th, 12th, and 16th.

Snow never entirely absent from Mount Wellington during the month.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR NOVEMBER, 1865, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swabreck Hall.

To the mass of the community, particularly all those under 45 years old, never was there any month of the twelve, in the previous eight years and ten months, so auspicious to health and life as the present month, other months have had a smaller number of total deaths but they were at ages indicative of less favorable atmospheric conditions.

Atmospheric pressure mean, 29·808, was + ·083 only above the 20 years' adopted standard. The daily fluctuations, and extreme range of the month, were less extensive than is usual in November. The greatest movement of the barometer, between any two 1 p.m. records, was a rise of + ·532 on the 17th, being'less than for any November of the previous four years. The greatest fall, was — ·518 on the previous day, altogether there were ten days on which the movements exceeded one-fifth of an inch. The extreme range of the whole month was ·956 of an inch, being considerably below that of the Novembers of the two preceding years. The maximum was, 30·236 on the 27th, the minimum, 29·280 on the 16th.

Wind force total, was 136·90 lbs., being + 27·64 lbs. above the average of the previous eight years,—1863 and 1861, however, had both a greater aggregate force than the present month. Last year's was not so much, by upwards of 12 lbs., *west* and *north-west* were the predominant winds, exceeding the average largely, both in frequency and force. All the other six points of the compass were below the average in frequency, though *east* and *south-west* were in excess in force, and the rest below, The greatest pressure noted at any of the three—daily observations, was 10·42 lbs. to the square foot, and was recorded with a north-west *hot-wind* at 1 p.m. on the 11th ; with a west-wind at sunset on the 16th ; with an east-wind at 7 a.m. on the 19th ; the latter being a most remarkable occurrence. *Calms*, 8, were 2·29 below the average of the previous 7 years.

Temperature mean 59·23 degrees, is + 1·44 degrees above the 20 years' mean, and + 1·16 more than November, 1864, had. The mean of all the maxima of the self-registering thermometer was, 71·50 degrees ; showing an unusually great high-day temperature, and being + 1·27 more than November last year had. The mean of all the records of the minimum self-registering thermometer was 48.77 degrees, being almost identical with last year. The mean of both is 60·13 degrees. The maximum was noted on the 11th being 95 degrees, or 19 degrees above that of 1864 November, and higher than any November of the previous 24 years—1843, however, approached within half a degree of the present month. The minimum, or lowest night temperature, was 39 degrees, recorded on the 17th. No November since 1856 has had so low a minimum as this. The extreme range, 56 degrees, therefore, much exceeds that in any November recorded, that of 1843 being only 49·20 degrees.

The mean *daily-range* of temperature was 22·73 degrees, being +3·89 degrees above the 20 years' average, and +1·50 higher than 1864 had. 1862, however, had +·20 of a degree higher, but no other of the 24 previous years approached nearer than a degree less than the present. The greatest range of any day was 42 degrees on the 11th. This is the highest record for November in 24 years, except in 1846, when 44·8 degrees was registered. The smallest range was 13 degrees, noted on the 20th and 26th. On diseased, aged, and enfeebled persons, these extreme ranges of temperature had a very fatal effect, though quite innocuous to young and healthy individuals.

Solar-Intensity mean, 107·73 degrees, is +1·58 degrees above the average of the previous nine years, and +3·87 higher than 1864 had. 1856, only, had a higher mean, 112. The maximum was recorded on the 11th, being 129 degrees. Last year's was 4 degrees less, and no other year of the nine was higher than 120. The minimum solar-temperature was 71 degrees on the 26th. In this month, contrary to what was reported for November, 1864, cloud mean, it will be seen hereafter, was below the average. The mortuary record does not indicate that this excessive sunshine was directly injurious to life.

Terrestrial radiation had a mean of 46.48 degrees, which is only ·01 below the nine years' average, and less than November 1864 had. The maximum was 56 on the 22nd, and the minimum 39 on the 17th, the former being one degree, and the latter eight degrees, above the corresponding observations in 1864.

Rain was registered on 12 days of the month being —·90 below the average of the previous ten years. The total amount precipitated was 2·03 inches, which is—·73 of an inch less than the 20 years' average for November, but is almost identical with the amount gauged in November 1864. During the present month, however, the rain was more equally distributed. On the 12th 14th, and 16th, the surface channels ran briskly. On the last 13 days there were only two days of sprinkling showers. *Snow* was persistent on Mount Wellington during the whole month, and the additions on three days were very copious, but soon disappeared. None fell in the city, but there was *hail* with the rain on the 23rd. Thunder was heard on the 11th and 12th, accompanied by lightning on the last named day.

Spontaneous-evaporation amounted to 5·46 inches, the highest quantity ever recorded except in January 1862, when it recorded 5·82 inches. In November 1864 spontaneous-evaporation was but little more than rainfall.

Humidity mean, 66, is —5 below the 20 years'average. It ranged from 45 to 93.

Elastic-force of Vapour, had a mean of 332, being + 5 above the average, with a range from 225 to 534.

Cloud mean, 5·59, is—50 below the 20 years average, and—96 less than November 1864 had.

Ozone mean was 8·46, being + 1·01 above the average of the previous eight years, but only + ·05 more than in November 1864. Saturation (10) was twice recorded, and four times it fell to 7, the minimum. The tendency to catarrhal and inflammatory affections of the respiratory organs, alluded to in the October report as induced by the great prevalence of ozone, was maintained this month from the same source. Yet only one death in the mortuary tables appears to have any connection therewith—a man of 45 from pneumonia (inflammation of the lungs.)

Electricity, as registered by the electrometer, gave very different results, this month to what was recorded for November 1864. There were 30 positive indications, with a range from 2 to 8 of tension; while last year had only 15, but with an extreme tension of 9. Negative was registered 29 times, with a range from 1·5 to 9·5 of tension. In 1864 there were 42 indications of negative with a maximum tension of 8·5. Nil was only recorded once, on the 12th.

The 37 *Deaths* for November, 1865, is —6 less than last year had, and —3 less than the average of eight years; 1863 and 1859, however, had both fewer deaths than the present month, though the other six had all more. No one of the years, moreover, was so propitious to all under 20 years, inclusive of infants, the year of minimum mortality, 1859, even having one-third more deaths under that age.

Nov. 1865	Ages.	Oct., 1865	Novembers. 1864	1863	1862	1861	Max. 1860	Min. 1859	1858	1857	Avg. 8 yrs. Novs., 1857–1864
4	Under 1	8	4	7	12	9	7	4	3	6	6 4-8
0	1 to 5	0	2	1	6	3	8	3	7	6	4 4-8
2	5 to 20	2	6	4	3	2	5	2	3	4	3 5-8
7	20 to 45	11	12	6	9	11	9	11	12	14	10 4-8
8	45 to 60	6	9	5	6	7	11	4	7	5	6 6-8
16	60 and above	12	10	7	9	7	11	5	6	10	8 1-8
37		39	43	30	45	39	51	29	38	45	40

The deaths "under 1 year of age" were much below the eight years' average. Three out of the four were under three weeks old. At "1 to 5," there was not a single death—as was noted also in October—which is without parallel, not even any single month in a year during the whole period being without deaths in this group of ages, in all the previous eight years. At "5 to 20," the deaths were greatly below the average, though both 1861 and 1859 had equally as small a mortality in this group. By comparing the deaths last year with this, it will be seen that the deaths at all ages above 20, were numerically the same in both years though differently distributed in the three groups, while at all ages under 20 the present year's mo tality is only half of that in November 1864. At "20 to 45" years of age, the number of deaths was considerably below the eight years' average, and only 1863 had less, by one. At "45 to 60" the deaths were somewhat above the average, two out of the eight years only having a greater number. At "all ages above 60," the deaths were nearly double the average, and greatly exceeded in number every year of the eight. The oldest was a man of 86, but six others had lived beyond three score and ten.

Nov., 1865	Classes of Disease	Oct., 1865	Novembers.								Avg. of 8 yrs. Novembers, 1857-1864.
			1864	1863	1862	1861	Max. '60	Min. '59	1858	1857	
3	1. Zymotic	2	1	3	8	3	4	4	6	4	4 1-8
9	2. Constitutional	8	11	6	7	4	5	6	6	4	6 1-8
21	3. Local	16	20	16	22	18	36	13	22	26	21 5-8
4	4. Developmental	10	6	2	5	8	2	3	1	4	3 ·78
0	5. Violent &c.	3	5	3	3	6	4	3	3	7	4 2-8
37		39	43	30	45	39	51	29	38	45	40

In the *Zymotic class of diseases*, 3 deaths are tabled—a child three weeks old from thrush, one five months old from *diarrhœa*, and a man of 35 from *delirium tremens*. In November 1864, there was only one death in this class. 1863 and 1861 had the same number as the present year, and the other five years all had more, the average of the eight being considerably above this November's amount. In the *Constitutional class of diseases*, the deaths were nearly thirty-three per cent. above the average. Last year's November was still greater, but all the other seven years much less. Five of the nine deaths were caused by malignant diseases classed as *cancer*, the ages being 45, 55, 65, 67, 72 respectively. The other four died from *consumption*. One woman of 28, having been born in Tasmania and another of 25, was registered as born in Melbourne. The other two, both men above 60 years old, were English by birth. Last year the deaths from consumption were two more, and one was Tasmanian born.

The *Local class of diseases* had a mortality slightly below the average, though one more than 1864 had. The first order, *diseases of the brain and nervous system* had 6 deaths, being 2 from apoplexy, 3 from paralysis, and 1 from convulsions. Last year this order had only 2 deaths. In the second order, *diseases of the heart and organs of circulation*, 4 deaths occurred, while 1864 had 10. The third order, *diseases of the lungs and organs of respiration*, gave two deaths, 1864 had 5. In the fourth order, *diseases of the stomach and organs of digestion*, the deaths were 4. Last year had but one. In the fifth order, *diseases of the urinary organs*, there were three deaths this year, to one last. The sixth and seventh orders had each one death, last year had not any, but had one in the eighth, which in this year, had none. In the *developmental class* the deaths were a fraction above the average, though two less than 1864 had; one was a babe that only survived its birth for an hour and a half; the other three were two women, aged 67 and 68, and one man aged 86, who died at the Invalid Asylum.

In the fifth class, *violent and accidental deaths*, the record is "nil"; no year of the previous eight had less than three, and the average is 4 2-8·. *Inquests* were two, both sudden deaths. The first an old man from *apoplexy*, the second from bursting of an *aneurism of the aorta* into the pericardium (bag of the heart). In November 1864, the inquests were 5. The deaths in hospital were 10, two of them admissions from country districts. Last November had 14. In the Brickfield's Male Invalid Asylum, there were 6 deaths, aged respectively 63, 65, 67, 72, 72, 86, November 1864 had 5. Of the 37 deaths, 25 were males and only 12 females. One of the deaths occurred in the Queenborough division of the Hobarton Registration District and all the rest in the City, not one having died in the Glenorchy division, either in this month, or in October.

In the first week of the month the deaths were 14; in the second 7: in the third 10; in the fourth 6; in the last two days none. The most fatal period of the month was the five days 4th to 8th, when 14 deaths took place. On the last four days of the month not a single death occurred, and five other days—two of them consecutive—were without a death.

The *Births* registered during the month were 77, being exactly the same in number as in November last year.

ROYAL SOCIETY.

METEOROLOGY FOR DECEMBER, 1866.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced: Highest.	Lowest.	Self-registering Thermometers: Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass	Wind: Direction from three daily registers.	Force in lbs. per square foot.	Rain in inches.
	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	29·388	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	29·786	81	51	119.0	49·0	NW SE SE	·78	
28	29·902	29·795	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	29·905	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 Guage. 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.

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 1860 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 1850. 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, aerial 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. Temperatu e, 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 ext emes. 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, × 1·78. 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 16½ 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 20, 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. Min. 1864	1863	1862	1861	1860	Max. 1859	1858	1857	Avg. 8 yrs. 1857–1864
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 pre ent month. At "all ages above 60," the deaths were below the average, though considerably mo e 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. Min. '64	1863	1862	1861	1860	Max '59	1858	1857	Avg. of 8 yrs. 1857-1864.
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
3	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, 40, 58. 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 *Cascades* 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.

SUMMARY OF WEATHER AND HEALTH IN 1865.

[By E. Swarbreck Hall.]

The weather generally in 1865 was of the most favorable character.

Atmospheric mean pressure for the year was 29·848, which is only + ·040 above the 20 years' mean of the adopted standard. February, May, September, December, had means below the average, but all the other months were above it. The greatest pressure noted was 30·566 on the 8th August, and the lowest was 28·885 on the 14th May, the extreme range for the year, therefore, being 1·681 inches.

The total *wind-force* of the year was 754·96 lbs., being—12·84 lbs. less than the average of the previous eight years. The strongest winds recorded had a pressure to the square foot of 10·42 lbs., and were registered three times, all in November—only two *hot winds* were noted in the twelve months, on the 31st October and 11th November.

The *mean temperature* of the year was 54·60 degrees, being only —·32 less than the average of the 20 years. March had the hottest mean, being 60·90 degrees—July, the coldest, had 49·15 degrees. The maximum temperature of any day in the year was 95 degrees, on the 11th November; and the minimum was 30 degrees in the night of the 10th July.

The year's mean of the *daily range of temperature* was 20·24 degrees, being + 2·08 above the mean of the 20 years. November had the highest mean daily range, 22·73 degrees, and February the lowest, 18·50 degrees. The greatest range on any day was 42 degrees, on the 11th of November.

Solar intensity had a mean for the year of 93·90 degrees, November having the maximum 1 7·73 degrees, and July the minimum 77·00 degrees. The highest single record was 129 degrees on the 11th November. This year's November has taken a very unusual position as to temperature in comparison with other months and years.

Terrestrial radiation mean for the year was 42·60 degrees; February had the highest mean, 48·28 degrees; June the lowest, 35·65 degrees. The minimum temperature was recorded on the 10th July, being 27·00 degrees.

Elastic force of vapor mean for the year was 3, 15, being —2 less than the 20 years' mean. February had the maximum, 393; July the minimum, 251. February had the highest record for any day in any month of the year, 628, on the 27th; the minimum was 160 on the 12th June.

Humidity mean for the year was 73·08, being—1·75 less than the 20 years' average. May had the highest mean, 79; November the lowest, 66. Saturation, 100, was frequently recorded.

The year's *rain fall* amounted to 23·07 inches, being + 1·55 above the twenty years' average. It was distributed throughout the twelve months with more than the average equality. December had the maximum, 3·43 inches; January the minimum ·63 of an inch. It is noteworthy, however, that, while the former was twice exceeded in quantity in the previous twenty-four years, it had had a minimum as low as ·11 of an inch in 1842, and in nine other years less than one inch; the mean of the 20 years for December being 1·32 inches. January had a misinmum of ·03 of an inch in 1841, and in eight other year less than one inch, the 20 years' mean being 1·50 inches. There were 146 days out of the 365, on which more or less rain fell, the minimum being 0·1 frequently, the maximum 1·22 inches on the 9th of October. Agriculturists, therefore, as well as sanitarians had no just grounds for complaint on this score in 1865, presuming that the Hobarton records is a fair mean for the whole island. Many parts of the colony had certainly a much greater deposit of rain, possibly others, however, had much less.

The year's *spontaneons evaporation* exceeded precipitation by + 14·30 inches.

Cloud mean for the year was 6·20, being + 55 more than the average of the 20 years. January, September, and October were the cloudiest months, and almost identical in their means. June, August, and November were the least cloudy, and scarcely differed in their means.

The year's mean for *Ozone* was 8·17, considerably exceeding any other of the eight years recorded. Every month had a mean above its average.

Electricity was more than usually abundant, but without any violent disturbances.

Deaths.—Every month of the year, except May, had a *death* record below the mean of the previous eight years. The total, 492, being 76 less than 1864 had, and 95 4-7 less than the average of the previous seven years, and far below any one of the number.

Under "one year of age" the seven years' average of deaths is 138 6-7—while 1864 had 124, the year just passed had only 95. At the same time the *births* registered during the year, amounting in number to 835, were only 3 less than 1864 had.

At "1 to 5 years of age" only 27 died in 1865, while 1864 had 67, and the average of the previous seven years is 87 5-7. Never before in Hobarton district did infantile deaths prove so few, all and sanitarians and statisticians admit that their mortality affords the surest test of the salubrity of any climate or season. Perhaps no country in the world could exhibit such favorable returns for children under five years old as the foregoing.

At "5 to 20 years of age" the total mortality of the year 1865 amounted to 37, while 1864 had 44. and the seven years' average is only 35 5-7. In this group of ages, and in those above 60 only, was the average exceeded.

At "20 to 45 years of age" the deaths were 83; they were 113 in 1864, and the seven previous years gave the average of 126.

At "45 to 60," 90 deaths occurred, 1864 had 113, and the average of the seven years was 97 4-7.

At "all ages above 60" the deaths were 160, while 1864 had only 107, and the seven years' average was 101 5-7. So large a proportion of deaths in this group is quite abnormal, and its relative amount to those under five years most remarkable. The ordinary rate is for the deaths above 60 years old, and under five, to be nearly alike, so that this relative mortality greatly enhances the favorable character of 1865.

In the first, or *Zymotic class* of diseases, the deaths for the whole year were only 61, while in 1864 they were 111, and the average of the previous seven years was 128 3-7ths.

In the 2nd, or *Constitutional class* of diseases, 86 were tabled for 1865, while 1864 had 95, and the seven years' average is 90 4-7ths.

In the third, or *Local class* of diseases, 240 deaths were recorded, to 266 in 1864, and a seven years' average of 272 2-7ths.

In the fourth, or *Developmental class* of diseases, there were 70 deaths; 1864 had 69, while the seven years' average is only 56 3-7ths. This class includes death from "old age," which accounts for the excess, as was shown in the group of "all ages above 60."

The fifth, or *Violent and Accidental class*, had 34 deaths, being seven more than 1864 had, but 5 6-7ths less than the seven years' average.

In the registration district of Hobarton it is probable that the numerical amount of the population in 1865 did not deviate much from the census total of 1861, when it was 24,773, but for calculation it may be approximately estimated in round numbers at 25,000. The death-rate would, therefore, be somewhat less than 20 per 1000 It must not be forgotten that had the death-rate of the Queen's Asylum for Destitute Children—which on an average of the 19 years 1841-1859, out of an average daily strength of about 430, had upwards of 15 deaths per annum—continued, the total would have been increased by 17, the average daily strength in 1865 of the institution being about 550 children. During the last four years the deaths altogether have been only 7; in no other consecutive four years since 1841 were there less than three times as many deaths, out of the much smaller number of children.

The mortuary returns for all Tasmania in 1865 are nearly as favorable as that for the Hobarton registration district alone. Launceston had 214 deaths, which is 37 less than in 1864. The rural districts had 569 in 1865, to 601 in 1864. The total deaths in all Tasmania for 1865 is after adding one death of a convict, and another of a man executed—1,277, being less than 1864 by 158, and below the average of the eight previous years by 205 2-8ths; 1862 had previously the smallest mortality, 1 362, and 1860 the largest, 1,749.

Births.—The total of births registered in all Tasmania in 1865 was 3069, being 38 more than 1864 had. The birth-rate, therefore, was about one in 31 of the population. A much greater rate existed for a few years after the gold discoveries, but with the diminished prosperity of late years, marriages have not been so numerous, and the great curse of the European world—the "social evil"—has augmented rapidly amongst us.

Population.—To the 31st December 1864, I computed the inhabitants of Tasmania to amount to about 95,000. For the year ended 31st December 1865, I caluclate an addition of 2,000 thus :—Registered births 3,069, unregistered births 121, "arrivals" to the colony, 3,596, altogether 6,786—less by 4,786, being 1,277 deaths and 3,509 "departures" from the colony. It is worthy of special note, that in 1865, as in 1864, the "arrivals" in the colony of *adult males* exceeded the "departures" from the island, by 505 and 666 respectively. For many years previously "departures" were much more numerous than "arrivals." This important fact seems to be very generally unknown or misunderstood. Nevertheless it has lad a very depressing effect on the labor market, and added no little to the demands on charitable institutions. It is not laborers, but employment for them that is scarce.

1277 deaths out of 97,000 persons—or taking the medium between the two years is—about one death, to 76 living, or at a rate of about 13¼ per 100. The normal death-rate calculated for a standard by the Registrar-General of England, is 17 per 100. The healthiest rural-districts in England and Wales have 15 per 1,000, while the death rate for all England and Wales, is about 9 per 1000 more than that of all Tasmania in 1865.

Two causes principally, seem to have operated in producing the annually decreasing rate of mortality in Tasmania, the first being :—the constantly increasing proportion that those born in the colony bear to the imported inhabitants.At the same time, by the ordinary laws of mortality a disproportionately large share of children adds to the death-rate. The second seems to have arisen from climatic improvements, the meteorological phenomena of late years having certainly been more auspicious to health and life. Though as these changes are usually cyclical in their character, we must expect a return to the old type for another period of years, ere long. Sanitary improvements, moreover, and specially the enlarged and much purer water-supply in both the southern and northern capitals, has doubtless improved the health and reduced the deaths of their citizens. Were as valuable a change effected in the sewerage of the two towns, in the ventilation of our houses, in the abolition of intra mural interments,in more watchfulness over the purity of our food-supplies, and last, though by no means the least, less intemperance in drink, the mortality rate might be reduced to an amount, which the most sanguine of sanitarians have never yet ventured to predict, and which no country in the world has so far exhibited. If we we will only take all the advantage science affords, to utilize and improve the blessings the Giver of all good has conferred upon our beautiful island, there will indeed be a happy future for little Tasmania amongst the great nations of the southern hemisphere.

ERRATA.

Page 6.—Fourteenth line, fourth paragraph. For "smaller share," read "a smaller share."

Page 9.—First line, third paragraph. For "14·40 less, read "being 14·40 less."

,, ,, —Fifth line, fifth paragraph. For "had so small a maximum," read "had a smaller maximum."

Page 22.—Twentieth line, second paragraph. For "none resemble," read not to resemble."

Page 33.—Heading, third line. For "Swabreck," read "Swarbreck."

Page 49.—Ninth and tenth lines, fifth paragraph. For "Wave of Temperature," read "Wave of Heat."

Page 66.—Fifteenth line. For "no considerable with," read "no considerable width."

Page 68.—Eleventh line. For Bryozric," read "Bryozoic."

Page 72.—Fifth line, sixth paragraph. For "electric-force," read "elastic-force."

,, ,, —Last line, eighth paragraph. For "$+ 11\frac{3}{8}$," read "$+21\frac{3}{8}$."

Page 102.—First line of tenth paragraph. For "43 deaths," read "44 deaths;" and for "$3\frac{3}{8}$ less," read "$2\frac{3}{8}$ less."

,, ,, Table, first column. For "14," read "15;" and for "43," read "44."

Page 103.—Table, first column. For "4," read "5," and for "43," read "44."

Page 110.—Second line, third paragraph. For "automaically," read "automatically."

Page 115.—Third line, eighth paragraph. For "there 2 nils," read "there were 2 nils."

,, ,, —First line, ninth paragraph. For "39, being $4\frac{5}{8}$," read "40, being $3\frac{5}{8}$."

,, ,, —Table, bottom of first column. For "12," read 13," and for "39" read "40."

Page 116.—Table, first column, third line. For "16," read "17," and at bottom for "39," read "40."

Page 117.—Last line of first paragraph. For "minimum," read "maximum."

Page 134.—Second line, third paragraph. For "$13\frac{1}{4}$ per 100," read "$13\frac{1}{4}$ per 1000;" and fourth line, for "17 per 100," read "17 per 1000."

RESULTS

OF

METEOROLOGICAL OBSERVATIONS

MADE IN TASMANIA

From 1st January to 30th June, 1865.

FOR THE PAPERS AND PROCEEDINGS OF THE
ROYAL SOCIETY.

REDUCED AND PRINTED UNDER THE SUPERINTENDENCE OF
F. ABBOTT, F.R.A.S., *&c.*

Private Observatory, Hobart Town.

Contents.

ROYAL SOCIETY.

METEOROLOGY FOR JANUARY, 1866.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced: Highest.	Lowest.	Self-registering Thermometers: Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind: Direction from three daily registers.	Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	29·745	29·641	87	55	125·0	53·5	NW SE	1.30	
2	29·776	29·772	82	54	109·0	52·5	W NW W	3·64	
3	29·942	29·832	75	50	105·0	49·5	NW SW	3·38	0·02
4	29·072	29·915	70	42	93·0	40·5	NW W SE	1·04	
5	29·776	29·705	73	53	89·0	50·5	NW SE	·26	
6	29·617	29·398	74	59	112·0	56·5	S SE	·78	
7	29·373	29·297	75	56	114·0	55·0	NW W	8·33	
8	29·496	29·412	74	56	108·0	56·0	NW W	10·41	
9	29·865	29·714	69	50	89·0	48·5	NW SW	·78	
10	30·034	29·920	73	50	110·0	49·0	NW W SE	1·04	
11	29·922	29·817	76	50	116·0	51·0	N NW S	·78	
12	29·972	29·613	78	50	114·0	50·0	NW SE S	1·30	
13	29·448	29·370	75	57	110·0	56·5	NW W	5·46	
14	29·894	29·726	74	54	113·5	53·5	NW	5·46	
15	29·959	29·905	73	50	109.0	52.5	S SE	·78	
16	29·824	29·778	87	55	120·0	55·5	E NE SE	1·04	
17	29·921	29·910	80	54	81·5	55·0	NE SE S	.52	
18	29·872	29·801	74	50	104·0	49·0	NW SE	2·86	0·01
19	30·049	30·024	60	42	103·0	40·5	SW W	5·72	
20	30·155	30·099	69	53	97·5	52·5	E SE	·78	
21	30·222	30·187	70	58	108·0	54·0	SE	1·30	0·03
22	30·209	30·151	64	54	69·0	55·5	SE E	·26	0·06
23	30·109	30·009	74	54	112·0	53·5	NE SE	·52	
24	29·953	29·631	83	55	123·0	49·5	NW SE	1·04	
25	29·824	29·691	77	53	111·5	56·0	NW SW	5·72	
26	29·957	29·915	70	49	107·0	46·0	SW SE S	·52	
27	29·882	29·863	68	52	106·0	52·0	NE SE E	·52	
28	30·080	29·996	67	55	79·0	54·0	NW SE SW	2·86	
29	30·136	30·087	72	55	107·0	55·0	NW SE	2·86	
30	30·126	29·963	77	53	113·0	50·5	NW SE	·78	
31	29·994	29·852	78	50	115·0	50·5	NW SE S	3·38	

Mean 29·856, 63·47 105·6 51·74. Total force 75·42 0·12

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 Guage. 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 :—

8th. Veronica augustifolia in full flower.
10th. First ripe Turkey apricot gathered.
20th. Grevillea robusta in full flower.
24th. First ripe Jargouelle pear gathered.
26th. Catalpa syringœfolia in flower.
28th. Black mulberries commencing to ripen.

Barometer mean, 29·856in., being 0·141in. above the average.
Temperature mean, 62·13°, being 1·44° below the ditto.
Solar intensity mean, 105·6°, being 5·6° ditto.
Dew point mean position, 49·0°, being 1·69° ditto.
Humidity of air mean, ·66, being ·2 per cent. ditto.
Elastic force of vapor mean, ·372, being ·008 per cent. below the average.
Total amount of rain, 0·12in., being 1·38in. ditto.
Increase of spontaneous evaporation on rainfall 6·27 inches.
Mean amount of ozone, 6·84, being 0·29 of chromatic scale above the average.
Electricity active on the 2nd, 4th, 8th, 9th, 10th, 11th, 13th, 14th, 19th, 25th, 26th, and 27th.

Sea breezes most days, p.m. Lightning on the 6th. Great evaporation all through the month.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR JANUARY, 1866, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

Nothwithstanding the very dry character of this month,—only January 1841 having a smaller rain-fall of any January in the last twenty-five years—this phenomenon usually so adverse to health at this season of the year was more than compensated by other peculiarly favorable meteorological circumstances, so that the mortuary tables record an amount of deaths very much below the January average of the previous nine years.

Atmospheric pressure mean 29.856, was + 1·141 above the 20 years' adopted standard mean, and almost identical with that for January 1865. The extremes were, 29.297 minimum, on the 7th; 30.222, maximum on the 21st; consequently in fourteen days the barometer varied ·925, or nearly one inch. The range was not so great in 1865 by —·214. The greatest movement in any twenty- four hours, from noon to noon, was only a fall of—·396 of an inch on the 24th. On eight other days the fluctuations exceeded one-fifth of an inch. In January 1865 the extreme daily range, and the number of movements exceeding ·200, were both greater. Atmospheric pressure, therefore, was somewhat more favorable to life this month than last year was.

Wind-force total was, 75·42lbs. being + 3·67 more than the 4 years' average, and nearlythe same above last year's. In other respects,however, they differed materially, and greatly to the benefit of the present year. The pure ozone-bearing ocean winds, from the *South-east*, *South*, *South-west*, and *West* greatly predominated both in frequency and force;—the first being the most numerous, and the last strongest in total force. *North-west*, *North*, *North-east* and *East*, were all far below the average both in frequency and force. No *hot winds* occurred. The strongest winds had a pressure of only 5 ·21lbs., to the square foot, and were only noted twice, both being west winds. *Calms* were registered 15 times, being $2\frac{1}{4}$ less than the four years' average of the standard tables. Never before in the month of January was wind movement so propitious to health, and so pleasant in every respect.

Temperature mean of the dry-bulb thermometers, 62.13 degrees, was—1.44 below the 20 years' average, but above January, 1865, by + 2.60 degrees. The wet-bulb thermometer mean was, 55.71 degrees, being only —·61 of a degree below the average. The self-registering dry maxima and minima thermometers gave a mean of 63.47 degrees, being about the usual difference higher of the latter. The self-registering wet-bulbs had a mean of 57.25 degrees. The extremes of the dry-bulbs were, 87 degrees, noted on the 1st and 16th; and 42 on the 4th and 19th. The former being × 9 degrees higher, and the latter one degree lower than in January 1865. The mean of all the high day maxima was, 74.42 degrees, being + 4.94 degrees higher than last year's January had. The mean of all the low-night minima was 52.52 degrees, only three nights out of the 31 having fallen below 50. In 1865 the minima mean was only 50.74 degrees,—eleven nights having a temperature below 50 degrees.

Daily range of temperature mean was 21·90 degrees, being ×1·15 above the 20 years' average, and+3·16 more than last year had. The greatest range on any day was 32 degrees, registered on the 1st and 16th. The lowest was 10 degrees on the 22nd. As often before remarked, wide daily ranges of temperature do not appear to have the same pernicious influence in Tasmania as that usually ascribed to them in England.

Solar intensity mean, 105·60, is —4·05 degrees less than the average of the previous 10 years, though + 1·15 more than January 1865 had. The greatest heat was attained on the 24th, when the solar thermometer rose to 123 degrees, being one degree higher than the maximum last year, though precisely the same as that of 1864. The minimum solar intensity was 69 degrees registered on the 22nd.

Terrestrial radiation mean was, 51·74 degrees, being only half a degree higher than the average of the previous 10 years. The coldest records were 40·5 degrees in the nights of the 4th and 19th. The maximum was, 56·5 degrees, on the 6th and 13th. This thermometer, in January, 1865, gave a mean —4·23 degrees less than the present month, though its minimum was exactly the same.

Rain fell on four days in the month, but in such small quantities that the aggregate amount was only ·12 of an inch, being —1·38 inches below the 20 years' average for January. In the previous 25 years, only the first of the series—1841—had less, *i.e.*, ·03 of an inch. The next smallest was 1858, which had ·43 of an inch, or nearly four times as much as the present month. Last year had more than five times as much. Fortunately the heavy rain-fall in December had thoroughly cleansed our sewers, and replenished the sources of water supply, or there is little doubt the health-return for January would not have been so satisfactory. No *snow* fell on Mount Wellington during the month, but on the first day there remained faint traces of the December deposit.

Humidity mean was, 66, being —2 less than the 20 years' average.

Elastic force of vapor, had the mean of ·372, ranging from the minimum. 255 at 7 a.m. on the 19th, to the maximum ·625 at the evening record of the 24th. Notwithstanding the aridity of the month, elastic force of vapor mean was actually —8 less than the 20 years' average. This result no doubt tended in a high degree to preserve health.

Spontaneous evaporation amounted to 6·39 inches, exceeding any January since 1857, except 1864. It was nearly twice as much as last year's.

Cloud mean, 5·40 ·34 though slightly above the average for January of the previous 8 years, is below the 20 years' average. *Ozone* mean, 6·84 though slightly above the average for January of the previous 8 years, is more than a degree of the chromatic scale below what January, 1865, had.

Electricity gave 25 positive indications with the very high maximum tension of 8. Last year had only 16 and 6 respectively. The negative indications were 37, with maximum tension of 6. In 1865 the corresponding results were 45 and 9. Many sanitary philosophers associate a predominance of strong positive electricity with atmospheric conditions conducive to a high state of health, and so far my Tasmanian observations accord with that view. *Lightning* was observed on the evening of the 6th.

31 deaths for January, 1866, is — 21 4-9 less than the average for the first month of the year of the previous 9 years; it is also 10 less than 1865 had, though 7 more than for 1864, which had the smallest mortality on record, not merely for the month of January, but for any other month in the last nine years.

Jan., 1866.	Ages.	Dec., 1865.	Januaries. Max. 1865	Min. 1864	1863	1862	1861	1860	1859	1858	1857	Avg. 9 yrs. 1857–1865
9	Under 1	8	10	2	9	19	12	28	17	32	27	17 3-9
1	1 to 5	1	1	2	11	13	3	7	9	10	5	6 5-9
0	5 to 20	5	2	2	4	0	2	7	3	3	1	2 6-9
5	20 to 45	7	7	5	6	8	12	16	16	14	12	10 6-9
5	45 to 60	2	11	6	6	8	8	5	8	7	10	7 6-9
11	60 and above	7	10	7	9	7	8	9	3	8	5	7 3-9
31		30	41	24	45	55	45	72	56	74	60	52 4-9

In every group of ages, except "60 and above," the mortality was largely below the average of the previous nine years. In the exceptional group, no other January of the previous nine had so many deaths, though 1865 had only one less. Seven out of the eleven had passed beyond their 65th year, the oldest being a woman of 86.

Jan., 1866	Classes of Disease	Dec., 1865	Januaries.									Avg. of 9 yrs. 1857-1865.
			1865	Min. '64	1863	1862	1861	1860	1859	Max. '58	1857	
6	1. Zymotic	7	10	3	15	24	11	24	13	17	11	14 2-9
4	2. Constitutional	7	3	7	9	4	1	7	7	8	7	5 8-9
14	3. Local	11	24	10	15	22	27	26	30	32	32	24 2-9
7	4. Developmental	3	4	3	2	3	2	12	5	14	7	5 7-9
0	5. Violent &c.	2	0	1	4	2	4	3	1	3	3	2 3-9
31		30	41	24	45	55	45	72	56	74	60	52 4-9

Zymotic Diseases caused considerably less deaths than one-half the nine years' average. A girl, two years old, died of a low type of *fever*. Four children under 11 months old died of *bowel complaints*, and a man age d 42 of *Chronic dysentery*. 1864 is the only year that can show a more favorable report than this, and its meteorological character was in some respects more favorable to health than that of January 1866, generally auspicious, nevertheless, as the latter has been.

In the *Constitutional* class of diseases, the deaths were considerably below the 9 years' average. This class, however, has never varied so widely in its numbers as the other four classes have. Three of the 4 deaths were from *Consumption*, and one of the number, aged 33, was born in Tasmania. The fourth death was from *water in the head*, a child only six months' old.

The *Local class* of diseases, gave 10 fewer deaths, than the average, though 1864 had 14 less. Last year, however, had 10 more than the present. In the 1st order of this class, *diseases of the brain and nervous system*, the deaths were only 4, last year had 7. In the 2nd order, *Diseases of the heart and organs of circulation*, 2 deaths took place, 1865 had twice as many. In the 3rd order, *Diseases of the lungs and organs of respiration*, but one death—a man aged 60—was recorded, 1865 had 5, but 1864 had not even one. Nevertheless, so very small a return for this order is very unusual, the more particularly, because the average daily-range of temperature not only greatly exceeded that of the years 1865 and 1864, but the mean of the 20 years' standard also. In the 4th order *diseases of the stomach and organs of digestion*, there were 4 deaths—1865 had one more. In the 5th order, *Diseases of the urinary organs*, there was only one death, last year had 2. In the next order, this month had no deaths, last year had one. In the 7th order, *Diseases of the locomotive organs*, 2 deaths were recorded from long standing affections of bones and joints—1865 had no deaths in this order.

The 4th, or *Developmental class of diseases*, had seven deaths, one an infant only two weeks old and prematurely born, the other 6, all from old age. No deaths from old age were registered in January, 1865, yet the actual deaths above 60 years of age in that year's January and the present, only differ by one numerically.

In the 5th class, *Violent deaths, &c.*, no deaths were recorded, as was also the case in 1865, though all the preceding eight years had from 1 to 4 each. One *Inquest* only took place on a death in the present month; *Apoplexy from Intemperance* being the cause of death. Last year had also one. In the *Hospital* there were 8 deaths, 1865 had 10. At the *Male Invalid Asylum* there were no deaths, in 1865 there were 2. At the *Cascades Factory* a female invalid died.

Of the 31 deaths this month, 17 were males, 14 females. In the Glenorchy division of the registration district five deaths took place, all the rest in the city. In the first week of the month there died only 3; in the second, 5; in the third, 9; in the fourth, 9; in the last three days, 5. The last five days of the month was the most fatal period of any five consecutive days, 9 having died. This might be expected from the continued extension of the drought, no rain of much sanitary efficacy having fallen since the 22nd of December foregoing.

The *births* registered were 84, being + 16 more than in January, 1865. Should births and deaths bear the same proportion to each other for the remaining months of 1866, the rate of population increase, by excess of births over deaths, will be enormous.

METEOROLOGY FOR FEBRUARY, 1866.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced: Highest.	Bar.: Lowest.	Self-registering Thermometers: Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind: Direction from three daily registers.	Wind: Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	30·317	30·211	71	58	98·0	44·5	NW SE	1.04	0·11
2	30·391	30·366	71	55	111·0	45·0	NW SE	1·30	
3	30·364	30·315	69	57	92·0	57·5	S SE	.52	
4	30·322	30·250	71	56	112·0	56·5	SE	·78	
5	30·235	30·154	73	55	113·0	54·5	NW SE	·78	
6	30·151	30·009	73	58	110·5	57·5	E SE	·50	
7	30·095	29·929	79	50	117·0	50·0	NW SE	1·04	
8	29·921	29·783	87	59	121·5	50·0	NW SE	1·04	
9	29·789	29·739	77	60	111·5	61·0	SE	1·04	0·03
10	29·855	29·763	71	61	110·0	60·5	SE	1·04	
11	29·868	29·681	82	58	118·0	58·0	NE SE S	·52	
12	29·618	29·321	76	61	86·5	60·0	NW	1·04	
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14	30·004	29·977	77	53	115·5	52.0	NW	3·64	
15	30·062	30·009	78	50	120·0	49·5	SW NW SE	·52	
16	29·962	29·882	75	59	118·0	46·5	N SE	·78	
17	29·754	29·647	80	55	115·0	55·5	NW SE	1·04	
18	29·771	29·608	87	59	121·5	53·5	N NE	3·12	
19	29·585	29·338	81	69	119·5	68·5	N NW	5·20	
20	29·907	29·821	73	55	107·0	55·0	N NW	3·64	
21	29·855	29·582	85	62	120·0	56·0	NW W SE	·78	
22	29·569	29·441	86	55	122·0	53·0	NW	5·46	
23	29·744	29·727	77	54	113·0	53·0	NW	1·30	
24	30·007	29·864	72	58	114·0	57·5	E SW NW	1·04	
25	30·069	29·934	77	49	105.0	47·0	NW SE	·78	
26	29·915	29·836	79	57	112·5	55·0	NW SE	1·30	
27	29·918	29·847	74	60	81·5	53·0	NW N SW	·52	
28	29·826	29·675	69	53	84·0	57·0	SE S	·78	0·19
							Total force	41·86	0·55

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 Guage. 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 :—

1st. Peaches commencing to ripen.
10th. Kerry pippin apple commencing to ripen.
Bon Chretien pear commencing to ripen.
11th. Windsor pear commencing to ripen.
17th. Greengage plum commencing to ripen.
22nd. Ash seeed commencing to ripen.
30th. Sycamore commencing to shed seed.

Barometer mean, 29·903in., being 0·053in. above the average.
Temperature mean, 65·19°, being 2·66° above the ditto.
Solar intensity mean, 110·20°, being 1·20° above the ditto.
Dew point mean, 52·3°, being 2·09° above the ditto.
Humidity of air mean, ·66, being 4·5 per cent. below the ditto.
Elastic force of vapor mean, ·405, being ·032 per cent. above the average.
Total amount of rain, 0·55in., being 0·92in. below ditto.
Increase of spontaneous evaporation on rainfall 5·30 inches.
Mean amount of ozone, 8·05, being 1·22 of chromatic scale above the average.
Electricity active on the 1st, 14th, 20th, 21st, 23rd, 24th, 25th, and 26th.
Lightning on the 19th. Hot wind on the 18th. Sky hazy, with frequent rainbows and lunar-halos through the month.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR FEBRUARY, 1866, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

February, though having the smallest number of days of any month in the year, has had on the average of the previous nine years, the greatest number of deaths. In last year, however, March was higher. Notwithstanding many meteorological conditions in the present month adverse to health and life, others of more auspicious character have so counteracted the injurious effects, that on the whole the mortuary records give a total of deaths below the February average of the previous nine years,and only one more than last year had, though the heat and dryness of the present month have been so unusually in excess.

Atmospheric pressure, 29·903, was only + ·053 above the 20 years' mean of the adopted standard, but + ·102 higher than February 1865 had. The extremes were:—Maximum, 30·391 on the 2nd; minimum, 29·321 on the 12th; being a range for the month of 1·070 inches. Last year the extremes were both much lower, though the range was considerably greater. The greatest movement on any day of the barometer, was a rise of + ·694 of an inch on the 13th. There were six other days on which movements exceeded one-fifth of an inch; the highest being a rise of + ·420 on the 1st, and the lowest a fall of – ·263 on the 17th.

Wind-force had a total of 41·86 lbs.,being — 15·15 lbs. less than the February average of the previous 9 years, and 16·01 below the 4 years' average of the standard tables. It was also less than 1865 by — 2·35 lbs. *South-east* winds were more than usually numerous, but of so gentle a type that the total force was below the average. *North-west* alone exceeded the average considerably both in number and force. From all the rest of the points of the compass the winds were much below the mean both in frequency and force. The greatest force of the wind from any point was only 2·60 lbs. pressure to the square foot, and registered six times. The *calms* were only 14, being —1¼ less than the 4 years' mean,—3·88 below that of the previous eight years, and 5·00 fewer than 1865. Constant, but gentle movement was the character of the winds this month. There was a *hot wind* on the 18th, but of a very subdued kind.

Temperature mean, by the three daily observations, was 65·19 degrees; being +2·66 above the 20 years' mean. Only one year (1855) in the previous 25, had a higher mean, 68·00 degrees. Last year's mean was only 60·74 degrees. The self-registering maxima and minima thermometers gave a mean of 66·75 degrees. The mean of all the maxima or high-day records was 76·50 degrees, while in February 1865, it was only 69·86. The low-night mimima gave a mean of 57·00 degrees, which exceeds that of last year by +5·64 degrees. So that both days and nights of the present month were considerably warmer than in February 1865. The maximum temperature, 87 degrees, was registered on the 8th and 18th. Last year's maximum was only 79. The minimum temperature was, 49 degrees, on the night of the 25th, being 6 degrees higher than the minimum of February 1865. The extreme range of the month, 38 degrees, is much below the February average, for in the previous 25 years, 17 had a much higher maximum, and not one of them so warm a minimum. Equable, but continuous high temperature, therefore, chacterised the present February in a very unusal degree.

Daily-range of temperature mean, 19·50 degrees, is —·89 of a degree less than the 20 years' mean, and—1·00 degree less than 1865 had. The greatest range, 31 degrees, was noted on the 22nd, and the smallest, 10 degrees, registered on the 10th.

The solar self-registering thermometer gave a mean of 110·20 degrees, being + 2·33 more than the February average of the previous ten years, and +3·65 above the mean for 1865. There has not been so much hot sunshine in February since 1857. The maximum of the present month, however, was only 122 degrees, on the 22nd. Only 1861 had a lower maximum (117) in the previous ten years; 1862 had the same as the present month, but all the rest more, the highest being 143 in February, 1857. The lowest record of the solar-thermometer was 81·5 on the 27th, but on twenty-two out of the twenty-eight days of the month, the records exceeded 100 degrees.

The terrestrial radiation self-registering thermometer on the grass, gave a mean of 54·20 degrees, which is +4·73 more than the 20 years' average, and +5·92 above last year's mean. The extremes were, 61 in the night of the 9th, 44·5 in that of the 1st. No February in the previous 10 years gave so warm an earth temperature as the present month.

Rain fell only on the 1st, 9th, 12th, and 28th days of the month, to the aggregate amount of ·55 of an inch, which is— 92 of an inch below the 20 years' average for February. In 1865 there were 15 wet days in February, and a total rain-fall of 2·94 inches. Out of the previous 25 years, eight had even a smaller rain-fall than the present month. No *snow* appeared on Mount Wellington during the month, as there did in February 1865.

Spontaneous-evaporation amounted to 5·85 inches, being much the highest amount in any February since 1856, during which period only have records been kept.

Elastic-force of vapour mean was 405 being +32 above the 20 years' average, and +12 more than 1865 had. The extremes were 672 at 1 p.m., on the 12th, 283 at 7 a.m., on the 20th. In the previous 25 years, only 1861, 1858, 1857, and 1856, had a higher mean.

Humidity mean was 66, being —4½ below the 20 years' mean, and —8 less than in 1865.

Cloud mean was only 4·66, which is—1·03 less than the 20 years' average, and —1·84 below 1865. In the 25 years' records, only Februaries 1858 and 1844 had a smaller mean.

Ozone had the maximum of 10 (saturation) on the 12th and 28th, and the minimum of 5 on the 2nd. The mean, 8·05 being +1·04 higher than the mean of the previous 8 years, and even +0·24 above 1865. This high degree of ærial purity must principally have arisen from the numerous sea-breezes, together, perhaps, with the abundance of positive electricity. While many other of the phenomena this month were adverse to health and life, their evil influences were much counteracted by this very general atmospheric purity.

Electricity had 16 positive indications, with maximum tension of 6·5, while February 1865 had only 3 with maximum tension of 4. Negative indications were 38, with maximum tension of 6.5 also—1865 had 42 negative records with maximum tension of 7. "Nil" was only registered twice, on the 9th and 12th. In February 1865 there were 11 "nils." *Lightning* was seen on the evening of the 19th, the day after the hot wind. No *Thunder* was heard during the month.

The 54 *Deaths* in the present month are —5 4-9ths less than the February average of the previous nine years, - five out of the nine having a much larger mortality, 1857 the same in number, last year one less only, but 1864 and 1861 respectively 7 and 12 less. The analysis of the ages at death, and the diseases causing death, will, however, give a clearer idea of the lethal peculiarities of the month under review.

Feb., 1866.	Ages.	Jan., 1866.	Februaries. 1865	1864	1863	1862	Min'61	1860	Max59	1858	1857	Avg. 9 yrs. 1857–1865
16	Under 1	9	15	10	25	21	8	22	31	34	19	20 5-9
7	1 to 5	1	5	4	9	9	10	13	11	16	5	9 1-9
2	5 to 20	0	2	1	2	1	2	3	2	1	1	1 6-9
6	20 to 45	5	7	11	12	8	3	10	18	8	10	9 6-9
8	45 to 60	5	9	8	5	11	8	14	5	5	8	8 1-9
15	60 and above	11	15	13	16	8	11	5	8	6	11	10 3-9
54		31	53	47	69	58	42	67	75	70	54	59 4-9

"Under one year of age" the deaths are considerably below the average, and only one more than 1865 had. Six out of the nine years had a mortality at this age above that of the present month.

At "1 to 5 years of age" the mortality was also below the average, though 2 more than 1865 had, Six of the nine years were much more numerous.

At "5 to 20" the deaths were slightly above the average, but the same in number as last year.

At "20 to 45" the number was much below the average, and one less than in 1865. Only 1861 had a smaller mortality in this group of ages.

At "45 to 60" the deaths were slightly below the 9 years' average, and one less than 1865 had.

At "60 and above," the deaths were nearly one half more than the average —only 1860 had more, and last year had exactly the same number. It is thus evident that more than two thirds of the mortality of the month has fallen upon children below 5 years old, and old people above 60, the latter, and at "5 to 20," being alone above the nine years' February rate.

Feb., 1866.	Classes of Disease	Jan., 1866	Februaries. 1865	1864	1863	1862	Min. '61	1860	1859	Max. '58	1857	Avg. of 9 yrs. 1857-1865.
24	1. Zymotic	6	11	3	28	27	14	19	29	30	7	18 6-9
7	2. Constitutional	4	11	8	14	9	8	13	8	6	6	9 2-9
13	3. Local	14	20	27	17	15	14	28	28	27	32	23 1-9
7	4. Developmental	7	8	8	7	5	2	3	6	5	7	5 6-9
3	5. Violent &c.	0	3	1	3	2	4	4	4	2	2	2 7-9
54		31	53	47	69	58	42	67	75	70	54	59 4-9

In the 1st or *Zymotic Class* of diseases, the deaths were considerably above the nine years' average. 19 were from *bowel-complaints*, of which 12 were under 2 years old,one at 49, and all the rest above 60. Last year these complaints only caused 8 deaths, *i.e*, 7 below 2 years old, and only one above 60 ; other years, however, suffered a much greater mortality from bowel-complaints than the present. For instance, in February, 1863, there were 21 deaths from these diseases ; in 1862, 25 ; in 1859, 22 ; in 1858, 24.

In the 2nd or *Constitutional class of diseases* the deaths were considerably below the average, and still fewer than 1865 had. Indeed, only the first two years of the series of 9, had less than the present. Two of the 7 deaths were from *Cancer*, at 41 and 80 years old respectively. The rest were from *Consumption*, of which two females, aged 14 and 22, were born in Tasmania. Last year the deaths from consumption were 6, but only one born in Tasmania.

The 3rd or *Local class* of diseases, had a mortality very much below the average, and considerably less than any other February in the 9 years recorded.

In the 1st order of this class, *Diseases of the brain and nervous system*, the deaths were 9, being 3 more than 1865 had. In the 2nd order, *Diseases of the heart and circulatory system*, there was only one death, while 1865 had 6. In the 3rd order, *Diseases of the lungs and respiratory system*, there were 2 deaths. Last year had 3. There was only one other death in any of the other orders of this class, *i.e.*, the 5th, or *Urinary*. Last year there were 2 in the 4th, and one each in the 6th and 8th orders.

The 4th or *Developmental class of diseases* had above the average deaths though one less than either of the two preceding Februaries had. Four were infants, one a year old, one two months old, and two under a month. The three old people were aged 70, 81, and 85 respectively. The two last died at the male Invalid Asylum.

The 5th or *Violent and accidental class of diseases* had slightly more than the average through precisely the same in number as 1865 had. One was from *burns*; another a fall causing *fracture in the neck*, the third knocked down by a race-horse.

The deaths this month on which inquests were held, were 4. Last year had 3. In *Hospital*, inclusive of two of the deaths on which inquests were held the mortality was 9, 1865 had 15. Two only in the present month were received into hospital from other districts, last year had 7.

Of the 54 deaths, 30 were males, 24 females, a much more normal proportion than in 1865, when they were, 36 and 17 respectively. In the *Glenorchy* and *Queenborough* divisions of the registration district, the deaths were 2 and 4, all the rest died in the city.

On four days in the month no deaths took place. In the first week there died 13; in the second 12; in the third 16; in the fourth 13. The greatest number of deaths on any two consecutive days were 7 on the 21st and 22nd.

The registers of births were 53, being 14 less than in 1865 but the Registry Office was closed on more days than usual from public holidays.

ROYAL SOCIETY.

MARCH, 1866.

The monthly evening meeting of the Fellows, the first of the present session, was held on Tuesday, the 13th March, His Excellency Col. T. Gore Browne, president, in the chair.

Mr. Henry James Marsh having been previously nominated by the Council, was, after a ballot, declared to be duly elected a Fellow of the Society.

The Secretary, Dr. Agnew, laid on the table the usual returns, viz. :—

1. Visitors to Museum during February, 552.
2. Ditto to Gardens, ditto, 1786.
3. Plants, &c., received at Gardens :—From A. Verschaffelt, Ghent, Belgium, one box containing 200 varieties of bulbs.
4. Times of leafing, flowering, and fruiting of standard plants in Gardens.
5. Books and periodicals received.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.
   a. Table for February.
   b. Summary of Observations for ditto.
2. Port Arthur, from J. Boyd, Esq.
   a. Tables for December, 1865, and January, 1866.
   b. Reading of Government schooner's barometer for ditto ditto.
3. Swansea, from Dr. Story.
   a. Tables for October and November, 1865.
4. Tamar Heads, from R. Henry, Esq.
   a. Tables for November and December, 1865; January and February, 1866.
5. Westbury, from F. Belstead, Esq.
   a. Tables for November and December, 1865; January and February, 1866.
6. Ross, from M. Duncanson, Esq.
   a. Tables for November and December, 1865; January and February, 1866.

The SECRETARY read the usual Analysis of the Observatory Records, with a Health Report for February, by E. Swarbeck Hall, Esq.

The presentations were as follows :—

1. From the Trustees of Australian Museum, Sydney, 6 specimens of Mammals, 58 ditto of Birds, and 14 of Reptiles, all named.
2. From Mr. Chick, Ironstone Creek, specimen of Musk Duck (*Biziura lobata*). Intestinal Worm and button, passed by a child.
3. From J. Perkins, Esq., a sample of Queensland grown sugar.
4. From J. Cogle, Esq., 6 samples of wool collected in New Zealand.
5. From Col. Chesney, specimen of Echinus.
6. From Mr. Wm. Henry, 4 copper coins, 2 Chinese ditto.
7. From Mr. J. Kelly, 2 half-pennies, George III.
8. From Mr. J. Lumsden, New Norfolk, specimens of White Hawk (*Astur Novæ Hollandiæ*) and Nankeen Night Heron (*Nyctocorax Caledonicus*).
9. From M. Allport, Esq., specimen of Rail.
10. From Mr. Roblin, a brown Hawk (*Ieracidea berigora*).
11. From Mr. J. Smith, River Ouse, a spotted Owl (*Athene maculata*).
12. From Dr. Hall, 12 fossils from new Huon Road.
13. From Mr. F. Abbott, jun., 1 ditto ditto.
14. From Mr. Fletcher, jaws of Ray.

It having been determined by the Council, and announced to the Fellows generally, that a microscopical exhibition should be held this evening, the final arrangements were now made by intending exhibitors, and the doors were thrown open at eight o'cock.

The microscopes, fourteen in number, occupied two rooms, and were liberally supplied with objects of varied interest. The exhibitors were Mr. Abbott, Mr. M. Allport, Dr. Agnew, Mr. Bright, Lieut.-Colonel Chesney, Mr. Giblin, Mr. W. Johnston, Mr. Legrand, Mr. Napier, Mr. Stone, and Mr. Roblin. Amongst the objects deserving special notice may be mentioned diatoms on dark-ground illumination, magnified to the extent of twelve hundred diameters exhibited by Mr. Abbott. With the Binocular microscope, Mr. Abbott exhibited some very interesting injections, and other opaque objects were also shown with a similar instrument by Mr. W. Stone. Living infusoria were shown by Lieut.-Colonel Chesney; and Mr. Napier exhibited a beautiful series of objects under polarized light. Mr. M. Allport exhibited the living eggs of the English Pond Snail *(Limnæa stagnalis)*, as seen on the third, eighth, and fourteenth days. This series attracted general attention, the progressive development of the young animal presenting points of great interest.

In addition to the microscopes, Mr. Abbott also exhibited a Herschel-Browning direct vision Spectroscope—the instrument by which observations in spectrum analysis are made. The Magnesium Light was exhibited by Mr. Nicol, and so arranged by means of clock-work that continuous combustion was kept up in front of a powerful reflector. On directing this towards the shipping, and neighboring buildings, the exceeding brilliancy of the light could be fully appreciated.

As the Fellows were authorised to introduce ladies, the rooms throughout the evening were thronged with interested visitors. Several officers from the ships of war now in the harbor were also present. The exhibition closed a little before ten o'clock, and the satisfaction generally expressed was such that a soiree of a somewhat similar character, with perhaps other attractions, will probably become an annual institution of the Society.

MICROSCOPIC OBJECTS EXHIBITED.

MICROSCOPE No. 1, MR. F. ABBOTT.

Arachnoidiscus Ehrenbergii, *on dark ground illumination.*
Polycystina, *ditto.*
Podura Scale (Test) *Mag.* 400, 800, *and* 1200 *diameters.*
Arachnoidiscus Japonicus, *Mag.* 400, 800, *and* 1200 *diam.*

MICROSCOPE No. 2, MR. M. ALLPORT.

Eggs (living) of Limnæa stagnalis, on the 3rd, 8th, and 14th days, showing progressive development, *Mag.* 80 *diameters.*
Circulation of Blood in Tadpole, *ditto.*

MICROSCOPE No. 3, (Smith and Beck's Binocular,) MR. F. ABBOTT, JUN.

Injection, Human Skin, *Mag. from* 24 *to* 40 *diam.*
Ditto ditto Intestine, *ditto.*
Ditto Sheep's ditto, *ditto.*
Ditto Eye of Wallaby, Iris and Ciliary Membrane, *ditto.*
Opaque Objects, Spicules of Gorgonia, *ditto.*
Ditto Polycystina (fossil) *ditto.*
Ditto Young Oysters, *ditto.*
Ditto Australian Gold Dust, *ditto.*

MICROSCOPE No. 4 (Educational), MR. F. ABBOTT.

Liemophora splendida, *Mag. from* 55 *to* 75 *diam.*
Aristolochia, section of Stem, *ditto.*
Date Palm, ditto, *ditto.*
Spine of Echinus, section of, *ditto.*
Ditto, ditto, *ditto.*
Scale of Fish, *ditto.*
Compound Eye of Beetle, *ditto.*

MICROSCOPE No. 5 (G. Oberhauser's pocket), MR. F. ABBOTT.

Scales of Butterflies (3 slides).
Hair of Dormouse.
Human Hair.
Cornea of Fly.

MICROSCOPE No. 6 (Pritchard), MR. G. R. NAPIER.

Section of Flint (by Polarized Light), *Mag.* 90 *diam.*
Carbonate of Lime, *ditto.*
Oxalate of Ammonia, *ditto.*
Iodide of Quinine, *ditto.*
Salicine, *ditto.*
Asparagine, *ditto.*

Horse Hair (by Polarized Light), *Mag.* 90 *diameters.*
Section of Hoof of Horse, *ditto.*
Whalebone ditto.

Microscope No. 7, Dr. Agnew.

Photographs,—Lord's Prayer.
" Passage of Bonaparte over the Alps.
Wing of minute Beetle.
Foot of Fly.
Coralline (2).
Wing of Gnat.

Microscope No. 8, Dr. Bright.

Proboscis of Blow Fly.
Ditto of common Fly.
Stings of Wasp.
Section of Human Tooth.
Ditto ditto Bone.
Poison Fangs of Snake.
Section of Sheep's bone.

Microscope No. 9, Colonel Chesney.

Transverse Section of Equisetum.
Ditto ditto Root of Horse Chesnut.
Ditto ditto Branch of ditto, 1st year.
Petiole of Horse Chesnut.
Ditto of Palm.
Ditto of Tropical Plant.
Living Infusoria.

Microscope No. 10, Mr. W. Johnston.

Spiculæ from Holothuria, *Mag.* 350 *diam.*
Tarsus of Fly, *ditto.*
Spine of Echinus, ditto.
Eye of Tabanus, *Mag.* 130 *diam.*
Diatomaceæ from Bohemia, *ditto.*
Diamond Beetle, *ditto.*
Fossil Infusoria, &c., &c., *ditto.*

Microscope No. 11, Mr. T. Giblin.

Seaweed with Oscillatoria, Baccillaria, &c.
Portion of Eye of Fly.
Sting of Nettle.
Beard of Periwinkle.
Poison Fang of Black Snake.
Volvox globator.
Sulphate of Copper crystals.

Microscope No. 12, Mr. Legrand.

Scale of Eel.
Synapta vittata, from Red Sea.
Foraminifera, from Anvers.
Coscinodiscus, from Algiers.
Diatoms, from Ichaboe Guano.
Foraminifera (Fossil), from Oran, Algiers.
Photographs.

Microscope No. 13 (Smith and Beck's Binocular), Mr. Stone.

Opaque Objects, Shells of Foraminifera, *Mag.* 30 *to* 40 *diam.*
Crystals of Metallic Ores, *ditto.*
Fructification of Fern, *ditto* 60 *ditto.*
Leaf of Lily to show Stomata, *ditto* 60 *ditto.*
Leaves of Sage, Thyme, and Mint, shewing oil globules, *ditto* 60 *ditto.*
Lung of Cat, injected, *ditto* 60 *ditto.*
Human Skin, ditto, *ditto* 60 *ditto.*
Section of Hoof of Rhinoceros (by Polarized Light), *ditto* 60 *ditto.*
Hair of Elephant (ditto), *ditto* 90 *ditto.*
Spicules of Gorgonia (ditto), *ditto* 90 *ditto.*
Crystals of Bichromate of Potassa (ditto), *ditto* 90 *ditto.*
,, Sulphate of Copper (ditto), *ditto* 90 *ditto.*
,, Salicine (ditto), *ditto* 90 *ditto.*
Spinnerets of Spider, *ditto* 350 *ditto.*
Hair of Mouse, *ditto.*
Scales of Moth, *ditto* 750 *ditto.*

Microscope No. 14, Mr. Roblin.

Circulation of Blood in Web of Frog's foot, *ditto* 360 *ditto.*
Sections of Colonial Woods (6), *ditto* 80 *ditto.*

METEOROLOGY FOR MARCH, 1866.

Private Observatory, Hobart Town.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced		Self - registering Thermometers.				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	30·084	30·045	64	45	101·0	43·0	W SW S	1·30	0·01
2	30·130	29·818	65	39	77·0	38·0	NW N	1.04	
3	29·430	29·196	77	51	101·0	47·5	NW W NW	·52	
4	29·452	29·367	72	48	88·0	46·5	NW W	8·33	0·03
5	29·821	29·616	66	46	100·0	42·0	SW NE	6·25	0·15
6	29·933	29·899	71	52	105·0	51·0	NW W	1·30	
7	29·898	29·562	69	57	95·0	55·0	NW	·52	0·05
8	29·932	29·646	64	46	97·0	44·0	W NW	3·64	1·14
9	30·140	30·084	73	52	110·0	49·5	NW SE	·78	
10	30·190	30·140	70	47	100·5	44·0	NW SE	·78	
11	30·169	30·163	67	53	83·0	51·5	SW SE SW	.52	
12	30·154	29·878	85	60	121·5	51·5	NW N	·78	
13	29·781	29·508	88	60	120·0	57·0	NW SW	5·47	
14	30·217	30·057	79	49	105·5	47·0	SE W SW	·78	
15	30·431	30·396	73	43	106·5	41·0	NW E SE	·52	
16	30·445	30·340	75	45	112·0	43·5	NW SE	·78	
17	30·257	29·989	80	48	116·5	47·5	NW	·78	
18	29·838	29·787	74	58	86·0	54·5	NE N SE	1·04	0·34
19	30·065	29·990	70	47	96·0	46·0	SW NW	·78	0·05
20	30·191	30·167	78	47	113·5	45·0	NW E	·52	
21	30·381	30·312	75	50	118·0	49·0	NW SE	1·04	
22	30·448	30·346	69	50	80·0	54·0	NW SE	·26	
23	30·258	30·033	69	50	94·0	50·0	NW N NW	·78	0.30
24	30·005	29·939	75	60	104·0	57·0	NW S	·52	0·06
25	29·956	29·853	81	54	112·0	52·5	NW W NW	·78	
26	29·813	29·676	78	58	98·0	58·5	NW W NW	5·20	0·22
27	30·143	29·932	69	53	108·0	49·5	NWSWNW	2·86	
28	30·206	30·107	72	42	107·0	40·5	NWSENW	·52	
29	30·147	30·076	71	41	102·5	49·0	SW NE S	·78	
30	30·364	30·344	69	54	80·5	53·0	SE E	·0	0·03
31	30·341	30·243	74	47	110·0	46·0	NW SE S	·26	
							Total force	49·43	2·38

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 Guage. 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 :—

13th. Tips of hornbean commencing to turn.
14th. Coe's golden drop plum ripe.
16th. Seckle pear ripe.
18th. Tips of elm turning yellow.
20th. Horse chestnut leaves turning brown.
28th. Ash leaves commence falling.
Oak leaves commence falling.

Barometer mean, 30·017in., being 0·160in., above the average.
Temperature mean, 60·25°, being 0·27° above the ditto.
Solar intensity mean, 101·60°, being 3·40° below the ditto.
Dew point mean, 48·7°, being 0·87° below the ditto.
Humidity of air mean, ·72, being 1·5 per cent. above the ditto.
Elastic force of vapor mean, ·371, being ·016 per cent. above the ditto.
Total amount of rain, 2·38in., being 0·86in. above the ditto.
Increase of spontaneous evaporation on rainfall 2·07 inches.
Mean amount of ozone, 6,92, being 0·19 of chromatic scale above the ditto.
Electricity active on the 4th, 5th, 6th 8th, 14th, 15th, and nil on the 18th, 23rd, 24th, and 30th.
Mount Wellington covered with snow on the 8th.
Hot wind on the 13th. Thunder and lightning on the 25th.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR MARCH, 1866, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

In the mortality-rate for the twelve months of the year—on the average of the previous nine years—March stands the third on the list, February and July both having a higher mean of deaths. The mean is 56 3-9, the present month had 57 deaths, and six out of the previous nine, had each between 50 and 60. The extremes were 73 in 1864, and 48 in 1859. After the short but violent storm of wind and rain on the morning of the 8th the deaths diminished largely, one third of all the deaths of the month having occurred during the first week, and principally from the bowel-complaints which had originated in the previous month.

Atmospheric pressure mean, 30·017, was unusually high, being + ·160 above the 20 years' adopted standard mean for March. Only two years out of the previous 25 had a higher mean, *i.e.*:—1864, 30·109; the most fatal March on record, and 1858, 30.021,—when the second heaviest death-rate took place; the present month occupying the third place in both respects. The range of pressure, moreover, during the present month, exceeded both those years, or indeed any March since 1857, being 1·252 inches. The minimum, 29·196, was registered at sunset on the 3rd; the maximum, 30·448, at 7 a.m. on the 22nd. In 1864 the latter rose higher, but the former was much less. In 1858 the maximum differed but little from that of the present month, but the minimum did not fall nearly so low. The greatest movement of the barometer on any day, was a fall of —·628 of an inch on the 3rd, and on the 14th there was a rise of almost as great an amount. Altogether there were 16 days on which the pressure varied above one-fifth of an inch. Last year's March had only 9. Atmospheric pressure, therefore, was more inimical to health and life this month than usual.

The *Winds*, too, this month, were not on the whole favorable to health and life. The total force was only 49·13 lbs., being —5·53 lbs. less than the four years' table, and nearly as much less than the mean of the last nine years. From every point of the compass except north-west and south-west, the winds were below the average in frequency, and only west and north-west had more than the average force. North-west winds were greatly in excess, and they are always least propitious to health and life, having the least ozone. There was a strong *hot wind* on the 13th, and a feeble one on the 25th. The strongest winds recorded had only a pressure of 5·21 lbs. to the square foot, and were registered three times, on the 4th, 5th, and 13th. Had the wind been guaged between 3 and 6 a.m. of the 8th, I am sure, from personal experience of it, a strength of more than double the above would have been noted. At the usual hour of observation, 7 a.m., it had sunk to 2.60.

Temperature mean, by the observed thermometers, was 60·25 degrees, being so near the 20 years' average for March, that it only exceeded it by + 00·27 of a degree. 1865 had a mean nearly 1¼ degrees colder. By the self-registering maxima and minima thermometers, the mean was 61·56 degrees. The extremes were 88 with the hot wind on the 13th, and 39 in the cold night of the 2nd. No year since 1856 has had so low a minimum, and no year since 1861 so high a maximum. The extreme range of the month, 49 degrees, was eight degrees beyond that of last year, and considerably greater than any other March since 1861, when the range was 54 degrees. The mean of all the maxima was 73·03, while last year's was nearly two degrees less. The mean of all the minima was 50·03, being more than half an inch lower than last year; so that the present month had on the whole warmer days and colder nights than March 1865 had.

Daily range of temperature had a mean, which has only been exceeded in the last 25 years, by March, 1857, and 1856, being exactly 23·00 degrees, while the two exceptional years were about half and three quarters of a degree more. The 20 years' mean for March is only 20·04 degrees. The greatest range of temperature in any twenty-four hours was 33 degrees on the 29th; last year's was the same, and many years have had more. The smallest range on any day was 12 degrees; last year's was 6. There have therefore been constant but moderate daily-ranges. The diseases popularly ascribed to variations of temperature prevailed but little this month, and the influence on the mortuary returns is scarcely appreciable. No deaths occurred from inflammation of the lungs, &c.

The solar-thermometer gave a mean of 101·60 degrees, which is —1·68 below the average of the previous 10 years, and +00·73 more than 1865 had. The maximum was, 121·5 on the 12th, and the minimum 77·0 on the 2nd.

Terrestrial-radiation mean, 48·51 degrees, is + 00·36 above the mean of the previous ten years, and +1·58 more than 1865 had. The extremes were, maximum, 58·5 on the 26th, minimum, 38 on the 2nd. Notwithstanding the colder nights than usual, the earth's temperature was above the average. 1865 had the same maximum, but a minimum 2½ degrees higher.

The total *rain-fall* of the month was 2·38 inches, being + ·86 of an inch, above the 20 years' average, and + ·45 of an inch more than 1865 had. There were eleven days on which rain fell, being two more than the average of the previous eleven years, and two more than 1865 had. On the 4th, enough of rain fell to make channels, with a good fall, run, but on the morning of the 8th it fell so quickly and copiously, that in about three hours at Mr. Abbott's observatory, 1·14 inches were guaged, while my pluviometer gave 1.69 inches. The surface-drains and sewers of the city were thoroughly cleansed, and from this date the deaths from bowel-complaints lessened considerably. On the 18th the surface gutters again got thoroughly flushed. *Snow* appeared in considerable quantities on Mount Wellington on the 5th, but was all gone next day. On the 8th, Mount Wellington was again well mantled with snow, but none remained on the 9th.

Spontaneous-evaporation amounted to 4·45 inches, being +1·85 inches more than in 1865. None of the nine years' recorded had so much as this.

Elastic force of vapor had the mean of 371, being +16 above the 20 years' average, though 7 less than 1865 had. The range was from 244 to 551.

Humidity mean. 72, was 1½ above the 20 yrs' mean, though 4 less than in 1865.

Cloud mean was 5·51, being + ·15 above the 20 years' mean, but—·98 below 1865.

Ozone had a mean of 6·92, ranging from 5 to 9. It was ·73 less than 1865 had, and slightly below the March average of the previous 8 years. With so little ærial movement, and few ocean-winds, this result was to be expected. The rain-fall, however, kept the mean much above what it otherwise would have been.

Electricity this month was much more favorable than in March, 1865, there being 17 *positive* indications with maximum tension of 6·5, while last year had only 6, with maximum tension of 5, and minimum of 2·5. *Negative* was registered 39 times, with maximum tension of 6·5, but a minimum as low as ·05. In 1865 there were 49 negative, with maximum tension of 5·5. Nils were 6, last year had 7.

Thunder and lightning occurred just before midnight on the 25th. Some of the citizens imagined at first that it was H.M.S.S. Curaçoa firing, having been accustomed to hear a gun report from her every evening at nine o'clock and every morning at day-break while in port. A brilliant *Aurora* was seen on the evening of the 19th.

The 57 *deaths* this month, is only one more than March, 1865, had, and only a fraction above the average of the previous 9 years.

Mar., 1866.	Ages.	Feb., 1866.	Marches. 1865	Max. 1864	1863	1862	1861	1860	Min.'59	1858	1857	Avg. 9 yrs. Marches 1857-1865.
15	Under 1	16	12	25	16	12	19	16	15	26	14	17 2-9
11	1 to 5	7	6	13	11	8	6	9	9	17	6	9 4-9
3	5 to 20	2	2	2	1	3	4	2	4	3	2	2 5-9
7	20 to 45	6	9	11	9	10	6	11	8	7	16	9 6-9
8	45 to 60	8	9	13	5	9	9	8	8	5	11	8 5-9
13	60 and above	15	18	9	11	10	7	7	4	8	6	8 8-9
57		54	56	73	53	52	51	53	48	66	55	56 3-9

"Under one year old" the deaths were less than the average, though three more than in 1865. Nine of the 15, were feeble children under 4 months old, and the other 6 were all from 8 to 11 months old, or at the age when teething and bad-dieting render children so susceptible of the bowel-complaints usually prevalent in the summer months.

At "1 to 5" years old the mortality was above the average. Of the 11 deaths, all were under two years old but two, and the exceptions had not attained the age of three years—one being from a burn. All the rest died from the prevailing bowel-complaints, "At 5 to 20" the deaths were a fraction above the average.

"At 20 to 45" the deaths were about 25 per cent. less than the nine years' mean, and but one year of the nine had fewer. At "45 to 60" the average mortality was not attained.

At "60 and all ages above" the average was largely exceeded, though the number, 13, was 5 less than in 1865. The oldest was an invalid at the Brickfields Asylum, aged 85.

March, 1866.	Classes of Disease	Feb., 1866	Marches.									Avg. of 9 yrs. Mchs. '57-'65.
			1865	Max. '64	1863	1862	1861	1860	Min. '59	1858	1857	
18	1. Zymotic	24	10	35	21	15	15	15	16	25	9	17 8-9
7	2. Constitutional	7	9	8	8	10	11	8	5	10	6	8 3-9
18	3. Local	13	29	19	13	19	21	24	17	14	29	20 5-9
10	4. Developmental	7	5	8	9	5	2	5	6	11	7	6 4-9
4	5. Violent &c.	3	3	3	2	3	2	1	4	6	4	3 1-9
57		54	56	73	53	52	51	53	48	66	55	56 3-9

In the 1st, or *Zymotic class of diseases*, the deaths were a fraction above the average, and nearly double last year's number. A boy five years old died from *croup*, being the only death from any acute form of diseases of the organs of respiration, notwithstanding the extremely wide daily range of temperature. A girl of 17 died from *typhoid fever*, no doubt owing to the usual local causes, which engender this preventable disease. The other 16 deaths were all from *bowel complaints*, only three of them being above 3 years old, *i.e.*, 45, 50, 66, respectively.

The 2nd, or *constitutional class of diseases*, had less than the average deaths. One from *senile gangrene*, two from *concerous affections of the stomach*, one from *water in the head*, three from *consumption*, of whom one man, aged 25, was born in Tasmania. Last year this disease caused five deaths, and one of the number, a male of nearly the same age, was born in Tasmania.

The 3rd, or *local class of diseases*, had less than the nine years' average of deaths, and eleven less than 1865 had. The first order of this class, *Diseases of the Brain and Nervous System*, had only seven deaths, a child of eleven months from *Inflammation of the membranes of the Brain*, and the old man of 85 from *Serous Apoplexy*, and five young children from *Convulsions*. In March, 1865, this order had 11 deaths. In the 2nd order, *Diseases of the Heart and Organs of Circulation*, there were 3 deaths; last year had 5. In the 3rd order, *Diseases of the Lungs and Respiratory Organs*, 3 deaths took place, all of a chronic character, and of long standing; 1865 had 7. In the 4th order, *Diseases of the Stomach and Organs of Digestion*, 4 died, being the same in number as last year. In the 5th order, *Diseases of the Urinary Organs*, one death occurred; 1865 had 2.

The 4th, or *developmental class of diseases*, had an excessive number of deaths, 5 of them being under 10 months old, and the other 5 from 71 to 79 years old. Last year had only half the number, only one of them being a babe.

The 5th, or *violent and accidental class of diseases*, had somewhat more than the average number of deaths. One was *run over* by an Albert car, another *fell* into a clay-hole, a child died from *burns*, and the fourth died from *Tetanus* (lock-jaw) in Hospital. He had some days before admission trodden on a rusty knife, and neglected himself for many days. *Inquests* were held on four deaths occurring within the month in the Hobart Town Registration District; last year had double the number. The deaths in *Hospital* were 16, including one of the *Inquest* cases, 6 of them from country districts; 1865 had exactly the same number. At the *Male Invalid Asylum* 3 died; last year had only 2. At the *Cascades Female Prison* 2 children died from *bowel complaints*. Of the 57 deaths, 33 were males, 24 females. The Glenorchy and Queenborough divisions of the district had each one death, all the rest died in the city.

On four days of the month no deaths occurred. In the first week there died 19; in the second, 7; in the third, 14; in the fourth, 11; in the last three days 6. The most fatal period was the six days, 2nd to 7th inclusive, when 19 died.

There were only 49 *births* registered, being 21 less than in March, 1865. The last two days of the month the Registry Office being closed, will perhaps account for the discrepancy.

ROYAL SOCIETY.

APRIL, 1866.

The monthly evening meeting of the Fellows was held at the Museum on Tuesday the 10th April, His Excellency Colonel T. Gore Browne in the chair.

J. W. Graves, Esq., having been previously nominated by the Council, was, after a ballot, declared to be duly elected a Fellow of the Society.

The Secretary (Dr. AGNEW) laid on the table the usual monthly returns, viz.,—

1. Visitors to Museum during March, 588.
2. Ditto to Gardens ditto 1714.
3. Plants received at Gardens ditto. From Mr. Patterson, Sydney, 9.
4. Plants, &c., sent from Gardens. To A. Verschaffelt, Ghent, Belgium, 2 large tree ferns. To the Botanic Gardens, Melbourne, a collection of Tasmanian mosses. To Capt. Storie, 48 papers colonial seeds. To Dr. Picken, H.M.S.S. Curaçoa, 50 papers colonial seeds for transmission to Turkey.
5. Specimens sent to Dr. Mobius, Hamburg Museum, 15 specimens of Tertiary fossils, 10 mountain limestone do, 9 carboniferous do, 1 dysodyle, 8 wood opal, 1 silicified wood, 101 Tasmanian shells, (recent), 3 sphœria Gunnii, 2 S. Robertsia, total, 150 specimens.
6. Books and periodicals received.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.
   a. Table for March,
   b. Summary of observations for ditto.
2. Westbury, from F. Belstead, Esq.
   a. Table for March.
3. Port Arthur, from J. Boyd, Esq.
   a. Table for February.
   b. Reading of Government schooner's barometer for ditto.
4. Tamar Heads, from R. Henry, Esq.
   a. Table for January.
   b. Ditto for February.
5. Swansea, from Dr. Story.
   a. Table for February.
   b. Ditto for March.

The SECRETARY read the usual analysis of the Observatory Records and Health Report for the month by E. S. Hall, Esq.

The presentations were as follows :—

1. From the author, the Rev. J. E. F. Woods, F.G.S., &c., two Papers (printed), read before the Adelaide Philosophical Society, on "The Tertiary Rocks of South Australia." Also a Pamphlet on the "Tertiary Deposits in the Colony of Victoria," by the same author.
2. A parcel containing 16 varieties of Tasmanian shells. From H. M. Hull, Esq.
3. A Grebe *(Podiceps poliocephalus)*. From J. W. Graves, Esq.
4. White hawk *(Astur Novæ Hollandiæ)*. From Mrs. C. Lamb.
5. Mussel, with pearls. From A. B. Jones, Esq.
6. 40lb. Armstrong shot, fired from H. M. S. S. Curaçoa, and afterwards picked up on a sandy beach. From Commodore Sir W. Wiseman.

The shot, or conical-headed bolt, presents some points of interest. Having been fired into soft sand its original figure is preserved, whilst its lead coating exhibits in a very striking manner the effects of the rifling of the gun.

The attention of the Fellows present was directed to a fine collection of fruit from the Society's gardens, comprising 120 varieties of apples and 55 of pears.

The SECRETARY read a paper by C. Gould, Esq., the Government Geologist, on the "Position of the Gordon limestones, relatively to other palæozoic formations, &c."

Conversation ensued on several subjects arising out of the paper. Amongst others it was hoped that at the ensuing Intercolonial Exhibition our marble, in all its varieties, would be well represented, and that attention would be excited in the neighboring colonies to the vast deposits of this material which exist in Tasmania. In the vicinity of Macquarie Harbour alone, it exists in cliffs varying in height from one to two hundred feet, with deep water at their base enabling ships to lie alongside and take it in as cargo.

A vote of thanks having been accorded to the author of the paper just read and to the donors of the various presentations, the meeting broke up.

ON THE POSITION OF THE GORDON LIME-STONES, RELATIVELY TO OTHER PALÆOZOIC FORMATIONS, &c.

By C. GOULD, F.G.S., Government Geologist.

Several years ago a collection of remarkable fossils was made by Dr. Milligan, and subsequently lodged in the Society's Museum. They were entirely, or in most part, obtained at the Gordon river in Macquarie Harbor.

These fossils occur in lime-stone, but a glance is sufficient to show their distinctness from those which are so abundantly contained in the ordinary lime-stones of the colony, as at Mount Wellington, Fingal, &c., &c.

This collection has been supplemented by one made by myself in the summer of 1862, which I had the pleasure of submitting to the Society on my return, pointing out at the time their lower silurian aspect, and enumerating a few of the principal forms.

I have now further to add that, taking the opportunity afforded by a recent visit to Melbourne, I made a selection of the most typical specimens, and submitted it to the judgment of Professor M'Coy, the most competent Palæontologist in the colonies. He immediately identified several of the specific and most of the generic forms, and although from want of access to my notes I am unable on the present occasion to forward a list of the species so determined, it will be sufficient for my purpose to state broadly the results of his examination, which I may point out are confirmatory of my originally expressed views.

It appears that these lime-stones are contemporaneous with the beds at the very base of the lower silurian system of Europe and America, anterior to the described fossilferous beds of Victoria, as well as to the Calymene containing beds of the Eldon Valley in this country.

The fossils principally belong to the family of the *Orthoceratidæ*, together with Corals, *Murchisoniæ*, and species of *Raphistoma*. The absence of Trilobites and Graptolites is noticeable, the more especially as sand-stone beds, intimately associated with the probable equivalents of these lime-stones cropping at the Mersey, contain one, or perhaps two, species of Trilobite clearly allied to the older forms described by Barrande and American authors.

The extensive series of metamorphosed rocks forming the larger portion of Western Tasmania are inferior to this lime-stone, and, I may take this opportunity of remarking, the absence of gold in paying quantities in the districts hitherto examined may be attributable to this reason.

I have previously pointed out the existence of several main anticlinal axes, traversing the western country in the direction of its length from north to south, and forming a series of folds, which bring down the upper beds, and cause their disposition in narrow strips of country alternating with the more extensive areas occupied by the lower one.

Thus in passing from west to east we have these lime-stones appearing again and again at intervals of many miles in distance, at Point Hibbs, the Franklin river, the great bend of the Gordon, and the Florentine Valley the axes of the anticlinal embracing the larger intervals, and developing the inferior metamorphosed beds, consisting of quartzites, micaceous and chloritic schists, &c., &c., which form the prominent mountain features of the country.

The importance of the determination of the age of these beds can therefore hardly be over-rated, since it establishes a clue to the classification of nearly all the beds in Western Tasmania, and materially assists in the interpretation of those immediately associated with them occurring in more accessible parts of the colony, for in addition to the localities above mentioned this lime-stone may be traced in the West Tamar district, at the Mersey, at arms of the creek near Deloraine, and forms a prominent feature in the neighborhood of Chudleigh. Imperfect remains of fossils, apparently corals, are sparingly contained in the quartzore sand-stones immediately underlying the lime-stones, and although in many situations where their position protects them from exposure to deundation, it is difficult to discover fossil remains in the lime-stones themselves, yet even in these localities a careful search will, in nearly all cases, disclose their existence.

I have now no hesitation in considering the Eldon beds as superior to the lime-stones, both on account of their containing fossils, and their relation as exhibited near the mouth of the Gordon river, where sections also assist us in the determination of the age of the Fingal formation, beds of a similar lithological character to the most typical of the auriferous beds of that locality cropping out on Settlement Island, and to a limited extent upon the neighboring coast.

These appear to be above the dark colored Sand-stones in the lower part of the river, which appear to correspond with the Eldon river beds. No fossils have, however, as yet been discovered in the Fingal beds, and this question may still be considered as not perfectly determined.

I think it will be found convenient to retain permanently the terms which I have employed in referring to the leading subdivisions of the older rocks as well as consistent with the custom observed in other countries of employing as *terms of* *classification* for formations, the names of those districts in which they are either most prominently developed, or offer especial facilities for study. A series of named land-marks is thus obtained, by which the order of succession of the various divisions is secured as they are determined one by one, and to which reference may be made for the comparison of similar or equivalent beds at long distances apart. The exact collation with the defined systems of Europe will thus be facilitated, and the nomenclature itself may at any time be converted into the equivalent terms of that or neighboring countries in proportion to the advances made in our acquaintance with their fossil contents.

In the same manner it may be convenient to speak of the coal formation east of Fingal, East Coast, &c., &c., as the Mount Nicholas beds, that being the spot where they are best developed. The spiriferous lime-stones as the Mount Wellington lime-stone, &c., &c.

As far as our information goes at present, the leading subdivisions of the silurian formations may then be arranged as follows :—

1. FINGAL BEDS	Clay, Slates, Sandstones, and Grits	No fossils have yet been discovered Abundance of quartz reefs	
2. ELDON VALLEY	Mud-stones and Clay Slates	Calmyene Orthis Cardiola, &c.	Thin quartz reefs not abundant.
3. GORDON BEDS	Lime-stones Slates Lime-stones Conglomerates Quartzose Sand stones		

At some future period I shall enter in greater detail into the component parts of the above divisions, and their connection with each other.

METEOROLOGY FOR APRIL, 1866.

Private Observatory, Hobart Town.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced. Highest.	Lowest.	Self-registering Thermometers. Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind. Direction from three daily registers.	Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	30·106	29·815	76	56	115·0	46·5	NWNESW	·78	
2	29·944	29·829	71	53	102·0	49·5	SW S SW	1·30	
3	29·900	29·826	69	50	95·0	42·0	NW N	3·38	
4	29·782	29·609	67	53	72·5	51·5	NW W	8·33	
5	29·984	29·840	64	49	96·0	46·5	NW W SW	13·02	
6	30·193	30·156	61	42	90.0	40·5	NW SW	·78	
7	30·227	30·104	70	38	105·0	36·5	NW NE SE	1.04	
8	30·249	30·145	70	47	102·0	43·5	SW N S	·78	
9	30·336	30·263	74	51	105·5	51·0	NW SE	·78	
10	30·037	29·949	79	50	110·0	48·0	NW E	·52	
11	29·929	29·802	71	52	91·0	50·5	W NW N	·26	
12	29·753	29·682	70	55	79.5	52·5	NW	3·12	
13	30·077	30·037	76	47	108·0	46·0	W NW SE	·52	
14	30·155	30·132	70	43	60·0	46·0	NW NE E	0·	
15	30·180	30·024	78	55	80·5	53·0	W NW W	0.	0·31
16	30·369	30·191	73	41	109·0	40·5	NE E	0·	
17	30·452	30·364	73	40	105·0	42·0	NWNESW	.26	
18	30·406	30·329	61	45	66·5	45·5	NW SE NE	·26	
19	30·146	30·010	65	54	69·0	54·0	SE N SE	·26	0.25
20	30·054	29·888	62	49	80·0	49·5	NW N SE	0·	0·02
21	29·784	29·768	65	50	99·0	50·0	NW SE	.26	0·14
22	30·019	29·984	74	50	101·5	50·0	NW SE	.52	
23	30·090	29·989	75	47	110·0	47·5	NW NE	·52	
24	29·974	29·767	69	55	96·0	54·0	NE E SW	·52	0·22
25	29·978	29·932	59	49	88·0	45·0	NW	2·86	0·03
26	29·965	29·865	63	50	88·0	49·5	NW W N	3·64	
27	29·925	29·875	61	45	97·0	45·5	SE W NW	8·33	0·05
28	29·915	29·884	66	54	102·5	49·0	SW SE W	·78	
29	29·959	29·818	68	51	85·0	43·5	NW N W	2.86	
30	30·283	30·079	66	51	68·0	48·5	SW SE SW	·78	
							Total force	56·46	1·02

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 Guage. 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 :—

3rd. Elm leaves commencing to fall.
8th. Chrysanthemums commencing to flower.
12th. Coe's late red plum commencing to ripen.
18th. Mountain ash leaves commencing to fall.
20th. Black mulberry leaves commencing to fall.
25th. Seeds of hornbeam ripe.

Barometer mean, 30·017in., being 0·132in., above the average.
Temperature mean, 57·33°, being 1·69° above ditto.
Solar intensity mean, 92·55°, being 0·55° ditto.
Dew point mean, 47·4°, being 0·08° ditto.
Humidity of air mean, ·74, being 1·5per cent. below ditto.
Elastic force of vapor mean, ·347, being ·023 per cent. above ditto.
Total amount of rain, 1·02in., being 0·76in. below ditto.
Increase of spontaneous evaporation on rainfall 1·12 inches.
Mean amount of ozone, 6·98, being 0·32 of chromatic scale above ditto.
Electricity active on the 6th, 7th, and 28th, and nil on the 15th, 18th, 19th, 20th, 21st, 22nd, and 23rd.
Thunder, lightning, and rain on the 24th, without intermission.
A complete corona round the moon on the eve of the 25th, with several series of concentric-colored circles in a diameter of only a few degrees.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR APRIL, 1866, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

The meteorological phenomena this month have been so nicely balanced in their influence upon health, that the death list is within a fraction of the average of the previous nine years, though considerably higher, numerically, than April 1865 was.

Atmospheric pressure underwent no extensive perturbations, the greatest movement of the barometer on any day did not exceed + ·392 of an inch, and the whole range of the month was only ·843 of an inch, between the 4th, when the minimum, 29·609, occurred; and the 17th, when the maximum, 30·452, was registered. So high a minimum for this month was never before noted in the 25 years' records. The mean pressure of the month was 30·017, which is + ·132 above the 20 years' mean for April of the adopted standard-tables, and + ·066 more than 1865 had. Continuously high atmospheric pressure is inimical to health, as well as sudden and wide fluctuations.

Wind-force total, 56·46 lbs., is + 1·58 above the 4 years' average in the standard-tables, but + 7·78 more than the mean of the last nine years. It was, however, very unequally distributed in the month. In the first and last five days of the month no calms were recorded, and the winds were strong and from favorable points of the compass. In these two periods the smallest number of deaths occurred, the first five days having only five deaths, and the last five not a single one. So many days together without a death, is without parallel hitherto in any month of any year recorded. On the other hand, between the 6th and the 25th, there were no less than 35 calms noted out of the 60 observations. The 14th, 15th, 16th, and 20th, had not an appreciable amount of ærial movement at any one of the three daily observations. North-east, south-east, south-west, west, and north-west winds were all above the average in number, but only south-east and north-west had more than the average force. The strongest winds recorded had a pressure of 5·21 lbs. to the square foot, and were registered thrice in the first five days, and once in the last five days of the month. There is no doubt that in the night of the 5th inst. the strength of the wind must have attained 10·42 lbs. to the square foot. The calms in the month, 35, exceeded the 4 years' table by ·8·75, and the average of the last eight years by + 4·50.

Temperature mean, 57·33 degrees, is + 1·69 above the 20 years' mean, and nearly a degree warmer than April 1865 was. The mean by the self-registering maxima and minima thermometers was 58·97 degrees, being about the usual rate of difference with the observed thermometers. The mean of all the maxima or high day temperatures was 68·87 degrees, being nearly one degree less than 1865 had; on the other hand the mean of all the minima or low night temperatures was 49·07 degrees, which is rather more than half a degree higher than April 1865 had. The highest day temperature was 97 degrees on the 10th, being 8 degrees less than the maximum last year. The lowest night temperatuie, 38 degrees, on the 7th. Last year's was exactly the same.

Daily range of temperature had the mean of 19·80 degrees, which is +·88 degrees above the 20 years' mean for April, but − ·1·30 less than 1865 had. The greatest range on any was 33 degrees on the 17th, and the lowest was 10 on the 25th. Last year the extremes were 38 and 4.

The *Solar-thermometer* had a mean of 92·55 degrees, which is + 2·37 degrees higher than the mean of the previous 10 years, and + 1·23 more than 1865 had. The maximum was 115 degrees on the 1st, the minimum 60 on the 14th. Last year the extremes were respectively 120·5 and 64.

Terrestrial-radiation mean was 47·25 degrees, being + 4·19 degrees above the mean of the previous 10 years, and + 3·07 more than April 1865 had. The maximum was 54 degrees in the nights of the 19th and 24th; the minimum was 36·5 in the night of the 7th. The extremes were much wider in 1865, being 60·5 and 35.

Rain fell in appreciable quantities only on 7 days of the month, being — 4·82 days less than April average of the previous eleven years, and two less than last year had. For the first fourteen days of the month no rain was registered. On the 15th there was the largest quantity precipitated for any day, *i.e.*, ·31 of an inch ; on the 19th there fell ·25 of an inch ; and on the 24th nearly as much. Altogether the total rain-fall of the month was 1·02 inches, being — ·76 of an inch below the 20 years' average, and even — ·21 of an inch less than 1865 had. *Snow* never appeared on Mount Wellington during the month.

Spontaneous-evaporation amounted to 2·16 inches, being — ·44 less than 1865 had.

Elastic force of vapour had the mean of 347, which is + 23 higher than the mean of the 20 years' standard, and + 6 more than last year's. The range was from 218 minimum on the 7th to 549 maximum on the 23rd.

Humidity mean was 74, being — 1½ less than the 20 years' average, but identical with that of 1865.

Cloud mean, 6·27, was + ·56 above the 20 years' average and — ·55 more than April last year had.

Ozone mean, 6·98, was — ·01 less than the April average of the previous 9 years, and — 1·18 less than last year had. Indeed with the warm calm dry character of the month, and the many consecutive days on which electrical indications were absent, it is surprising that the mean did not fall much lower. The extremes were minimum 5, maximum 8·5.

Electricity had 17 positive indications, with maximum tension of 6, and minimum of 2·5. April 1865 had two more in number, with less divergent maxima and minima. Negative indications were registered 30 times with extremes of tension, respectively, of 5·0 and 1·0. In 1865 there were 6 more negatives, but with one less in maximum tension and the same minimum. "Nil" was registered 13 times, whilst April last year had only 5. From the 18th to the 23rd inclusive, the record at every observation but one was "nil." In this period the heaviest mortality for any similar number of days in the month took place, being 14, or very nearly one-third of the total deaths of the month, in six days. There was much *lightning*, with *thunder* and rain, on the night of the 24th. There was on the evening of the 25th a complete *Corona* round the moon, with several series of consecutive coloured circles, in a diameter of only a few degrees.

The 45 deaths in the present month, is within a small fraction (1-9) of the average of the previous 9 years, but 7 more than April 1865 had, four, however, of the seven, being the excess of "violent" deaths this year over last ; only three can be attributed to atmospheric influences.

April, 1866.	Ages.	Mar., 1866.	Aprils. 1865	Max. 1864	1863	Min '62	1861	1860	1859	1858	1857	Avg. 9 yrs. Aprils 1857–1865.
8	Under 1	15	5	15	5	7	10	8	11	11	12	9 3-9
7	1 to 5	11	2	18	8	3	13	9	8	11	4	8 4-9
2	5 to 20	3	4	4	3	1	1	4	1	1	7	2 8-9
8	20 to 45	7	7	5	10	10	6	6	11	9	8	8
6	45 to 60	8	7	5	11	10	10	9	9	4	8	8 1-9
14	60 and above	13	13	7	11	6	8	9	7	11	3	8 3-9
45		57	38	54	48	37	48	45	47	47	42	45 1-9

"Under 1 year of age," the deaths were below the nine years' average, though more than April 1865 had. At "1 to 5 years of age," the mortality was also less than the average, though much greater than last year had. At "5 to 20," the deaths were less than the average, and only half the number that occurred in April 1865. At "20 to 45," the nine years' average was exactly attained, though 1865 had one less. At "45 to 60," the deaths were considerably below the average, as well as one less than in 1865. At "60 and all ages above," the mortality was greatly in excess of the nine years' average, and one more than 1865 had. In England, where the relative numbers living at the different ages may be considered normally proportioned, somewhat more th an hf of the whole deaths are at and above 60 years of age, by the ten years' average, 1851-60. In no other of the Australasian colonies do the deaths in this group of ages form so large a proportion of the total deaths as they do in Tasmania. No comparison can be exact or fair that does not compare the number of deaths to the number of living in each group of ages, and when this is done the mortality rate of Tasmania is found to be very much less than that of any of the neighbouring colonies.

April, 1866.	Classes of Disease	March, 1866.	Aprils.									Avg. of 9 yrs. 1857-1865.
			1865	Max. '64	1863	Min. '62	1861	1860	1859	1858	1857	
8	1. Zymotic	18	5	32	7	9	17	8	8	12	8	11 7-9
6	2. Constitutional	7	7	4	9	5	4	6	7	10	7	6 5-9
23	3. Local	18	20	13	24	16	21	25	24	16	20	19 8-9
3	4. Developmental	10	5	5	6	4	6	3	5	7	1	4 6-9
5	5. Violent &c.	4	1	0	2	3	0	3	3	2	6	2 2-9
45		57	38	54	48	37	48	45	47	47	42	45 1-9

In the 1st, or *Zymotic class of diseases*, the deaths were considerably below the nine years' average, but nearly as much more above what last year had. *Bowel complaints* alone caused the whole of the 8 deaths, and all but one of them was under 20 months old.

The 2nd, or *constitutional class of diseases*, caused 6 deaths, being one less than in 1865. Two were cases of *cancer*, in very old people, one case of *hydrocephalus* (water in the head), and three were from *consumption*, two of whom were born in Tasmania.

The 3rd, or *local class of diseases*, had considerably more than the average rate of deaths. The 1st order of this class, *Diseases of the Brain and Nervous System*, had 6 deaths, being one less than in April 1865. The 2nd order, *Diseases of the Heart and Organs of Circulation*, had 6 deaths, being 5 more than 1865 had. The 3rd order, *Diseases of the Lungs and Organs of Respiration*, had 7 deaths, being one less than in 1865. Only two of the number were children, and most of the others were chronic diseases in old people. The 4th order, *the Stomach and Organs of Digestion*, had 3 deaths, all from long standing disease. Last year had the same in number. The 5th order, *Diseases of the Urinary Organs*, had one death this year, none last, but another order had one in which there was no deaths this month.

The 4th, or *developmental class of diseases*, had 3 deaths, two children and one old man of 72. This class had two more in number in 1865.

The 5th, class of *violent and accidental deaths*, had a mortality of 5; last year had only one, and the nine years' average is less than half of the present month's deaths. One was *fracture of the skull*, how inflicted unknown. A boy of 7 years old was *drowned*, and an old man of 80, though taken out of the water still living, died from the *shock of the immersion*. A man of 70 died from *burns*, and a man of 39 from taking a *poisonous dose of laudanum* when intoxicated. In only the first year of the series of nine, were the violent and accidental deaths nearly so numerous as the present.

The *Inquests* held on deaths occurring within the month were 7, while last year had only 2. In the *Hospital* there were 10 deaths, including two of the inquest cases. Three of them were of cases sent from country districts. The Hospital deaths in April 1865 were nine. At the *Male Invalid Asylum* 4 deaths took place, aged respectively 74, 75, 76, 77. There was one more in number there last year.

Of the 45 deaths, 32 were males, 13 females, the latter being an abnormally small proportion. All the deaths but one occurred in the city. The exception was the death from falling into the water at the ferry over to Risdon.

On eight days of the month, of which five were consecutively the last days of the month, no deaths occurred. In the first week of the month there died 7; in the second, 14; in the third, 14; in the fourth, 10; in the last two days, none. The least fatal period of the month was the last five days, during which there was not a single death. For so many days consecutively, I have never hitherto noted such an instance. The most fatal five days were from the 19th to the 23rd inclusive, when 14 deaths took place. The greatest number on any single day was 5 on the 23rd.

The *births* registered were 55, being 6 less than last year.

The *births* and *deaths* returns for the whole of Tasmania in the first quarter of 1866 are less favorable than they were for the corresponding quarter of 1865. The births registered were 685, which is 67 less than 1865 had. Of this falling off the rural districts had the largest share, 45; Launceston had only 3; Hobarton, 19. The deaths for the whole island were 346, being 20 more than in the first quarter of 1865. Of these the rural-districts had 11; Launceston, 5; Hobarton, 4.

Before the new water works in Launceston and Hobarton furnished a more copious and purer supply of water to their inhabitants, the death-increase of such dry seasons as the present one, would have been relatively much greater for the urban than the rural districts. It is quite possible by sanitary improvements to reduce the death-rate of a town to less than that of the adjoining country, as witness the success achieved at Ely. While the sewerage, however, of Hobarton remains in its present neglected state, incessantly distilling the most noxious of gases in almost every quarter of the city, as well as in the vicinity of the city rivulet, to the waste of public health, and in opposition to the soundest principles of political economy, no such triumph as engineering skill and a moderate outlay of public money has won for Ely, can be obtained for Hobarton. No better initiatory move could have been made than that recently unanimously adopted by the Municipal Council of the city, "to forthwith employ a competent sanitary engineer to devise a plan for a perfect and comprehensive sewering of Hobarton." It must be satisfactory to the Fellows of the Royal Society to know that the Alderman (Lewis) who moved this most important resolution is one of their body.

ROYAL SOCIETY.

MAY, 1866.

The usual monthly evening meeting of the Society was held on Tuesday, the 8th May, J. Barnard Esq., in the chair.

Charles S. Cansdell, Esq., having been previously nominated by the Council, was, after a ballot, declared to be duly elected a Fellow of the Society.

The Secretary, Dr. AGNEW, laid on the table the usual monthly returns, viz.,

1. Visitors to Museum during April, 501.
2. Ditto to gardens, ditto, 1 623.
3. Times of leafing, flowering, &c., of a few standard plants in gardens.
4. Periodicals, &c., received.

Meteorological Returns:—

1. Hobart Town, from F. Abbott, Esq.
   a. Table for April.
   b. Summary of Observations for ditto.
2. Port Arthur, from J. Boyd, Esq.
   a. Table for March.
   b. Reading of government schooner's barometer for ditto.
3. Tamar Heads, from R. Henry, Esq.
   a. Table for March.
   b. Ditto ditto April.
4. Westbury, from F. Belstead, Esq.
   a. Table for April.

The SECRETARY read a communication from E. Swarbreck Hall, Esq., to the effect that owing to illness he had been unable to prepare, in time for the meeting, the usual "Analysis of the Hobart Town Meteorological Records," and remarking that the "Meteorological phenomena last month, favourable and unfavorable to health and life, were so nicely balanced that the number of deaths, 45, is within a fraction of the average of the previous nine years, 45 1-9, though seven more than April, 1865. Atmospheric pressure was continuously high, with slight perturbations. Aerial motion for the first and last five days of the month favorable, but otherwise in the intervening period. Temperature much above the average, particularly terrestrial radiation. Elastic force of vapor very great. Rain-fall small. Ozone fair, but much less than April, 1865. A total absence of electricity for many days."

The presentations were as follows:—

1. From H. M. Hull, Esq. Four specimens star fish.
2. From W. L. Gellibrand, Esq. Head and hide of Native Tiger, (*Thylacinus cynocephalus.*)
3. From R. Maddock, Esq., Dunrobin. Skin of Owlet Nightjar, (*Ægotheles Novæ Hollandiæ*), and head of Thylacinus.
4. From Mr. L. A. Davies. Seeds of Chinese tea plant.
5. From Mr. S. H. Wintle. Seven specimens of photographic typography, and three photographic copies of engravings.

In reference to presentation No. 4, the Secretary read a letter from the donor to the effect that these seeds were obtainable at the price of 5s. per single lb., or 2s. 6d. per lb., if purchased by the cwt., from a firm in Melbourne by whom they had been imported direct from China.

The general opinion among those present was that the climate of Tasmania would be unsuitable to the tea plant, chiefly on account of the summer frosts. The seeds, however, will be tried in the Society's Gardens; and some were also taken by the Fellows for planting in other localities.

Mr. Morton ALLPORT read a paper on the "Late successful experiment for the introduction of salmo ova, and sea trout ova into Tasmania."

After reading the paper, Mr. M. Allport, in answer to queries on the subject, mentioned that the first batch of smolts left the breeding ponds in September. They were seen in the Plenty till November. and therefore probably reached the sea early in December. Authorities were divided as to the probable period of their return. According to some they might be expected in three months, according to othe s, with whom he agreed, in about 15 months. In reference to the use of ice, Mr. M. Allport observed that on the occasion of the first unfortunate shipment, by the Beautiful Star, after all the ova in the cases had died, at about the 70th day of the voyage, Mr. Ramsbottom on clearing out the contents of the ice house, found a little box which had previously been deposited in the ice. On opening it, he found to his astonishment that it contained many living ova, and although these subsequently died when the ice failed, it was clear that their prolonged vitality was entirely due to the extreme degree of cold to which they had been subjected. Mr. Ramsbottom on his arrival reported the circumstance to the Salmon Commissioners, who considered it of such importance that they at once determined before making another attempt to introduce the ova, to send Mr. Ramsbottom home for the purpose of making a series of experiments as to the influence of cold in retarding incubation.

The result of these experiments was well known, and the consequence has been, that both subsequent shipments have been crowned with success. Of the last he thought there were about 50,000 healthy ova now safely deposited in the breeding ponds.

Mr. BARNARD was glad to see that full justice had been done to Mr. Youl. He (Mr. Barnard) happened to be in London on the occasion of the first shipment, and could bear ample testimony as to the immense amount of trouble taken by Mr. Youl, and to the untiring zeal and energy he at all times displayed in the cause.

Mr. M. ALLPORT remarked that the Salmon Commissioners were fully aware of the obligations they all were under to Mr. Youl, and that it gave them the greatest pleasure to record and acknowledge the fact.

On the motion of Mr. DAVIES, seconded by Mr. F. ABBOTT, the thanks of the meeting were given to Mr. M. Allport for the paper just read; and the same having also been accorded to the donors, of presentations, the proceedings terminated.

REPORT OF THE LATE SUCCESSFUL EXPERIMENT FOR THE INTRODUCTION OF SALMON OVA AND SEA TROUT OVA TO TASMANIA.

BY M. ALLPORT.

On the 8th day of February last the ship Lincolnshire left Plymouth bound for Melbourne, having on board about 103,000 salmon and 15,000 sea trout ova stowed in an ice-house of rather larger capacity, but of much the same construction as that built in the ship Norfolk for the same purpose two years ago. The whole of the arrangements for shipping were superintended by Mr. James A. Youl, who again exhibited the determined zeal upon which so much depended in the former experiment. The method of packing the ova in the boxes, and the boxes in the ice-house, has been so thoroughly explained to the Fellows of this Society in the account given of the former experiment that I need not again give the details. After a rather long passage of 79 days, the Lincolnshire arrived in Hobson's Bay, on the 30th of April last, the ova and ice were at once transhipped to the steamship Victoria, again most liberally placed at the disposal of the Tasmanian Salmon Commissioners by the Victorian Government, and arrived in the Derwent on the 4th May, and by 8 p.m. on the following day the last of the ova were placed in the hatching boxes at the Plenty, the water, by the help of the remaining ice, being reduced to 45 Fahr.

On the present occasion a large number of the boxes were packed by Mr. Robert Ramsbottom, father of the superintendent at the Plenty, the remainder by one of his sons, and by Mr. Thomas Johnston. The boxes packed by Mr. R. Ramsbottom were all marked with his initials in pencil, and were found, on unpacking, to contain a far larger average of living ova than the others, though some of the latter were in better order than any of those brought by the Norfolk. I was most careful to examine the state of each box I unpacked, and invariably found that in the boxes packed by Mr. R. Ramsbottom there was rather less moss, and that the ova were more evenly distributed through it, being thus kept separate and never gathered into masses as in the others. To these causes I attribute the better average. In this opinion I am fully borne out by my able coadjutors in unpacking, Mr. John Buckland and Mr. W. Ramsbottom. One remarkable fact in the present experiment is the forward state of the larger portion of the ova, the fish being distinctly visible, furnishing abundant proof that the great majority, at any rate, have been successfully impregnated. This is especially observable in the sea-trout, the pupils of the eyes in which last stand out as black spots on a yellowish white ground, the enveloping tissue being evidently more transparent than in salmon ova.

Many are so far advanced that I fully expect to hear of their hatching within a week. I estimate the proportion of living ova now deposited at above 45 per cent. of all sent out. Since the deposition of the ova in April, 1864, several great improvements have been effected by the Commissioners in the arrangements at the Plenty, the chief of which has been the alteration of the gravel in the breeding boxes. To explain the change and the advantages of the present plan, I must call your attention for a few moments to the habits of the salmon in a state of nature. In its own rivers the salmon chooses for its spawning beds shallow rapids running over a bottom of coarse river gravel, consisting of pebbles weighing from half a pound to 3 or 4 lbs., the spaces between which are of course large enough to permit the ova to roll down to depths varying from a few inches to a foot and a half. This is no doubt a wise provision of nature for the protection of the ova and the helpless young fry from their innumerable natural enemies, but has serious objections in artificial rearing. To begin with, it is absolutely impossible in the first instance to separate the dead from the living ova: all must be rapidly transferred to the water together, and the dead ova gradually picked out afterwards. In 1864 numbers of dead and living ova together got out of sight between the interstices of the gravel, purposely made to resemble as nearly as possible the natural spawning beds, and much of the living ova was assuredly destroyed by contact with that which was decomposing, to say nothing of the ill effects which the decaying ova would have upon the water generally. Again, it is now an ascertained fact that a considerable admixture of atmospheric air is indispensable in hatching the ova of most of the Salmonidæ, and that, consequently, the farther the ova are from the surface of the water the more tumble and splash you must have in the water to drive bubbles of air through and amongst the gravel. It follows that if in artificial rearing the ova are allowed to get some three or four inches down into gravel, a sharp stream of water must be directed over the artificial beds to supply them with the air necessary, but that if it is desired to keep the ova in sight they must be placed on fine gravel, and an even gentle stream of water about an inch or an inch and a half in depth must flow through the beds. As in the artificial process the boxes are thoroughly guarded from all possible enemies, the advantages are so manifestly in favor of keeping the ova in sight that the Commissioners have replaced the coarse gravel, formerly used, by an even bed of very fine pebbles, on which the ova rest about an inch from the surface of the stream which flows gently and evenly through the boxes. The result is that the moment an egg becomes opaque, or in other words dies, it is removed and all danger to the neighboring ova is avoided.

Amongst the boxes brought in the ice-house was one containing a clutch of hen's eggs, which arrived to all appearance in a perfectly sound state for culinary purposes, but which I scarcely think were seriously intended to be hatched here. Whoever sent them with any such intention, must have a very limited knowledge of natural history, for in a state of nature the eggs of birds are rarely allowed to fall in temperature to a degree much below that of the outside of the parent bird's body, while the eggs of the salmon on the contrary are frequently in their own rivers reduced to within a trifle of the freezing point for weeks together without injuring the developing embryo. A small packet of garden bulbs was also placed in the box containing the hen's eggs, and this is more likely to prove a valuable experiment, for every bulb appears to have arrived in admirable condition. As these bulbs were consigned to the Victorian Acclimatisation Society, and were brought here by mistake, the Commissioners have, of course, handed them to Commander Norman to be returned to their destination.

Before concluding, I desire to call the attention of the Fellows of the Society to the leading article, on the subject of salmon, in *The Mercury* of yesterday, the 7th instant, and on the part of the Commissioners to disclaim having any such intentions as are, in that article, attributed to them. The writer urges the propriety of distributing, as soon as possible, fish hatched from the present importation of ova into various rivers of the colony, the Huon, Gordon, Mersey, Forth, &c., but he forgets to say *how*. The main object of the Commissioners is the thorough establishment of the fish in all rivers adapted for them, but to carry out the idea contained in that leading article would be the most certain way of defeating that object.

To turn the young fish into these rivers before they were able to protect themselves would be to consign them to certain destruction, therefore we must retain them in the breeding ponds till they become active fish; and to distribute one thousand of them safely when they had reached this stage, amongst the various rivers mentioned (even if it were possible, which I greatly doubt) would cost far more than the expense already occasioned by the whole of the experiments. Even if it was possible to distribute them, and at reasonable cost, it would be the height of folly to do it, for this reason—

It is only in well-stocked rivers in Great Britain that breeding fish can be caught for the purpose of obtaining ova for artificial rearing, and the long-coursed Derwent, stretching some 90 miles from New Norfolk to Lake St. Clair, will be but thinly stocked, even though we should be far more successful on this occasion than on the last. Until we obtain ova taken from fish in this colony the experiment cannot be looked upon as commercially successful, and to place any portion of the original stock of fish in other widely scattered waters, will be to increase the difficulty of obtain breeding fish to an incalculable extent. On the other hand, once obtain spawn from fish in the Derwent, proving the success of the experiment, and all difficulties vanish; breeding establishments would soon be formed on all suitable rivers, and millions of fish turned out.

Again, our Victorian neighbors to whose generous liberality the experiment owes so much of its success, would have just cause of complaint against us, if we made any distribution in which they did not equally participate, and the sole reason why they did not retain a portion of the present batch of ova, is that their Acclimatisation Society cordially agrees with the Salmon Commissioners here, that every fish (even if there were a million) should go into the one river till a return of breeding fish is obtained.

METEOROLOGY FOR MAY, 1866

Private Observatory, Hobart Town.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced — Highest.	Lowest.	Self-registering Thermometers. — Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind. — Direction from three daily registers.	Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	30·389	30·311	68	49	98·0	48·5	N NW W	·26	
2	30·319	30·237	68	43	96·0	44·0	NW SE	·52	
3	30·219	30·071	60	45	85·0	44·5	NW E SE	0·	
4	30·150	30·076	70	46	97·5	43·5	NW SE	.26	
5	30·283	30·254	69	49	100·0	51·0	NW E SE	.26	
6	30·198	30·035	65	45	94.5	45·0	NW N	·78	
7	30·112	30·092	75	44	105·0	43·0	NW SW	·78	
8	30·125	29·982	75	45	101·0	44·5	NW N	·78	
9	30·186	30·115	70	53	100·0	52·0	NW E	·26	
10	30·172	30·159	60	53	60·0	52·5	NE SE	0·	0·04
11	30·019	29·945	64	53	69.0	51·5	NW	·78	
12	30 071	30·055	64	52	76·0	50·0	NW E	0.	
13	30·007	29·825	68	48	96·5	48·0	NW	1.04	
14	29·816	29·798	63	52	84·0	51·5	SW W NW	·26	0·12
15	30·032	29·976	64	41	93·0	40·0	NW	.52	
16	30·194	30·149	65	41	93·0	39·0	NW SE	·52	
17	30·108	29·904	57	39	77·5	37·5	NW S E	·52	
18	29·588	29·443	57	50	57·0	44·0	SE S SW	13·02	0·50
19	29·574	29·464	54	51	56·0	43·0	SW S	10·68	0·75
20	29·884	29·858	66	43	95·5	39·0	SW NE	·52	
21	29·928	29·890	59	44	80·0	41·5	W NW	·26	
22	29·810	29·799	65	47	97·0	41·5	NW N	·52	0·04
23	29·974	29·885	65	43	95·0	42·0	SW NW N	·26	0·01
24	29·978	29·809	58	46	66·5	45·5	NW	0·	
25	29·762	29·538	70	49	97·0	46·5	NW	2·86	0·05
26	29·427	29·354	67	52	92·0	49·0	N NW	13·02	
27	29·653	29·546	60	44	83·5	41·5	NW W	3·64	0·18
28	29·795	29·708	63	46	85·0	40·5	NW	0·	0·08
29	29·608	29·544	57	42	82·0	36·5	NW SW	·52	0·05
30	29·876	29·720	49	42	65·0	35·5	NW SW S	2.86	
31	30·120	30·064	60	40	90·0	34·0	NW SW	0·	
Monthly mean	29.932		54.20		86.05	44.06	Total force	55·69	1·82

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 Guage. 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 :—

5th. First Dutch medlar ripe.
11th. Coronilla glanca commencing to flower.
18th. Ailanthus glandulosa leaves all shed.
25th. Diosma alba commencing to flower.
29th. Photinia serrulata commencing to flower.

Barometer mean, 29·932in., being 0·104in. above the average.
Temperature mean, 54·20°, being 3·69° above the ditto.
Solar intensity mean, 86·05°, being 5·05° above the ditto.
Dew point mean, 48·1°, being 4·63° above the ditto.
Humidity of air mean, 81, being 03 per cent. above the ditto.
Elastic force of vapor mean, 342, being 033 per cent. ditto.
Total amount of rain, 1·82in., being 0·03 below the ditto.
Increase of rainfall on spontaneous evaporation.
Mean amount of ozone, 6·87, being 0·38 of chromatic scale above ditto.
Electricity feeble throughout, 0·43.
Weather changeable. A large deposit of snow on Mount Wellington on the 30th.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR MAY, 1866, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

Never before during the twenty-five years that exact and continuous meteorological records have been kept was there so warm a May as the present month. Atmospheric pressure, too, was very high, calms very numerous, with great predominance of winds from the quarter least favorable to health, excessive daily ranges of temperature, unusually hot sun, warm terrestrial radiations, great elastic-force of vapour, and very peculiar electrical conditions. At this season of the year all the pnenomena alluded to were more or less adverse to health and life. On the other hand, an average fall of rain, a slight excess of atmospheric humidity, with ozone above the average, to some extent counteracted the inimical phenomena, so that the mortuary return is not much above the mean of the previous nine years for the month of May. May and November have been always, on the average, the healthiest months in the year.

Atmospheric pressure mean was 29·932, being +·104 above the twenty years' adopted standard mean. The maximum was 30.389 on the 1st, the maximum 29·354 on the 26th, so that the extreme range in the month was 1·035 inches. The daily fluctuations were not excessive, the greatest range on any day being a fall of —·480 of an inch on the 18th, and the smallest a fall of —·013 of an inch on the 7th. The greatest rise was +·366 of an inch on the 20th. Altogether movements exceeding one-fifth of an inch were noted only on ten days, and the maximum almost the same.

Wind force, 55·69 lbs, was +·5 12 above the May average of the previous nine years, yet the calms (43) were +3·75 above the average. Up to the 18th, the wind pressure never exceeded ·52 of a lb. pressure to the square foot, and 26 calms were recorded. Strong winds from the south-west on the 18th and 19th, with equally strong north-west winds (a sort of abortive hot wind), on the 25th, 26th, and 27th, raised the average greatly beyond what the general character of the month would have made it. North-north-east and west were all below the average both in frequency and force, south was below the average in number but above it in strength, east and south-east were slightly in excess, both in frequency and force, south-west winds though only slightly more numerous than the average were +17·13 lbs. above it in force, while north-west with an excess of force of only +3·49 lbs, had no less than 51 in number out of the 93 records, being +22 more than the average. On six days in the month not a breath of wind was noted at the three hours of observation.

Temperature mean was 54·20 degrees, being +3·69 degrees above the 20 years' standard mean, and +4·25 warmer than May 1865 was. No year of the last 25 had so warm a May. The year next to it in warmth was 1856, when the mean attained was 53·03 degrees. All the Mays of the last twelve years, it is worthy of note, have much exceeded in their means, those of the previous fourteen years, the former having a mean of 51·86, the latter only 49·20 degrees. By the self-registering thermometers the mean was 55·03 degrees, the two sets of instruments approaching more nearly to the same result than usual. The highest temperature recorded was 75 degrees on the 7th and 8th, and the lowest was 39 on the 17th. The mean of all the maxima or high-day records was 63 71 degrees, being nearly one degree more than 1865 had. The mean of all the minima, or low night records, was 46·35 degrees, which is +3·83 above May, 1865. It thus appears that it was principally by warmer nights, that the mean heat of the present month, so much exceeded that of the corresponding month of 1865.

Daily range of temperature mean, 17.35 degrees, was +2.05 degrees higher than the 20 years' mean, though 2.59 less than May, 1865 had. The greatest range on any day was 31 degrees, on the 7th; and the least 3, on the 19th.

The *Solar-thermometer* gave a mean of 86.05 degrees, being +4.18 degrees above the mean of the previous 10 years, and +1.76 above May, 1865. The maximum was 105 degrees, on the 7th, being one degree higher than last year, but five more than was ever before recorded in the month of May; the minimum record was 56 degrees, on the 19th.

Terrestrial-radiation mean, 44.06 degrees, is much higher than any May of the previous 10 years, and +4.76 degrees above the mean of the whole. 1865 had a mean- 5 50 degrees below that of the present month. The maximum was 52.5 degrees, on the 10th ; the minimum 34 degrees, on the 31st. For 1865 the extremes were 49 and 30.5 degrees.

Rain was recorded on 10 days, being —4.11 days below the average of the previous 11 years, and 4 less than 1865 had. At the same time the amount precipitated, 1.82 inches, was only —.03 below the 20 years' average for May. It therefore fell in larger quantities in a smaller time than usual. It was very heavy indeed on the 18th and 19th, the guage giving 1.25 inches by Mr. Abbott's observatory record, but 1.90 inches by mine. The rain-fall at my residence for the whole month exceeded the observatory amount by more than half an inch. The same showers at their edges and centre will often give very discrepant results in the amount of rain deposited. Of course, moreover, showers are often very circumscribed in their area of precipitation. In the first nine days of the month no rain whatever was recorded.

On the 30th there was a large deposit of *Snow* on Mount Wellington, which was still abundant on the following day.

Spontaneous evaporation amounted to only 1·39 inches being much less than rain-fall, and ·24 of an inch less than May 1864 had.

Humidity mean was 81, being +2 more than the 20 years' average, and the same above 1865.

Elastic force of vapor had the mean of 342, being +33 higher than the 20 years' mean, and +59 more than last year. The range was from 200·7 to 406·7.

Cloud mean was 6·40 being +70 higher than the 20 years' avearge, but 0·7 less than 1865. It is remarkable that with so much cloudy weather, that sunshine should have given so much higher a mean than usual, and indicates how very hot the sun was when it was shining at all.

Ozone mean was 6 87 being 1·31 less than 1865 had, though +.30 more than the average of the previous 9 years. The maximum 10, was only recorded twice, but the metre never gave less than 5 of Schonbein's chromatic scale.

The electrometer gave very unusual results this month. There were only 3 positive indications noted at the evening observation of the 26th, and both observations on the succeeding day. The maximum tension was only 4. In May, 1865, there were 16 positive, with maximum tension of 6.

Negative indications were 41, being the same in number as last year, but of less tension. The range being 0·5 minimum, to 4 maximum. Last year's maximum was 5.

Nils were 17, last year had only 5. It is remarkable that for many days together no electricity was indicated; as for instance from the evening observation of the 9th to the morning observation of the 13th, both included ; and again at the morning of the 16th, and both daily observations on the 17th and 18th.

The *deaths* this month were 43, which is + 2 8-9 more than the average of the preceding nine years' Mays. Last year's had the same in number, but differed considerably as to the causes of death, and in a slighter degree also varied as to the age at death. Five years out of the nine, had a much smaller mortality than the present year, and only 1864 and 1866 had a greater amount.

May, 1866.	Ages.	April, 1866.	Mays.									Avg. 9 yrs. Mays. 1857–1865.
			1865	1864	1863	1862	Max61	1860	Min.59	1858	1857	
5	Under 1	8	5	9	4	7	12	9	7	12	8	8 1-9
5	1 to 5	7	2	6	6	2	16	4	5	7	7	6 1-9
3	5 to 20	2	4	2	3	3	9	1	1	2	1	2 8-9
7	20 to 45	8	8	11	11	12	5	13	7	7	10	9 3-9
11	45 to 60	6	12	12	3	8	3	8	5	10	7	7 5-9
12	60 and above	14	12	8	8	4	5	4	4	5	5	6 1-9
43		45	43	48	35	36	50	39	29	43	38	40 1-9

"Under 1 year old" the deaths were considerably below the nine years' average, but exactly the same numerically, as in 1865. At "1 to 5" the mortality was also less than the average, though more than twice as many as last year. At "5 to 20" the average was exceeded by a fraction, though one less than in May. last year. At "20" to "45" the deaths were below the nineyears' average rate, and even one less than in 1865. At "45 to 60," many more than the average rate of deaths occurred, though still one less than May 1865 had. At "60 and all ages above," the deaths were nearly double the average, and exactly the same in number as in 1865. The abnormal weather of the present month, therefore, has been most fatal to persons past the meridian of life, while the deaths of children, under five years old, have been much less than the average.

May, 1866.	Classes of Disease	April, 1866.	Mays.									Avg. of 9 yrs. Mays '57-'65.
			1865	1864	1863	1862	Max.'61	1860	Min.'59	1858	1857	
7	1. Zymotic	8	1	7	6	3	23	9	2	8	7	7 3-9
11	2. Constitutional	6	12	12	6	11	7	8	9	2	3	7 7-9
16	3. Local	23	21	24	16	13	14	18	13	25	21	18 3-9
6	4. Developmental	3	3	4	4	3	4	3	2	4	2	3 2-9
3	5. Violent &c.	5	6	1	3	6	2	1	3	4	5	3 4-9
43		45	43	48	35	36	50	39	29	43	38	40 1-9

In the 1st, or *Zymotic class of diseases*, the deaths were slightly below the average, though very much more numerous than in 1865. All but two were from *bowel affections*, in children under two years old. It is very rarely that this summer-disease extends its ravages to the month of May, but the unusual warmth of the month indicates the cause.

The 2nd, or *Constitutional class of diseases*, had many more deaths than the nine years' average. One was from *cancer*, three from diseases of a *scrofulous* character, and seven from *Consumption*, none of whom were born in Tasmania. Last year, out of the total of 8 from consumption, two were Tasmanians by birth.

In the 3rd, or *Local class of diseases*, the deaths were less than the nine years' average, and nearly one-third less than last year. The 1st order of this class, *diseases of the brain and nervous system*, had only three deaths, while May 1865 had double the number. The 2nd order, *diseases of the heart and organs of circulation*, had four deaths, being one less than last year. The 3rd order, *diseases of the lungs and organs of respiration* had but three deaths, May 1865 had one more.

The 4th order, *diseases of the stomach and organs of digestion*, had four deaths, the same in nnmber as in 1865.

The 5th order, *diseases of the urinary organs*, had two deaths. 1865 had only one. The 7th order had a death last year, but none this.

The 4th, or *developmental class of diseases*, had six deaths (nearly double the average), all but one from old age, at ages ranging from 69 to 79. The other death was a woman aged 37, from puerperal causes. Last year this class had only half the number of deaths.

The 5th class, or *violent and accidental deaths* had three, being a little less than the average. One was injured in the chest by the *upsetting of a vehicle*, one died from *burns*, one was *drowned*. Last year had twice as many deaths in this class.

Inquests this month were 5; last year had 7. In the *Hospital* the deaths were 11, including one of the inquest cases; 1865 had 18. Four of the Hospital deaths this month were admissions from other districts. At the *Brickfields Male Invalid Asylum* only two deaths occurred, aged respectively 61 and 75. Last year had 5. Of the 43 total deaths, 25 were males, 18 females. Three died in the Glenorchy, and the same number in the Queenborough divisions of the Registration District, the rest in the city. On seven days of the month there were no deaths, though only two of the days, the 30th and 31st, were consecutive. In the first week of the month, there died 11; in the second, 7; in the third, 7; in the fourth, 14; in the last three days, 4. The greatest number of deaths on any three consecutive days was 8; from 22nd to 24th, and again from 27th to 29th. The most fatal period of the month was, from the 23rd to the 29th inclusive, when 16 deaths took place in seven days.

The *births* registered were 55, being 18 less than in May, 1865.

ROYAL SOCIETY.

JUNE, 1866.

The monthly evening meeting of the Fellows was held on Tuesday, the 12th June. F. Abbott, Esq., in the chair.

The following gentlemen (who had been previously nominated by the Council) were, after a ballot, declared to be duly elected as Fellows of the Society:—C. B. Wilkinson, Esq., E. Swan, Esq., and J. C. Mace, Esq.

The usual monthly returns were laid on the table, viz.:—

1. Visitors to Museum during May, 457.
2. Ditto to Gardens, 1342.
3. Plants, &c., received at Gardens:—
   a. From M. Allport, Esq., seeds of White Waterlily *(Nymphœa alba:)*
   b. From T. Paterson, Esq., Sydney, 9 varieties Pelargonium cuttings, 7 papers seeds, and 14 plants.
4. Plants, &c., sent from the Society's Gardens, by the Victoria, to the Melbourne Botanic Gardens, 289 plants, 100 papers of seeds, and 9 varieties of forest seeds.
5. Time of leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
6. Books and periodicals received.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.
   a. Table for May.
   b. Summary of observations for ditto.
2. Port Arthur, from J. Boyd, Esq.
   a. Table for April, and reading of Government schooner's barometer.
   b. Ditto for May, and ditto, ditto.
3. Westbury, from F. Belstead, Esq.
   a. Table for May.
4. Swansea, from Dr. Story.
   a. Table for April.

The SECRETARY read the usual analysis of the Observatory Records and Health Report for the past month, by E. S. Hall, Esq.

Dr. HALL observed that his remarks relative to the difference in the amount of rainfall at various places were borne out by the returns before the meeting.

The amount recorded for May at Port Arthur was 3·86in.; at Westbury for the same month, 3·64in.; while at Hobart Town it was only 1·82in.

Mr. ABBOTT observed that as an almost invariable rule the observations showed a much higher rainfall at Circular Head and Port Arthur than at any other locality, and he was certain were stations established on the West Coast generally, that there also the rainfall would be found to be very great.

The presentations were as follows:—

1. From the Rev. Dr. Nicolson, a collection of native dresses, weapons, &c., from Samoa, viz.,—A native dress, five pieces native cloth, a model of a canoe, a "killing stone," a hair fishing-line, and six specimens coral.
2. From W. Elliston, Esq.,a recent specimen of the Shoveller Duck (*Spatula rhynchotis*).
3. From Mrs. Wear, a Canary, stuffed and mounted.
4. From H. Hopkins, jun., Esq., an Australian Boomerang.
5. From W. P. Latham, Esq., Hamilton, a Crow, (*Corvus coronoides*) curiously marked.
6. From T. J. Falls, Esq., specimen of Pipe Fish (*Sygnathus sp.*)

7. From M. Allport, Esq., eighteen specimens of Tasmanian Unio (fresh water mussel).

8. From F. Abbott, Esq., a collection of Old Newspapers, viz. :—

"Some questions on Arbitration in Exchange," 1523.

"The Case of John Hussey, of Cambridge," 1698.

The Observator, June, 1702, to September, 1723.

"Address of the Lords Spiritual and Temporal," 1707.

"Lord Haversham's Speech," 1707.

The British Apollo, during 1708.

The British Mercury, 1711.

The Daily Courant, 1711.

"Mercator, or Commerce Retrieved," 1712, edited by Defoe. First newspaper stamped for Revenue.

The Flying Post, or *Post-Master*, 1712, edited by Defoe.

The British Merchant, 1713 and 1714.

The Medley, 1715. Stamped.

The London Journal, 1721 and 1722.

The Weekly Journal, or *British Gazetteer*, 1722-3.

The British Journal, 1723.

"On the loss of Sir Cloudesly Shovel." No date.

"Verses spoken at Cambridge." No date.

"His Majesty's Speech to both Houses of Parliament," 1730-1-2.

"Proposals of Agreement between the South Sea Company and the Bank of England."

"Copy of that Clause in the Last Charter granted to the City of Norwich by Charles the 2nd, relating to the choice of an Alderman."

And several other papers without date.

Mr. ABBOTT read some notes on the papers presented by him, showing the importance of preserving these old files of newspapers, as they were frequently found to be very valuable for reference. Among them were two ("Mercator, or Commerce Retrieved," 1712, and *The Flying Post*, or *Post-Master*, 1712) of considerable interest, from their being edited by Defoe. Mr. Abbott also read a list (from "Notes and Queries") of scarce publications enumerated in the Harleian catalogue at the British Museum, and not found elsewhere.

Votes of thanks having been accorded to Mr. Abbott, and to the donors of the various presentations, the meeting broke up.

METEOROLOGY FOR JUNE, 1866.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced — Highest.	Bar. — Lowest.	Self-registering Thermometers — Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind — Direction from three daily registers.	Wind — Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	30·166	30·037	60	36	90·5	32·0	W NW	1.04	
2	30·015	29·966	67	46	91·0	41·0	NW	·52	
3	29·825	29·690	58	43	60·5	42·5	NW SW S	5·73	0·22
4	29·993	29·493	56	40	60·0	33·0	N NW W	5·47	0·03
5	29·709	29·545	63	53	77·0	51·5	NW W	3·64	
6	29·690	29·643	61	48	72·0	44·0	NW	.52	0·10
7	29·606	29·275	60	42	93·0	38·5	W NW	5·20	
8	29·359	29·209	60	41	68·5	40·0	NW W SW	10·94	0·75
9	30·385	30·244	49	38	76·0	32·0	SW W	·52	0·13
10	30·541	30·519	59	34	84·5	32·5	NW	0·	
11	30·665	30·610	53	29	64·0	29·5	W NW	·52	
12	30·689	30·562	54	33	68·5	30·5	W NW	·52	
13	30·549	30·452	51	30	77·0	28·5	NW W	1·30	
14	30·424	30·368	61	31	85·0	30·0	NW N E	·26	
15	30·200	29·934	55	45	57·5	39·0	NE NW	0·	0·05
16	29·668	29·523	56	46	56·0	44·0	NW W	·26	
17	29·800	29·448	54	43	76·5	41·0	W NW W	10·41	0·24
18	30·187	30·042	64	47	77·0	38·5	NW N	·78	0·01
19	30·355	30·267	66	41	89·0	36·0	W N NE	·26	
20	30·214	30·090	59	38	79·0	36·0	NW	·52	
21	30·391	30·263	55	39	81·0	34·0	NW SW	·52	
22	30·452	30·354	57	32	82·5	28·5	W NW	·52	
23	30·170	29·934	52	34	70·5	32·0	NW	1·04	
24	29·916	29·850	58	36	85·0	32·0	N NW W	2·86	
25	29·672	29·534	56	36	81·5	33·5	NW	·78	0·07
26	30 267	29·296	51	39	76·5	36·0	W SE	5·20	0·13
27	29·454	29·435	50	34	64·0	33·5	NW W SW	10·41	0·06
28	29·682	29·598	63	43	88·0	43·0	NW SW	2·86	0·07
29	29·974	29·950	53	41	70·0	37·0	N NW	5·72	
30	29·984	29·969	57	49	75·0	46·0	NW N NW	·52	
Monthly mean	29.977		48.83		75·87	36·52	Total force	78·84	1·86

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 Guage. 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 :—

7th. Maclaura aurantiaca leaves commencing to fall, First early Narcissus open.
10th. Privet leaves shedding.
26th. Snowflake commencing to open.
28th. Pyrus Japonica commencing to flower.
30th. Leaves of black mulberry shed.

Barometer mean, 29·977in., being 0·111in. above the average.
Temperature mean, 48·83°, being 1·70° above the ditto.
Solar intensity mean, 75·87°, being 1·13° below the ditto.
Dew point mean, 41·7°, being 0·51° below the ditto.
Humidity of air mean, 77·0, being 6½ per cent. below the ditto.
Elastic force of vapor mean, ·266, being 008 per cent. below ditto.
Total amount of rain, 1·86in., being 0·03 below the ditto.
Increase of spontaneous evaporation on rainfall 0·36in.
Mean amount of ozone, 7·05, being 1·14 of chromatic scale above ditto.
A great paucity of electricity all through the month.
Snow on Mount Wellington through the month, with frequent fresh deposits on the mountain and low hills.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR JUNE, 1866, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

The very abnormal meteorological phenomena of the present June were attended with a very great mortality of aged people, one half of the total number of deaths being at ages ranging from 60 to 89 years. No year's June on record had anything near so large a proportion of senile deaths. On the other hand, 24 deaths at all ages below 60, is 13 5·9 less than the nine years' average for the same groups. Only 1865 had a smaller number than the present month, *i.e.* 20.

Atmospheric pressure, maximum, 30.689, occurred on the 12th, and is the highest ever recorded in the month of June for the last 26 years. The minimum, 29·208, was registered on the 8th. Many Junes have had a lower minimum. The month's range, 1·480 inches, occurring within four days, was only exceeded in June, 1851, when it amounted to 1.639 inches. The daily fluctuations were very great. The maximum rise of the barometer happened on the 9th, + 1·136 inches, being the greatest on record in the month of June. The largest fall was almost half an inch,—496, and noted on the 16th. Besides these, there were eleven other days on which the perturbations of the mercurial column exceeded one-fifth of an inch. The mean pressure for the month was 29·977, which is + ·110 above the 20 years' mean of the adopted standard. Nevertheless, the three previous years' Junes had all higher means, as also had 1859, 1858, 1852. Such a condition of atmospheric pressure, as above depicted, is always extensively fatal to old and debilitated persons, while the young and healthy endure it with impunity.

Wind-force greatly exceeded anything ever before recorded for this usually calm month, 78·84lbs. which is + 54·34lbs. above the average of the previous nine years, and more than twice the amount of the highest of them, 1857, which had a total of only 37·28 lbs. *Calms* were noted at 31 of the 90 observations, but the nine years' average for June is somewhat above 46. The strongest winds had a pressure of 5·21 lbs. to the square foot, and were registered 6 times. *South-west, west,* and *north-west,* were all greatly above the average both in frequency and force; while all the other five points of the compass were below in both respects, excepting a trifling excess in frequency only with *north-east* winds. So much aerial movement, mostly well charged with ozone, was highly conducive to atmospheric purity, and utterly banished zymotic or fermenting diseases, but proved injurious from its stimulating effects on the organs of respiration, and thereby creating catarrhal affections from which few persons escaped. Similar attacks were prevalent, from the same cause, in June 1864 and 1863. With the influenza, however, which was so destructive to old and weakly persons in July 1860, causing the enormous number of 114 total deaths in that month, 49 being above 60 years old, the meteorological phenomena were very different;—steady high atmospheric pressure, 57 calms out of 93 observations, total wind-force of no more than 10·14 lbs., of which, 7·28 lbs. was from north-west winds; temperature much more above the mean, a much smaller rain-fall, and ozone much below the average. The influenza is a disease of the asthenic type, while the catarrh of the present and other months was sthenic.

Temperature mean was 48.83 degrees, being + 1.70 above the 20 years' average. The mean of all the maxima and minima of the self-registering thermometers was actually less than the former, being only 48.55 degrees. This is an unprecedented occurrence. The mean of all the maxima, or high-day temperatures, was only 57.53 degrees, while in June, 1865, it was 61.60, though its month's mean was —·39 of a degree below the present month. The minima, or low-night mean, was 39.57 degrees, 1865 being 39.33 degrees. Yet in the present month there was so low a minimum as 29 degrees on the 11th, while 1865 had only the minimum of 32. The maximum temperature was recorded for the 7th, being 68 degrees, while in 1865 it was 72.

Daily range of temperature mean, was 17·10 degrees, being + 1·80 more than the 20 years' average, though—5·17 degrees less than June 1865 had. This gives pretty strong proof that mere variations of temperature did not cause the prevailing catarrh, notwithstanding the popular idea of taking cold from such a cause, for this disease did not exist last year, and the deaths from diseases of the respiratory organs were less than usual. The greatest range on any day of the present month was 30 degrees on the 14th, and the smallest range was 8 on the 30th; last year the extremes were only 28 and 15.

The Solar-thermometer had a mean of 75·87 degrees, which is + 3·9 above the average of the previous ten years, but —3·11 degrees less than June 1865 had. The maximum was 93 on the 7th, the minimum 56 on the 16th. In 1865 the extremes were 94 and 59.

Terrestial-Radiation mean, was 36·52 degrees being—·11 of a degree less than the average of the previous ten years, but + ·87 of a degree more than 1865 had. The extremes were 51·5 on the 5th and 28.5 on the 13th and 22nd. The maximum being 4 degrees more than in 1865, but the minimum the same.

Rain-fall, in the aggregate, amounted to 1·86 inches, being – ·03 only below the 20 years' mean, and just the same more than the mean of the last 25 years. 1865 had not so much by .66 of an inch. It fell on 12 days, being + ·36 above the average of the previous 11 years. It was pretty equally distributed through the month. The largest deposit ·75 of an inch, took place on the 8th, and thoroughly scoured the drainage channels; ·24 of an inch fell on the 17th, and made the channels run briskly; on the 3rd there was guaged ·22 of an inch which cleansed the surface drains. *Snow* appeared on Mount Wellington every day during the month except the 7th. On the 9th all the low hills about the city were mantled with snow, and again on the 27th.

Spontaneous evaporation was considerably more than rainfall as might be expected from the unusually windy character of the month. The amount was 2·22 inches, being nearly an inch more than in 1865.

Elastic-force of vapor had a mean of 266, which is —8 less than the 20 years' average; the range was from 160 minimum on the 22nd, to 403 maximum on the 15th and 18th.

Humidity mean 77, was the same as in 1865, but—6½ less than the 20 years' average.

Cloud mean was 5·52, or almost identical with the 20 years' average, differing only by an excess above it of + ·03.

Ozone mean 7·05 was + ·51 above the average of the previous nine years, though—1.18 less than 1865 had. The maximum was 10 (saturation) on the 9th. The minimum was 5 several times between the 12th and 19th, which had altogether an average of one degree less than that of the whole month. This was the least fatal period of the month.

Electricity, positive had not a single record, which I think is without parallel. June, 1865, had 1 8. There were 53 negatives, with maximum tension of 4·5, and minimum of—·05. "Nil" was registered 7 times, 5 of them recorded on the 15th, 16th, and 17th. On the first day calm was registered at every observation, on the second, twice out of the three, but the last day had strong winds.

48 deaths for the present month is + 2 5-9 above the June average of the previous nine years. Three of the nine had a greater number, two exactly the same, and four less.

June, 1866	Ages.	May, 1866	Junes. 1865	1864	1863	1862	1861	1860	1859	1858	1857	Avg. 9 yrs. Junes. 1857–1865.
5	Under 1	5	7	14	6	10	9	12	11	7	9	9 4-9
1	1 to 5	5	2	10	6	3	20	5	5	8	8	7 4-9
1	5 to 20	3	4	4	3	5	4	0	4	3	2	3 2-9
10	20 to 45	7	4	7	9	14	14	11	14	15	8	10 6-9
7	45 to 60	11	3	9	10	11	5	3	9	9	2	6 7-9
24	60 and above	12	12	10	14	10	7	5	5	5	3	7 8-9
48		43	32	54	48	53	59	36	48	47	32	45 4-9

"Under 1 year old" the deaths were little more than half of the June average of the previous nine years. They were also less than any year of the nine. At "1 to 5 years of age," never were the deaths so few, the average being nearly eight times as many. At "5 to 20" the mortality was less than one-third of the average, June 1865 had four times as many as the present month, and only June 1860 had less. Of the 7 deaths at all ages under 20 years old, 3 were under 5 weeks old, no year of the previous nine had so few, the average being above 20 deaths, the range being from 13 in June 1865, to 33 in 1861. Therefore, notwithstanding the abnormal character of the weather in the present month, it was by far the most favorable to life, for young persons, of any previous June. "At 20 to 45" the deaths were slighly below the average, though many more than the Junes of 1865 and 1864 had. However, the present month had at all ages below 45, less considerably of deaths than any of the previous nine years, except the last when it was numerically the same. At "45 to 60" the deaths were a trifle above the average, but more than twice as numerous as in 1865. At "ages above 60" the deaths were more than three times as many as the nine years' average, exactly twice as many as in 1865, and largely above any year of the nine. Of the 24 deaths in this group 5 were between 60 and 70; 5 in the next decade; 7 in the next; one each in the following two; and 5 between 80 and 90; the oldest being a man aged 89 years, who died at the Invalid Asylum at the Brickfields.

June, 1866.	Classes of Disease	May, 1866.	Junes.									Avg. of 9 yrs. Junes '57-'65.
			1865	1864	1863	1862	1861	1860	1859	1858	1857	
1	1. Zymotic	7	2	5	4	9	23	2	11	8	9	8 1-9
7	2. Constitutional	11	3	6	5	8	7	9	10	10	3	6 7-9
33	3. Local	16	19	33	29	26	25	20	21	17	14	22 6-9
6	4. Developmental	6	6	6	8	4	3	4	6	7	4	5 3-9
1	5. Violent &c.	3	2	4	2	6	1	1	0	5	2	2 5-9
48		43	32	54	48	53	59	36	48	47	32	45 4-9

In the first, or "*Zymotic Class of Diseases,*" there was only one death. 1865 had 2, and the nine years' average is more than eight times as many. It is certain, therefore, that the atmosphere this month contained no poisonous elements, but as the meteorological analysis states was excessively pure.

The second, *Consitutional Class of Diseases*, had a trifle more than the average death rate, and more than twice the number that 1865 had. Three of the 7 were *cancerous affections*, and the three others *consumption*, two of them born in Tasmania—one of them, however, did not belong to the Hobarton registration district, but was brought to hospital from a country district on the other side of the Derwent.

The third, or *Local Class of Diseases*, greatly exceeded the average in its number of deaths. 1865 had little more than half the number, though 1864 had exactly the same. The 1st order of this class, *Diseases of the Brain and Nervous System*, had nine deaths, being three more than in June last year. The second order, *Diseases of the Heart and Organs of Circulation*, had three deaths, being one less than in 1865. The third order, *Diseases of the Lungs and Organs of Respiration*, had 15 deaths. 1865 had only 4. In 1864 and 1863, however, when catarrh prevailed so much, the deaths were respectively 14 and 16. On the other hand when influenza prevailed in July, 1860, there were 51 deaths. A reference to my remarks on those occasions, will show the difference between these two affections, in each of which the air passages seem to be so similarly deranged. In the fourth order, *Diseases of the Stomach and Organs of Digestion*, there were 3 deaths, 1865 having only had one. The 5th order, *Diseases of the Urinary Organs* had one death, while 1865 had 4. The sixth order, *Diseases of the Bones, Joints*, &c., had 2 deaths, while 1865 had not any all from old age, respectively 66, 70, 86, 87, 87, 89 years old. 1865 had only 4 from old age, though 6 altogether in this class.

The 4th or *Developmental class of Diseases*, had 6 deaths.

The 5th, or *Violent and Accidental class of Diseases*, had 1 death, in a child 13 days after birth, from *umbilical hæmorrhage*. Why an inquest was held I do not know. There were 2 deaths in this class in 1865.

The *Inquests* were three. The first on a man of 72, whose death arose from *acute inflammation of the lungs*; the second on a man aged only 25, from *apoplexy*; the third on a man aged 69, from *apoplexy*, caused by excessive drinking. There were only 2 inquests in June, 1865. The deaths in *Hospital* were 14, of whom 5 were admitted from rural districts. 1865 had only 8deaths. At the *Male Asylum for Invalids*, there were the unusually large number of 10 deaths, aged respectively 40, 61, 66, 70, 71, 72, 75, 85, 87, 89. Only two, however, were from diseases of the organs of respiration, and said to have had no connection with the prevailing catarrh, *i.e.*, one from *consumption*, the other from *chronic-bronchitis*. June, 1865 had only half the number of deaths in this institution. The movement in London for the improvement of the treatment of the sick poor in the workhouses, is worthy of the special attention of the Board of Management of this Pauper Establishment. Of the 48 deaths, 3 died in the Glenorchy division of the district, the rest in the city. 30 were males, 18 females.

In the first week of the month there died 14; in the second, 6; in the third, 8; in the fourth, 17; in the last two days, 3. On eight days of the month there was not a single death. Four of these days were consecutive, *i.e.*, the 12th, 13th, 14th, 15th. From the 12th to the 19th was the least fatal period of the month, only four deaths having occurred in the eight days. The barometer fluctuated very much both in rises and falls, and so also did temperature, elastic-force of vapor was at its maximum, Ozone *below* the month's average, and a greater absence of electricity than during any other similar period in the month. The most fatal period in the month was in the four days, 22nd to 25th, inclusive, when the deaths were 14; no other four days had more than 9, *i.e.*,—1st to 4th. From the 7 a.m. observation on the 22nd to the sunset observation of the 25th, atmospheric pressure fell ·918 of an inch that is from the very high pressure of 30·452 to 29·354.

The *births* registered in the month were 73, being 5 less than in 1865.

ROYAL SOCIETY.

JULY, 1866.

The monthly evening meeting of the Fellows was held on Tuesday, the 10th July, T. Giblin, Esq , in the chair.

W. J. B. Jenner, Esq., who had been previously nominated by the Council, was, after a ballot, declared to be duly elected a Fellow of the Society.

The following returns were laid on the table :—

1. Visitors to Museum during June 510.
2. Ditto to Gardens ditto 796.
3. Tench supplied ditto 27
4. Time of leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
5. Plants and seeds sent from Gardens during June :—
   a. To Mr. Patterson, Sydney, N.S.W., 25 plants.
   b. To S. Hannaford, Esq., Launceston, 500 white mulberry plants for Public Gardens.
   c. To Colonel Chesney, for Macquarie-street entrance to Queen's Park, 63 trees, shrubs, &c.
   d. To E. M. Lloyd, Esq., R. E., 10 oaks for Military Barracks.
   e. To W. R. Falconer, Esq., for decoration of public places in Hobart Town and Launceston, 116 plants, and two varieties of bulbs.
   f. For the grounds of the Queen's Orphan Asylum, 119 plants.
   g. To A. Verschaffelt, Ghent, Belgium, 3 large tree ferns.
6. Plants and seeds received at Gardens :—
   a. From A. Verschaffelt, Ghent, 32 plants of which 18 were dead on arrival.
   b. From Dr. Mueller, Melbourne Botanic Gordens,—tree and shrub seeds, 164 papers; Herbaceous and Annual, 675 ditto; Grass, Wheat, Oats, Maize, Gourds, and Ricinus, 335 ditto; Palm, 2 ditto. Total varieties of Seeds 1,178, of Plants 185.

As to this large and valuable presentation from Dr. Mueller, the SECRETARY read the following letter from Archdeacon Davies :—

"I enclose a list of plants, which have been forwarded by Dr. Mueller, to the Royal Society's Gardens. Another case, if not already received, will arrive by the next Southern Cross. Dr. Mueller has also promised a very large supply of Fir Trees, for the new Cemetery, and he offered me, or through myself, 500 Tea Trees to any person who will take the trouble of preparing a suitable piece of ground to plant them in. Under these circumstances, I think some acknowledgment is due to Dr. Mueller more than the usual receipt for plants received."

The following memorandum, attached to his usual monthly return by Mr. F. Abbott, Superintendent of the Gardens, was also read :—"With reference to Dr. Mueller's splendid donation, I think the thanks of the Society are due to that gentleman for his liberality, not only on the present occasion but on many previous ones. In the present collection, which consists of 185 Plants and 1,178 papers of Seeds, although there are some more of botanical interest than otherwise, there are many useful and ornamental varieties."

Mr. M. ALLPORT then moved that a special vote of thanks should be given to Dr. Mueller, and he had the greatest pleasure in doing so, not only for the splendid and valuable donation, for which the Society had become indebted, but for the extreme attention Dr. Mueller had invariably shown when application had been made to him for information on any subject connected with horticulture or botany. On all such occasions we were certain of receiving a most prompt and courteous reply.

Mr. JOHNSTON seconded.

The CHAIRMAN was glad that such notice had been taken, not only of this magnificent presentation, but of the great courtesy which we had invariably experienced in our communications with Dr. Mueller, who, he might further remark, had also promised to furnish us at all times to the utmost of his ability with any shrubs and plants (not being in our own collection) which we might wish to procure for our gardens, or other places of public resort.

The motion was carried unanimously, and the Secretary was requested to transmit a copy of it to Dr. Mueller.

Meteorological Returns :—

1. Hobart Town, from F. Abbott, Esq.
   a. Table for June.
   b. Summary and analysis of observations for ditto.
2. Port Arthur, from J. Boyd, Esq.
   a. Table for June.
   b. Reading of Government's schooner's barometer for ditto.
3. Tamar Heads, from R. Henry, Esq.
   Tables for May and June.
4. Westbury, from F. Belstead, Esq
   Table for June.
5. Ross, from M. Duncanson, Esq.
   Tables for March, April, and May.

The following remarks by E. S. Hall, Esq., on the meteorology of the month were read :—

"The deaths during last month are not yet all registered, therefore I have not been able to complete my tables, and consequently cannot send my usual monthly report. The deaths registered, however, considerably exceed the June average of the previous nine years. There were only six children died under five years old, while the deaths at all ages above 60 were 24.

"Atmospheric pressure attained the highest maximum ever recorded, and the month range was only exceeded once in the last 25 years—*i. e.*, in June 1851. Never before was there so windy a June. The highest previously had little more than one-third of this year's. Temperature was above the average, with a daily range above the 20 years' mean. Rainfall was within a trifle of the 20 years' mean; cloud the same. Ozone was more abundant than in any June recorded, except last year's. Catarrhal affections have been almost universal. Many persons call it influenza, and imagine the visitation to be the same, and as severe as in 1861. The atmospheric peculiarities of the two periods were quite distinct, and 1861 almost the reverse of what 1866 has had. It is remarkable that in June this year there is not a single record of 'positive electricity.'"

The following presentations to the Museum were brought under the notice of the meeting :—

1. From J. Maclanachan, Esq. A hen Golden Pheasant.
2. From Mr. Willing. A bittern (*Botaurus Australis*).
3. From M. Allport, Esq. Specimens of *Echidua setosa,* and Platypus (*Ornithorynchus anatinus*).
4. From F. Sharland, Esq. A Nankeen Night Heron (*Nycticorax Caledonicus*).
5. From W. Johnston, Esq. A limestone fossil (cast of Pecten), from Huon Road.
6. From Mr. R. Wood. Five do do.
7. From F. Cox, Esq. Specimen of iron ore from Brighton.
8. From H. M. Hull, Esq. Specimens of Tasmanian shells.
9. From Mr. G. Smith, Old Beach. Head of fowl with malformed beak. (With a letter.)
10. From H.B. Tonkin, Esq., a seed from Queensland.
11. From Mr. Cummins, a 20 dollar Spanish note.
12. From His Excellency Colonel Gore Browne, a bottle of petroleum from New Zealand.
13. From Mr. Smith, specimens of granite and iron ore from River Forth.
14. From R. C. Read, Esq., Redlands, sample of charred grain, found on ploughing up a field which had not been under cultivation for 40 years. The form of the grain (barley) is perfectly preserved.

15. From C. B. Wilkinson, Esq., section of an Armstrong Segment Shell, with time and concussion fuse as fixed before firing.

Mr. M. ALLPORT read a "Report on the present state of the fry of the salmon and salmon trout at the Plenty, and of the taking of the first spawn from the brown trout."

After reading the paper, Mr. ALLPORT further remarked that of the first batch of the brown trout (now about two years old) there were still in the ponds probably two hundred; and it was noticed that the proportion of males to females was that of three of the former to one of the latter. In all cases of artificial fish-breeding at home—at least as regarded the genus Salmo—this proportion was found invariably to exist.

Mr. ALLPORT, sen., thought this ratio was perhaps a general one, and was probably intended to provide an excess of the milt, large portions of which were of course liable to be swept away by the streams or currents in which the spawning took place.

Dr. OFFICER was very happy in being able to confirm the statement in Mr. M. Allport's report as to the percentage of healthy-looking ova in the late shipment. Every individual present when the boxes were opened calculated that, at the very least, 40 per cent. of the ova were healthy, but no one could say how many of these were unimpregnated, or in how many the seeds of death already existed. The wonder was that we obtained so many living fish. Six thousand salmon promising to arrive at maturity constituted a great success. He thought great numbers of the ova had died very recently, and had the voyage been prolonged only a very few days he feared the mortality would have been so great as to have seriously imperilled the entire success of the experiment. From frequent visits to the ponds he could testify that everything which zeal and energy could accomplish had been done by Mr. Ramsbottom, and the general arrangements were now so perfect that he did not think any improvement could be made. The experiment has been the greatest, and the most promising as to its results of anything of the kind that had ever hitherto been accomplished, and the achievement was certain to obtain the greatest possible credit from the whole of the scientific world. For the valuable, lucid, and temperate paper just read, he thought our best thanks were due to the author, and he begged to move accordingly.

The motion was seconded by Mr. JOHNSTON, and carried unanimously.

Mr. M. ALLPORT returned thanks, and, in answer to a query, observed that Mr. Ramsbottom did not expect the salmon to return from the sea till fifteen months after they had reached it. In this opinion he quite concurred, although the belief in their return in a much shorter period was held by many men of the highest scientific repute at home. Mr. Ramsbottom's opinion, he might mention, had been considerably strengthened by a circumstance which had come under the observation of his brother. He (Mr. Ramsbottom's brother) was engaged in Ireland some time ago in stocking with salmon a river which previously contained none. On this river falls existed which prevented the fish coming up from the sea. He therefore placed ladders on these falls, and stocked the upper waters with the fish. In due time they were able to descend to the sea, and to return by means of the artificial assistance rendered to them; when it was found that the time of the return of the first fish was fifteen months from the date of the downward voyage.

Mr. F. ABBOTT read some notes on the "Abstract Tables of 25 years' Meteorological Observations taken at Hobart Town," recently presented by him to the Society, and a copy of which he laid before the meeting.

Discussion ensued, and a general opinion was expressed that these valuable returns should be printed for distribution with the least possible delay.

The SECRETARY mentioned that at the request of the Council he had written to Government on the subject. The Council were very anxious that the abstracts should have been in type before the time fixed for the Intercolonial Exhibition, where their importance could not fail to have been appreciated. He eared, however, that the Government printing-office would be so fully occupied during the session of parliament that there was not much probability of their being printed till after that period, except it was thought advisable that considerable expense for extra labor should be incurred.

Mr. ABBOTT thought they had a claim on the Government for the printing of these returns in time for the Intercolonial and Parisian Exhibitions. In most Governments expensive observatories were kept up, with highly salaried officials. Here all the meteorological observations were taken without any outlay whatever to the colony; and it was little to ask that a record involving so large an amount of care and trouble should be printed at public expense. He could vouch for the accuracy of the tables, and if, on their distribution over the world, they did nothing more, they would, at all events, show that no colony of Great Britain possesses a climate equal to that of Tasmania.

Mr. DAVIES, having heard what had fallen from Mr. Abbott and the previous speaker, thought the Society could do no less than record upon the minutes of their proceedings their sense of the patriotism and zeal exhibited by Mr. Abbott in the compilation of these valuable tables for scientific and public use, and moved that the thanks of the Society be given to Mr. Abbott accordingly.

Mr. JOHNSTON having seconded,

The CHAIRMAN, in putting the resolution, passed a flattering eulogium on Mr. Abbott, for the pains he had taken in the compilation of the records. He had no doubt they would soon be printed, when the public would reap the advantage of Mr. Abbott's valuable labors.

The motion having beeu unanimously carried,

Mr. Abbott in returning thanks hoped that his remarks about salaries, would not convey the impression that he wished for any remuneration for his trouble. No such idea had ever entered his mind. What little he had been able to do, was done from no mercenary motive, but from a pure love for a science in which he had always taken the deepest interest.

The usual vote of thanks having been accorded to the donors of the various presentations, the meeting terminated.

REPORT ON THE PRESENT STATE OF THE FRY OF THE SALMON AND SALMON TROUT AT THE PLENTY; AND OF THE TAKING OF THE FIRST SPAWN FROM THE BROWN TROUT.

I HAVE now to report that the hatching of the last batch of ova is complete, and that the young fish are progressing most favorably. Mr. Ramsbottom counted those which hatched from the salmon ova up to 5,000, and estimates the remainder at about 1,000, making 6,000 in all. The salmon trout safely hatched he estimates at about 1,000.

And I have further to report that spawn has been successfully taken from one of the common or brown trout, and is now deposited in a separate box prepared for its reception; in addition to the one trout that has spawned, several more have been examined, in which the ova are rapidly approaching maturity, and from which the spawn will probably be taken during this month.

An anonymous writer in the *Australasian*, of the 23rd June last, expresses great dissatisfaction at the discrepancy between the first estimates of the number of healthy ova and the subsequent numbers of fry actually counted, but a large number of Australian colonists are unable to appreciate the difficulties to be overcome, from their total ignorance of the subject, and it is quite possible that this writer may be included amongst that number.

There are two principal causes for the discrepancy complained of:—In artificial fish-breeding in Europe it has been invariably observed that the most critical time in the life of the young fish is when it is just at the point of hatching out; large numbers often die immediately before and at the time of the bursting of the egg. If this is the case when the ova have been carefully treated, and where every appliance is at hand to render the process of hatching as natural as possible, how much more certain is it that we must at the same critical period lose a far larger percentage here after the ova have been subjected to the unnatural packing in boxes, and to the tossing about of a sea voyage for more than one hundred days.

To explain the second cause of discrepancy I must call your attention for one moment to the wonderful process by which the ova in a state of nature are fecundated. When the ova are ripe for extrusion from the female fish and the milt from the male, the eggs are poured out in a continuous stream by the one, the milt by the other, the two streams mingling. The microscope has revealed the fact that for some short period (probably not more than a minute) after the extrusion of each ovum from the female, there is a free communication from the surrounding fluid, through one or more minute apertures in the horny covering of the egg, to the germ in its interior. The milt consists of myriads of wriggling spermatozoa, animalcules so minute as to require a microscope of very high power to distinguish them; during the short period that the communication through the ovum of which I have spoken lasts, if one of these myriads of spermatozoa finds its way into the interior of the ovum the communication with the outer fluid at once ceases, the ovum is fecundated and the growth of the embryo commences. If, on the other hand, the ovum passes through the period during which the communication with the surrounding fluid lasts without coming in contact with any of the spermatozoa the egg can never be fecundated, and can never produce a fish, but remains for a great length of time beautifully translucent, and apparently healthy. In a state of nature large numbers of these unfecundated eggs are often found, and it is but reasonable to suppose, therefore, that in the natural deposition of spawn, many eggs escape contact with the milt or germinating fluid.

In the process of artificial fecundation the eggs and milt are expressed into a vessel of water, mingled for a few seconds, and then the surrounding fluid containing the excess of milt is washed off. Of course, there is but little fear in this case of any of the eggs escaping contact with the spermatozoa, and, in fact, in the hands of *skilled* manipulators, few eggs fail. Occasionally, however, a whole batch fails, thus, amongst our first successful shipment, no less than from 15,000 to 16,000 eggs, at first apparently the most healthy of all, had never been fecundated, and were of course useless. In this shipment about 10,000 must be placed in the same category. The eggs of the female and the milt of the male may each be expressed by a slight extra force, though not quite ready for natural extrusion, and in either case (both of which are likely to happen in comparatively inexperienced hands) I have no doubt every egg would fail. Another cause of failure might be the leaving the eggs a few moments too long before the admixture of the milt; many other causes may operate towards the same end of which, in our present state of knowledge, we are entirely ignorant, but I think I have said enough to convince you that so far from the discrepancy referred to being surprising, the wonder is that so large a number of fry may be looked upon as comparatively out of danger.

We must first reduce the rough estimate of 45,000 eggs (which I still believe was under the true number) by 10,000 for unfecundated eggs, and then the ultimate loss by all causes, from the deposition in the ponds to this time, will be rather more than 80 per cent., that is to say that nearly one-fifth part of the ova deposited (excluding unfecundated eggs) have been safely hatched out.

And here I should have concluded my report if the anonymous letter referred to had not been followed in the *Australasian* of the 30th June last by an editorial article, the writer of which suggests that the Council of the Victorian Acclimatisation Society should insist upon knowing who is really responsible for the absurd exaggerations which were put forward on this subject when the ova first arrived in Tasmania. And he finishes the article by a statement that the public are naturally and justifiably disgusted at the lame and impotent conclusion actually attained.

It is perhaps impossible for the editor of a large newspaper to read and consider everything inserted in it, and this may account for my finding in the *Australasian* of the 23rd June (the week before the editorial article made its appearance) an excellent paper on fish breeding establishments, extracted from the *Intellectual Observer*, which must have escaped the notice of the editor. In that paper the following apt paragraph occurs in reference to the establishment at Huningen, which establishment, be it remembered, is held up as a bright example to all the world:—

"They reckon that out of the fructified roe at least 15 per cent. is utterly worthless, but of that which comes well to hand 25 to 30 per cent. of fresh young fish can be calculated on."

With that paragraph before him—if he ever read it—I wonder it never occurred to the writer of the editorial article that the statements as to the numbers of our apparently healthy ova might possibly have been made simply because they were true. If we analyse the last-mentioned figures for one moment what do we find? That out of the ova deposited excluding unfecundated or worthless eggs, they lose at Huningen from 70 to 75 per cent., our loss being slightly over 80 per cent.; in other words, they, with all their advantages, hatch out rather more than one-fourth, while we, with all our disadvantages, have safely hatched out nearly one-fifth. A marvellous discrepancy truly, but all in our favor, and one which must convince every thinking man that our estimate must have been under, rather than over, the actual number.

When our brown trout ova were hatched two years ago, the Commissioners estimated their number at 120. Months afterwards when they were removed and counted, the number proved to be 280, some were liberated, and from one we have taken, and from others we soon shall take, a fresh supply of ova. About eight years ago fourteen tench arrived here from England, their progeny are now breeding in some dozens of pools, rivers, and lakes in Tasmania besides numbers having been sent to Melbourne, Ballarat, Sydney, and New Zealand. About four years ago 13 English perch arrived here (after many attempts to introduce them had failed), and they are now so numerous that their increase will be distributed in vast numbers throughout suitable waters in this colony and in Victoria during the coming summer. In the face of these facts can any man justly speak of the result of the present experiment as a lame and impotent conclusion?

I feel it dueto Mr. Ramsbottom to mention one most significant fact which speaks volumes for the care and attention bestowed upon the young fish. When the last of the parr were removed from the large pond to the new ripples below it, a small deformed fish which had been from the time of hatching so doubled up as to be unable to swim, except in small circles, was found apparently in good health and considerably grown; if straightened this fish would measure about five inches in length, in a state of nature it would have been eaten by some water beast long ago, and even in our ponds without great care and an ample supply of food it must have come to grief.

In conclusion I beg to exhibit for the inspection of the Fellows some of the unfecundated eggs saved after each experiment.

METEOROLOGY FOR JULY, 1866.

Private Observatory, Hobart Town.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced — Highest.	Bar. — Lowest.	Self-registering Thermometers — Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind — Direction from three daily registers.	Wind — Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	30·233	30·194	61	46	92·0	44·5	W E SW	·52	
2	30·270	30·205	68	41	91·0	37·0	NW	·26	
3	30·055	29·934	65	38	87·5	41·0	NW N	.52	
4	29·841	29·795	57	41	73·0	38·0	NW W NW	3·38	0·02
5	29·542	29·415	60	41	86·5	39·0	NWNENW	·52	
6	29·535	29·456	62	40	85·5	34·5	N NW	·26	0·02
7	29·781	29·769	52	35	55·0	33·5	NW W NW	·26	0·03
8	30·030	29·972	53	36	75·0	32·0	W NW SW	·52	
9	30·341	30·277	58	34	79·0	30·5	NW SW	·26	0·04
10	30·432	30·419	51	31	77·0	31·0	NW	·78	
11	30·460	30·437	53	28	76·5	28·5	NW W	·78	
12	30·421	30·410	51	27	76·0	28·0	NW W	·52	
13	30·319	30·200	56	31	76·0	29·5	NW N NW	·26	
14	29·996	29·942	53	39	69·0	37·5	NW SE	·26	
15	30·123	30·043	52	42	53·5	42·5	S	1·04	0·24
16	30·227	30·205	53	35	81·0	33·0	NW S	·52	0·10
17	30·235	30·196	53	31	76·0	29·0	W NW W	·52	
18	30·231	30·146	52	29	72·5	28·0	NW W	·52	
19	30·188	30·118	49	30	63·0	27·5	NW	·78	
20	30·182	30·143	52	32	79·0	29·0	NW W S	·52	0·04
21	30·069	29·991	48	37	63·0	34·0	SW SE	0·	0·07
22	30·024	29·934	52	33	70·5	32·0	NW E SE	0·	0·10
23	29·955	29·850	53	31	75·5	28·0	W NE	0·	
24	29·912	29·892	57	32	82·0	28·5	W SW	.52	
25	29·930	29·790	57	30	84·0	29·0	NW S	1.04	
26	29·816	29·794	51	39	58·0	36·5	NW SW S	·52	0·06
27	29·911	29·885	55	41	84·5	39·0	NW SE W	·26	0·16
28	29·521	29·354	51	35	72·5	32·5	NW N SW	·78	0·02
29	29·676	29·520	48	39	52·0	38·0	S SW	5·99	0·89
30	29·956	29·869	49	35	75·0	34·0	SW S	1·04	0·53
31	30·153	30·090	56	35	83·0	33·0	NW N NW	·26	0·20
Monthly mean	30·100		46·23		75·00	33·50	Total force	23·67	2·52

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 Guage. 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 :—

1st. Arbutus unedo, commencing to flower.
2nd. Garrya elliptica, ditto.
7th. Almond, ditto.
10th. Leaf buds of Morus alba commencing to break.
28th. Crocus commencing to flower.
30th. White hyacinth ditto.

Barometer mean, 30·100in., being 0·242in. above the average.
Temperature mean, 45·23°, being 0·59° below the ditto.
Solar intensity mean, 75°, being 1° below the ditto.
Dew point mean, 38·5°, being 1·33° below the ditto.
Humidity of air mean, ·83, being ½ per cent. below the ditto.
Elastic force of vapor mean, ·255, being ·004 per cent. below ditto.
Total amount of rain, 2·52in., being 0·79 above the ditto.
Increase of rainfall on spontaneous evaporation 1·10in.
Mean amount of ozone, 7·00, being ·57 on chromatic scale above ditto.
A paucity in electricity all through the month.
Snow never absent from Mount Wellington during the month.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR JULY, 1866, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

The meteorological phenomena of this July have been so nicely balanced in their effects on life, that the deaths were only one below the average of the nine previous Julys. In 1865,—the healthiest July on record, —the mortality was one-third lower; nevertheless, it is remarkable, that the present month had a smaller number of deaths under 45 years of age, than any one of the preceding nine years, the death-rate being raised, altogether, by very infirm and old people. The weather, still, was quite abnormal, as the following analysis will show:—

Atmospheric-pressure mean, 30·100, was + ·242 above the 20 years' adopted standard for July. Only two years out of the previous 25, had higher means, —1860 and 1850. Last year was less by —·053. The month's range was 1·106 inches. The maximum, 30·460, having occurred on the 11th, and the minimum, 29·354, on the 28th. This range is about that of the mean of the previous eleven years, though + ·270 more than 1865 had. The greatest movement of the barometer in any twenty-four hours, from 1 p.m. to 1 p.m., was a fall of —·476 of an inch on the 28th. Last year's maximum was some what more. The next highest was a fall of —·380 on the 5th, and the largest rise was + ·327 on the 30th, and another of + ·324 on the 9th. Altogether there were eleven days on which the movement exceeded one-fifth of an inch. From the 6th to the 11th inclusive, the barometer rose daily until the maximum of the month was attained, and the deaths on these six days were more numerous (14) than on any other consecutive six days in the month, 8 of the number were from 60 to 71 years old, 4 from 28 to 58, and only 2 below 5 years old. From the 18th to the 23rd, there were only 2 deaths, aged 52 and 76 respectively, and this period was marked by the smallest daily barometical movements, of any six days in the month. Old and hopelessly diseased people succumb to variations of atmospheric pressure in this climate, much more readily than to variations of temperature, or the lowest cold we are subject to. Out of the six days of smallest mortality, there were four on which the minimum temperature was at or below freezing point, and the two others had minima of 33 and 37 only.

Wind-force was — 15·87 lbs. below the July average of the previous nine years, being only 23·67 lbs. 1860 and 1861, however, had both a much smaller amount, while last year had considerably more than double the aggregate force. Nevertheless, a minute comparison of the frequency and force of the winds from the eight points of the compass, gives the more favorable aspect to the present month. North, north-east, east, and south-east were all below the average, both in frequency and force; south, south-west, west, and north-west were all above the average in frequency, but south and west alone were above in force. Frequent and gentle breezes from these two points gave a pleasant and healthy character to this month. The greatest wind pressure recorded was 5·21 lbs. to the square foot, with a south wind at 7 a.m. on the 29th. On the 30th last year there was a storm from the south-west, which added 15·62lbs. to the month's force, and there were three other days on which 5·21 lbs. pressure was registered. The present month, moreover, had only one entry of 2·60 lbs., while last July had 7. The *Calms*, too, present a remarkable contrast, for while last year had 55, the present year had only 36, being —3·82 less than the average of the previous eight years. Almost constant but gentle ærial movement, therefore, characterised this month in this city; while storms, causing numerous shipwrecks, prevailed on the seaboard of the southern and eastern colonies of the Australian Continent.

Temperature mean, 45·23 degrees, is the coldest on record since July 1854, and is — ·59 of a degree below the 20 years' average. 1865 had a mean + 1·86 degrees milder, and 1864 was four degrees warmer than the present July. The self-registering maxima and minima thermometers gave only the mean of 44·87 degrees. Thus for two months consecutively these thermometers have given lower means than the observed ones. It is very rarely that any month does this, but that two in succession should do so is without parallel. Last year's self-registered mean was + 4·28 degrees more than the present month's. The extremes of temperature were 68 degrees on the 2nd, and 27 on the 12th. The last is the lowest temperature noted in the 26 years, during which regular records have been kept. 29·4 degrees, in June 1849, was previously the lowest. The extreme range, 41 degrees, is the greatest ever registered in the 26 years. The mean of all the maxima, or high-day temperatures, was only 54·45 degrees, while last year's was + 4·10 more. The mean of all the minima, or low-night temperatures, was only 35·30 degrees, being —4·45 less than July 1865 had. On eleven nights in the mouth, the minimum thermometer descended to and below freezing point, *i.e.*, from the 10th to the 13th; the 17th to the 20th; the 23rd to 25th. Ice on ponds four feet deep, attained more than an inch of thickness, and bore walking over. Neither in intensity, nor duration, was ever so much frost before recorded in this city and neighborhood. It is probable, however, that in the winter of 1836 there was more. At that time the Great Lake was so hermetically sealed by ice, that the fish perished for want of fresh air, and loaded bullock carts were driven across the lake to save the ordinary detours by the route on its margins. No minute and accurate data, unfortunately, exist, for the meteorological phenomena at that period, therefore, no reliably minute comparison can be made, I only write from memory on this point. In the very cold period of 16 days from the 10th to the 23rd inclusive, 22 deaths only occurred, while in the other 15 days, 32 deaths took place; so that the influence of cold, merely, on mortality, is not here marked as it is said to be in England and elsewhere.

Daily Range of Temperature had the mean of 19·16 degrees, being + 3·81 degrees above the 20 years' average, but only —·35 of a degree less than 1865 had. The greatest range on any day was 27 degrees on the 2nd and 3rd, and 25th. The two first days had a heavier mortality (10) than any other two consecutive days in the month, the next highest having only 6. The smallest range on any day was 9 degrees on the 29th, and on this day 4 deaths took place.

The *Solar Thermometer* gave a mean for the month of 75·00 degrees, being 2 less than 1865 had, and also—·51 of a degree below the average of the previous ten years. The maximum record was 92 degrees on the first; the minimum, 52 on the 29th. The corresponding records last year were 92 and 50.

The *Terrestrial Radiation* thermometer had a mean of 35·50 degrees, which is—3·26 below that of 1865, and —2·05 less than the average of the previous ten years. The extremes were, 44·5 on the 1st, 27·5 on the 19th. On the 12th, when the self-registering minima air thermometer, elevated four feet above the ground and under cover, fell to the lowest minimum ever recorded, 27; Terrestrial-radiation thermometer, on the grass and exposed to the sky, was one degree higher.

The aggregate *Rain-fall* of the month was, 2·52 inches, being + ·79 of an inch above the 20 years mean, and + ·92 of an inch more than July 1865 had. It fell on 15 days, which is + 1·27 more than the average of the previous eleven years. In the first fourteen days of the month, there were only 4 days on which rain fell, and the total amount was only ·11 of an inch, barely sufficient to moisten the surface of the ground. On the 15th, there was guaged ·24 of an inch, and there was a moderate run in the surface channels. On the 20th, 21st, 22nd, there was rain in small quantities. The last six days of the month were all wet, and 1·86 of an inch was guaged. The greater part of this fell on the 29th and 30th, and surface channels, sewers, and rivulet, were thoroughly flushed. *Snow* was never absent from Mt. Wellington during the whole month, and received several copious additional deposits.

Humidity had a mean of 83, which is only — ·05 less than the 20 years' mean, but + 4 above last year's. It ranged from minimum of 147 at 7 a.m. on the 19th, to maximum of 372 at 1 p.m. on the 2nd. The corresponding records for 1865 were, 174 and 318.

Spontaneous-Evaporation amounted to only 1·42 inches, being, as might be expected from the low temperature, little sunshine, and moderate wind-force of the month, much below rain-fall. Last year spontaneous evaporation exceeded rain-fall in amount.

Cloud mean was 5·49, being +·22 more than the 20 years' average for July, though ·41 less than 1865 had, notwithstanding the greater number of rainy days and rain-fall in the present month.

Ozone mean, 7·00, is ·09 less than the average of the previous nine years, and —1·55 less than 1865 had, showing how much ærial movement increases the purity of the air, above what mere washing of it by rain effects. In the present month the point of saturation (10), was never obtained, 9 being the maximum, though frequently recorded. The lowest register was 5, and very frequently entered, *i.e.*, 15 times out of the 62 records.

Electricity had only 2 positive records with tension of 4, registered on the 6th. In 1865 there were 21, with maximum tension of 6. There were 46 negatives, with maximum tension of 4, and minimum of 0·5. Last year had only 34, though with maximum tension of 7. "Nil" was registered 14 times this year, to 7 last. On the last six days of the month nil was noted 9 times out of the 12 observations. The contrast of the electrical conditions of the atmosphere, this year and last, accounts to some extent, for the difference in the ozone mean, and the relative amount of mortality at the same time, of course the latter was largely influenced by the state of atmospheric pressure.

Fifty-four deaths for July 1866 is just one less than the average for this month of the preceding nine years, though one-third more than July last year had (36), that having, with 1862, the smallest number for any of the nine Julys compared. Three years of the nine had a greater number of deaths than the present month, but the other six all had less.

July, 1866.	Ages.	June, 1866	Julys. '65Min	1864	1863	'62Min	1861	'60Max	1859	1858	1857	Avg. 9 yrs. Julys. 1857–1865.
4	Under 1	5	7	16	6	3	10	8	7	7	16	8 8-9
4	1 to 5	1	2	4	5	8	13	9	9	9	6	7 2-9
1	5 to 20	1	3	7	3	2	10	4	2	10	1	3 5-9
4	20 to 45	10	6	13	10	9	13.	22	8	11	20	12 4-9
13	45 to 60	7	7	18	14	11	3	22	5	8	4	10 2-9
28	60 and above	24	11	12	10	3	10	49	8	6	5	12 6-9
54		48	36	70	48	36	59	114	39	41	52	55

"*Under one year of age*" the deaths were not quite half the nine years' average, and only 1863 had fewer.

At "1 *to* 5 *years of age*" the mortality was slightly more than half of the average. 1865 had only half the number, however, and 1864 had an equality with the present year.

At "5 *to* 20" the deaths were little more than one-fourth of the average, and only one-third of what 1865 had. Nevertheless 1858 had even less than the present year, that is, none.

At "20 *to* 45" the average of the nine years was more than three times the number that died this month. At all ages under 45, therefore, the total deaths were but 13, while the nine years' average for all these groups amounts to 31 1-9, or nearly three times as many. Moreover no single year of the nine had less then 18, and that was last year. The other year of minimum total mortality, 1862, had 22.

At "45 *to* 60" the deaths were somewhat above the average, and only three years out of the nine had more.

At "60 *and all ages above*" the mortality was more than double the average, and only the fatal influenza-year, 1860, had more. Last year had much less than half. The previous month of June this year, too, had nearly as many.

July, 1866.	Classes of Disease	June, 1866.	Julys. '65Min.	1864	1863	'62Min.	1861	'60 Max	1859	1858	1857	Avg. of 9 yrs. Julys '57-'65.
6	1. Zymotic	1	3	0	3	8	19	38	4	6	6	9 6-9
6	2. Constitutional	7	9	13	7	7	6	10	8	7	9	8 4-9
27	3. Local	33	17	42	29	16	21	44	20	24	26	26 5-9
12	4. Developmental	6	4	11	9	1	5	1 1	3	2	5	5 6-9
3	5. Violent &c.	1	3	4	0	4	8	11	4	2	6	4 6-9
54		48	36	70	48	36	59	114	39	41	52	55

The 1st, or *Zymotic class of diseases*, had 6 deaths, which is more than one-third less than the nine years' average, but twice as many as 1865 had. Nevertheless the present month had three deaths included in this class which did not arise from climatic causes, while 1865 had not any in the same "orders." The "miasmatic order" in both years had the like number of deaths. Last year one of these deaths occurred in the Queen's Asylum. So far, in the seven months of 1866, there has not been a single death in that Institution. The 2nd or *Constitutional class of diseases* had 6 deaths, being little more than two-thirds of the nine years' average, None of the nine had less, but 1861 had the same number. Three of the present month's deaths were from *Consumption*, at the ages respectively of 28, 41, and 68; none of them were born in Tasmania. Last year also had 3, and none of them natives of the island. The 3rd, or *Local class of diseases*, had a fraction more than the average of deaths, 1864, 1863, 1860, had all more; 1865, however, had not so many by 10. The previous month of June had 6 more. In the 1st order of this class,—*The Brain and Nervous system*,—the deaths were 7, two from *apoplexy*, four from *paralysis*, and one from *convulsions*; 1865 had one less. In the 2nd order,—*The Heart and circulatory system*,—there were 5 deaths,last year had only 2. In the 3rd order, *Lungs and respiratory system*, the deaths were 9, all but a child of 6 months old, being from 46 to 72 years old. Last year had one third less in number June of the present year had 15 deaths in this group. In the fourth order, *The Organs of Digestion*, the deaths were 3, last year had 2. In the 5th order *The Urinary System*, 3 deaths took place, there was only 1 in 1865.

The 4th, or *Developmental class* of diseases, had 12 deaths, or more than double the nine years' average, and the highest of any year of the nine; one was an infant only four weeks old,from *Atrophy and Joint disease*; all the others, from old age, *i.e.* :—62, 67, 71, 73, 76, 77, 78, 80, 80, 82, 92. Last year had only 4 deaths in this class, and but 2 of them were old people, i.e. :—72, 88, the other two were children aged one hour,and two years respectively.

The 5th,or *Violent andAccidental class* of diseases, had 3 deaths,being considerably less than the average. One a child 2 months old, was *suffocated* by being overlaid; the second was a child, 2 years old, accidentally *burnt*. The third was a woman of 55, found drowned. Last year had the same number of deaths, *i.e.* :—2 *overlaid*, 1 *burnt*.

Inquests were alike 5 this year and last. The deaths in *Hospital* were 15,one admitted from a country district. In 1865 there were only 9, and four of those from country districts. At the *Male Invalid Asylum* there were 9 deaths the youngest being 51, and the oldest 92 years old. Last year there were only 4. In June and July of this year, therefore, there have been altogether the enormous number of 19 deaths. No person conversant with modern requirements for such like institutions, would say that the Brickfields Asylum has all the provisions necessary to smooth the passage to eternity, for such a number of persons, lingering, many of them, for months in hopeless agony. They should either have the comforts the General Hospital provides for the sick and dying, or be removed to die in that institution. In London it is proposed to establish six large hospitals with all modern improvements, for the sick and dying poor of the parish poor-houses. The revelations lately made as to the miserable treatment of the sick and hopelessly-diseased poor in these poor-houses has roused benevolent men of all denominations to urge the government to take prompt steps to remove such a scandal to humanity, and our common christianity. God speed their labors, and grant that we may go and do likewise. Of the 54 deaths 2 died in the Glenorchy, one in the Queenborough, and the rest in the city divisions of this registration district, 36 were males, 18 females. Last year males and females were alike, 18 in number.

In the first week there died 15; in the second, 13; in the third, 9; in the fourth, 11; in the last three days, 6. There were seven days in the month on which no deaths took place; but only three of them consecutive, *i.e.*, 20th, 21st, 22nd. The most fatal days of the month were the 2nd, 3rd, 17th, 29th, on which there took place 4, 6, 4, 4, deaths respectively. The most fatal periods of the month were, from the 7th to 11th inclusive, and 25th to 29th, when each fivedays had 13 deaths.

The *births* registered were 51, being 22 less than July, 1865, had.

ROYAL SOCIETY.

AUGUST, 1866.

The usual monthly evening meeting of the Fellows was held on Tuesday, the 14th August. The Ven. Archdeacon Davies in the chair.

Mr. J. M. Clarke, who had been previously nominated by the Council, was, after a ballot, declared to be duly elected a Fellow of the Society.

The SECRETARY (Dr. Agnew) laid on the table the following returns for the past month:—

1. Visitors to Museum, 446.
2. Ditto to Gardens, 678.
3. Plants, &c., received at Gardens:—
   a. From Dr. Officer, seeds of *Pittosporum tenuifolium*, and *Aralea Schœffleri*, received from the Acclimatisation Society, Christchurch, New Zealand.
   b From Dr. Mueller, Melbourne Botanic Gardens.—Scions of 43 varieties of Fruit; 12 varieties Phaseolus, 48 Peas, 43 Beans, 12 Lentils, &c.
   c. From the same, for the decoration of the proposed cemetery.—71 Coniferæ, 117 varieties of Trees and Shrubs, 90 Oaks, 30 Suckers of *Myrica gale*.
   d. From Mr. A. Beames, Sydney, 30 papers of Californian seeds.
4. Plants sent from Gardens.
   a. To W. A. B. Gellibrand, Esq.—Scions of 48 varieties of Apple, 26 Pears, 18 Plums, 10 Gooseberries, and 2 Currants; total, 101 varieties.
   b. To Director of Public Works, for Franklin-square, 97 plants.
5. Time of leafing, flowering, and fruiting of standard plants in Botanic Gardens.
6. Books and periodicals received.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.
   a. Table for July.
   b. Summary of observations for ditto.
2. Port Arthur, from J. Boyd, Esq.
   a. Table for July.
   b. Reading of schooner's barometer for ditto.
3. Swansea, from Dr. Story.
   a. Table for May.
   b. Ditto for June.
4. Westbury, from F. Belstead, Esq.
   a. Table for July.
5. Tamar Heads, from R. Henry, Esq.
   a. Table for July.
6. From F. Abbott, Esq.
   a. Table of Results of Meteorological Observations made in Tasmania, from 1st July to 31st Dec., 1865.

The SECRETARY read the usual "Analysis of the Hobart Town Meteorological Records, and Health Report" for the month, by E. Swarbreck Hall, Esq.

Dr. HALL drew attention to the remarkable fact indicated in the returns for the month of July, that although winds were very frequent, and of unusual violence, round the coasts of the neighboring continent, calmer weather than usual prevailed in the vicinity of Hobart Town, and round the seaboard of Tasmania generally.

The following presentations to the Museum were brought under the notice of the meeting:—

1. From Dr. Cox, Sydney, about 100 varieties Shells.
2. From Mr. Thatcher, per Mr: Legrand, 20 ditto.

3. From Dr. Officer, two specimens Nankeen Night Heron *(Nycticorax Caledonicus)*.
4. From J. Maclanachan, Esq., a Californian Quail.
5. From Col. Chesney, a Spotted Owl *(Athene maculata.)*
6. From J. Swan, Esq., a White Kangaroo Rat.
7. From E. Swan, Esq., a Kingfisher *(Alcyone azurea.)*
8. From M. Allport, Esq., a Crayfish.
9. From Master L. Agnew, a bronze Coin.
10. From Captain McArthur, barque Aladdin, Bow and Arrows from Aurora Island, a Spear from Espirito Santo, a Native Girdle from Leper Island.
11. From Captain Browne, barque Nightingale, a War Dress from Pleasant Island, a Hat from Straits of Bali.
12. From Mr. C. C. Schaw, two specimens of *Sphœria Robertsia*, from New Zealand.
13. From Mr. C. Basstian, sample of auriferous Iron Sand from New Zealand, specimens of a peculiar tissue forming the inside of the leaf of a New Zealand tree.
14. From Hon. E. Abbott, Esq., M.L.C., a specimen of Kauri gum.
15. From Colonel Chesney, specimens of quartz from the Union Company's new reef at Mangana.
16. From T. Stephens, Esq., the Athenæum, complete for years 1861-2-3-4.

Mr. M. Allport read a "Notice of some Fossils recently discovered near Risdon," and which he largely illustrated by a collection submitted for examination by the meeting.

Mr. Gould observed that the study of these tertiary deposits was of great interest, taken in connection with our other tertiary deposits, both of fresh water and marine origin occurring generally along the sea-board of the island. He described in some little detail the formations at Coal Head, in Macquarie Harbor, where fresh water deposits of sand, clay, and gravel form cliffs of from eighty to one hundred feet in height, and in which plant-remains, leaves, &c., occur abundantly, together with lignite; whence the name of the headland. He also alluded to the raised beaches, and marine tertiary drift, constituting largely the north-eastern part of the island, and discussed slightly the age of the different eruptions of basalt with reference to these deposits. Mr. Gould called the attention of the Society to some specimens of iron ore belonging to two mineral species, viz., Magnetic Oxide, and Brown Hæmatite, both of which he stated occurred abundantly in the vicinity of the Tamar River, near Ilfracombe, the first containing 72 per cent. of iron, the other varying up to 60 per cent. He forbore going into detail, as he said that would be the subject of a report to Parliament, but merely pointed out some interesting facts in connection with the variations of the specific character of the iron according to the country traversed; which he described as consisting of formations corresponding with those forming a large portion of the western district of Tasmania. He speculated briefly on the possibility of reducing the ore by means of charcoal,—referring to the superior quality of the iron produced direct by this means to that obtained by ordinary processes. He also pointed out that these iron deposits were metallic lodes, and not new superficial deposits.

Conversational discussion ensued as to the probable metalliferous resources of the island, and

The usual vote of thanks to the authors of papers and the donors of presentations, having been accorded,

The meeting broke up.

NOTICE OF SOME FOSSILS RECENTLY DISCOVERED NEAR RISDON, TASMANIA. By M. Allport.

As I purpose forwarding the interesting fossils which I have now the honor to submit for the inspection of the Fellows of the Royal Society to Professor Owen by the next mail, I avail myself of this opportunity to record their discovery, and to give a brief account of the locality and formation in which they were found.

For many years past Limestone has been quarried from a bed of Travertine at Geilstown Bay, a deep inlet on the eastern bank of the River Derwent, about a mile below Risdon Ferry. The hills lying between Risdon and this quarry are of the poor white Mudstone found over so large a portion of Tasmania, and which is associated with the Carboniferous, or Mountain Limestone. The Mudstone in this locality contains vast numbers of shell casts belonging to the genera Spirifer, Productus, and other characteristic fossils of the Mount Wellington Limestone. As no trace is now left in the Mudstone of the Carbonate of Lime which must at one time have filled these casts, the probability is that the lime has been, in the course of ages, carried off by the percolation of rain water, or other water containing carbonic acid, through the Mudstone, and has gone to form the bed of Travertine referred to in a deep pool on the course of some former rivulet, or the lime may have been derived from some more distant bed of the Mountain Limestone.

The Geilstown Travertine is highly fossiliferous, containing many interesting animal and vegetable remains, which afford some clue to its geological age; of these remains those belonging to the vegetable kingdom are by far the most numerous, the impressions of many of the leaves being especially beautiful. It is a matter of great difficulty to fix the species or even genera of plants from the mere impressions of seed vessels, leaves, and stems, and it therefore behoves the observer to examine carefully a very large number of specimens before any such attempt can be made. For twelve years past I have collected specimens from this quarry, and have in that period discovered the impressions of two seed vessels which I am unable to assign to any existing Tasmanian form. Impressions of the stems and leaves of some plant closely resembling a species of Leucopogon (a heath-like plant, now common on the hills in the immediate neighborhood of the quarry) are very abundant. Impressions are also numerous of serrated leaves bearing a superficial resemblance to those of the sassafras *(Atherosperma Moschata)*. Others, again, resemble the dogwood *(Pomaderris Apetala)*. Many specimens have occurred of a plant resembling a species of Pimelea, known here by the trivial name of the cotton-tree, from the toughness of its bark. The fossilized stems and roots of a rush, now growing in the neighborhood, are frequently met with, together with many other vegetable remains so badly preserved that I am as yet unable to decipher them.

Amongst the animal remains collected is one insect, unknown to me, probably the larval form of some waterbeetle, and five species of shells belonging to the genera Helix, Limnea, Planorbis, and Helicarion. Of these the commonest is a large Helix, now extinct in Tasmania, the others are rare and comprise a smaller Helix, probably Helix Sinclari—a Planorbis (unknown to me and possibly extinct) a large Limnea not now found in our fresh waters, and a Helicarion, probably Helicarion Milligani.

We may therefore safely speak of this Travertine as a recent tertiary formation.

Ten years ago I picked up in this quarry two small specimens, one of which, from microscopic examination of a section, I then believed to be bone, but which was so soft and mutilated as to be otherwise useless; the other is marked No. 1 amongst those now before you. Since that time the workmen at the quarry have kept a look out having promised to save anything resembling bones for me, but up to a few weeks back no definite traces of bone were found. Then, however, the specimens now on the table were discovered.

The bed in which these bones were found was exposed during the opening of a new part of the quarry, and consist of a deposit of arenaceous clay, containing coarse grit, and a few slightly rounded pebbles, just such as might be carried down any of our small rivulets by a moderate flood, and I have little doubt that the mutilated condition of most of the bones is due to the violence of the current which carried them to their present position, for in no instance have I found two bones occupying their proper relative positions, except in the case of a few of the teeth which have remained in the jaws,—as you may observe for yourselves in the specimens marked 2 and 3.

Masses of Travertine are found both above and below the clay deposit in which the bones occur, apparently marking the periods during which the deposition of lime went quietly on without the intervention of floods. The particular bed in which the bones were found is at a depth of thirty feet from the surface soil. With reference to the bones themselves, all the information I am competent to give you is, I regret to say, summed up in a very few words. Nearly all the specimens are mutilated, and so tender as to be removed from the matrix only with the greatest care, the most perfect being of course the comparatively hard teeth. They are in great numbers, and clearly belong to many creatures. After a diligent search I have found pieces belonging to almost all parts of the skeleton, from the skull to the tail, and even the ultimate nail-bearing joints of the toes, one or two of these last being in excellent preservation.

I have not arrived at any conclusion as to the nature of the one large bone bedded in Travertine. Of the others I believe that many of the teeth found belonged to creatures closely allied to existing marsupials, such as Hypsiprimni and Phalangistæ (Kangaroo Rats and Opossums) as I have carefully compared them with specimens of these creatures' teeth from my own cabinet. Of the history of the curious teeth in the specimen marked 3, I am so far in the dark that it will be better to wait for the decisive report of Professor Owen upon them than to attempt any foolish guesses which might hereafter prove erroneous.

Before concluding, let me call your attention to an interesting geological fact connected with this Travertine, first pointed out to me by my friend the Government Geologist (C. Gould, Esq.), and which proves the recent geological age of many of the masses of trap rock in our immediate neighborhood. In opening a road from the lower part of the quarry towards the River Derwent, the workmen have exposed a section, showing the actual contact of a stream of basalt with the Travertine and clay beds, under which it dips from west to east. As the strata have been considerably upheaved and distorted at this point by the basalt, it is clear that the Travertine is the more ancient formation of the two, and it is quite possible that the pool in which the Travertine was deposited was destroyed, and the springs which supplied it were diverted by the upheaval of this very basalt.

METEOROLOGY FOR AUGUST, 1866.

Private Observatory, Hobart Town.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced — Highest.	Bar. — Lowest.	Self-registering Thermometers. — Highest in shade.	Lowest in shade.	Highest in sun	Lowest on grass.	Wind. — Direction from three daily registers.	Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	30·185	30·103	52	31	79·0	30·5	NW W NW	·52	0·01
2	30·080	29.856	49	34	55·0	30·5	NW	.52	
3	29·837	29·811	62	42	90·5	39·0	N NW	·26	0·01
4	30.123	30·061	63	42	90·0	39·5	W NW W	1·40	
5	30.114	29·967	58	41	79·0	38·0	NW	3·12	
6	29·874	29·700	55	39	60·0	40·0	NW	2·86	
7	29·564	29·407	55	38	76·5	36·0	NW SE	·26	
8	29·236	29·188	57	48	79·5	43·5	SW	3·38	0·02
9	29·243	29·147	56	43	76·0	41·0	NNW	2·78	
10	29.520	29·458	52	42	56·0	40·5	SW SE SW	·78	0·34
11	29.450	29·375	52	37	78·0	38.5	N W SE	·52	0·09
12	29.493	29·436	54	44	79·5	40·0	SW SE SW	0·	0·30
13	29.808	29·630	57	38	90·0	37·0	W N	·52	0.02
14	29.892	29·807	61	43	96·0	40·0	N NW S	1·40	
15	30.320	30·246	60	38	90·0	36·0	W NW W	·26	
16	30·254	30·166	57	34	80·0	32·0	NW	·78	
17	30·442	30·365	62	36	90·0	34·0	NW SW	·78	0·03
18	30.507	30·425	62	31	90·5	28·0	NW W	·26	
19	30 332	30·224	54	40	70·0	35·0	NW	3·38	
20	30·308	30·228	58	41	93.5	40·0	NW SE NW	·26	0·03
21	30·285	30·225	59	45	88·5	40·5	SW NW	·26	
22	30·100	30·060	62	45	90·0	42·5	N S SW	·78	0·03
23	30·147	30·079	58	46	95·0	34·5	NW	·78	0·02
24	29·808	29·716	65	41	95·5	40·0	NW	8·33	
25	30·038	30·004	59	41	83·0	37·0	W NW	·52	
26	30·118	30·014	67	47	99·0	46·5	NW	·52	
27	30·145	30·099	69	47	97·0	44·5	NW W	5·73	
28	30·397	30·327	67	44	86·0	41·0	NW SE	·52	
29	30·308	30·210	67	42	93·5	36·5	W NW NW	·78	
30	30·156	29·926	61	41	69·0	39·5	N NW NE	·26	0·03
31	29·839	29·810	69	43	99·0	42·0	SW NW	.52	
Monthly mean	29·952		50 ·60		83.70	38·18	Total force	42.66	0.93

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 Guage. 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. Gooseberry bushes commencing to leaf.
12th. Horsechestnut buds breaking.
14th. Sambucus Niger commencing to flower.
20th. Elm commencing to flower.
22nd. Poplar commencing to break,
30th. Apricots commencing to flower.

Barometer mean, 29·952in., being 0.169in. above the average.
Temperature mean, 50.60°, being 1·90° above the ditto.
Solar intensity mean, 83·70°, being 2·70° above the ditto.
Dew point mean, 41·80°, being 0.93° above the ditto.
Humidity of air mean, ·73 being $3\frac{1}{2}$ per cent. below the ditto.
Elastic force of vapor mean, ·267, being $3\frac{1}{2}$ per cent. below ditto.
Total amount of rain, 0·93in., being 1·13in. below the ditto.
Increase of spontaneous evaporation on rainfall, 2·07in.
Mean amount of ozone, 7·79, being 0·62 of chromatic scale above ditto.
Electricity active on the 17th, 23rd, 24th, 25th, 27th, and 29th.

On the 25th and 26th, with full moon, over a thin layer of cum-cir and cum-stra clouds, was produced complete Coronas with several series of concentric-colored circles from three to four degrees in diameter.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR AUGUST, 1866, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

Never before was the month of August so pleasant in its climatic character, or so favorable to health and life. The last ten days of the month, specially, were more like model summer days, than winter ones. It is a general though peculiar phenomenon in the last week of August, that there should be three or four consecutive days of a warm summer character, but never before were there so many in any August, as have been recorded for the present month. August 1865 was a fine and healthy month, yet while the deaths then amounted to 42, the present month had only 33.

Atmospheric pressure mean, 29·952, was + ·169 of an inch above the 20 years' adopted standard, and + ·031 higher than August 1865. No August since 1861 had so high a mean as the present month. The maximum, 30.507, was registered at 7 a.m. on the 18th. 1865 had a somewhat higher maximum. This day was the most fatal to life of any in the month, 5 deaths having taken place, while no other day had more than 3 and that only twice. Last year also the day of maximum pressure, was the most fatal day of the month. The maximum was, 29·147, on the 9th, being considerably lower than in 1865. The extreme range of the month, therefore, was 1·360 inches, which is a wider range of pressure for August than any year since 1856. The greatest movement of the barometer, marked on any day, was a rise of + ·464 of an inch on the 15th, and the effect on life was palpable in the three following days, during which 9 deaths occurred, while the next highest three days, 26th to 28th, had only 7 deaths. Every August since 1858, however, had a much higher maximum movement of the barometer than the present month. Altogether there were fourteen days on which the pressure varied more than one-fifth of an inch.

Wind-force in the aggregate amounted to 42.66lbs., being + 2·36 lbs. more than 1865 had. It was + 4.31 lbs. more than the average in the four years' tables of the adopted standard—1862 and 1863, however, had so very great a wind-force, that the average of the last nine years has been so largely raised that the present year's amount falls below it, by −2·72 lbs. The *North*, *North-east*, *East*, *South-east*, and *South*, were all below the four years' average both in frequency and force; *South-west*, was above the average in both respects, *West* winds were more numerous than the average, but of less force, *North-west* was greatly above the average both in frequency and force. *Calms* were only 31, being −3·62 below the average of the previous eight years, and −·5 less than last year. The highest wind-force registered had a pressure of 5·21 lbs. to the square foot, and was recorded at the sunset observation on the 24th, and the 7 a.m. observation on the 27th, both from the North-west, and the last a *hot wind* being a rare occurrence in August. The former two partook of the same character in a lesser degree.

Temperature mean, 50·60 degrees, +1·90 degrees above the 20 years' average, and +1·29 warmer than 1865 was. The self-registering thermometer gave a mean of only 50·05 degrees, thus adding another month to the number in which this remarkable discrepancy has occurred. The mean of all the maxima or high-day temperatures was, 59·32 degrees, being more than one degree lower than 1865 had, nevertheless there were 14 days on which the temperature was above 60, rising to 69 on the 27th and 31st. Last year's maximum was only 66. The mean of all the maxima or low-night temperatures was 40·77 degrees; being more than a degree higher than last year. So that the present month had, on the whole, warmer nights and cooler days than August 1865 had. The minimum was 31 on the 1st and 18th; last year's was 32.

Daily-range of Temperature had the mean of 18·55 degrees which is + 2·16 above the 20 years' mean, but −2·35 less than 1865 had. The greatest range on any day was 31 degrees on the 18th (the most fatal in the month), while last year's was only 28.

Solar-Intensity mean, 83·70 degrees, is + 1·92 above the average of the previous 10 years, though −1·38 less than 1865 had. The maximum was 99 degrees on the 26th, the minimum 55 on the 2nd. Last year's extremes were 98 and 58.

Terrestrial-Radiation mean, 38·18 degrees, was +2·38 above the average of the previous ten years, and +2·33 more than 1865 had. The extremes were maximum 46·5 on the 26th, and minimum 28 on the 18th. Last year's extremes were 43·5 and 27·5.

Rain fell on 12 days, which is −1·45 below the 11 years' average of wet days for August. The total deposit gauged was only ·93 of an inch, being −1·13 below the 20 years' mean, and −·30 of an inch less than August 1865 had. On the 10th ·34 of an inch fell, and on the 12th ·30; on these two days only was there sufficient rain to cleanse surface drains. No *Snow* fell in the city this month, but it did so frequently on Mount Wellington, which was never free from snow during the whole month.

Humidity mean, 73, is −6½ below the 20 years average, and 3 less than 1865 had.

Elastic-force of vapour had a mean of 267, which is −10 less than the 20 years' average. The range was from minimum 156 on the 18th, to maximum 375 on the 30th.

Spontaneous Evaporation was 3·00 inches, therefore greatly exceeding rainfall. Last year's was not so much by close upon half an inch.

Cloud mean, 6·24, is +·65 more than the 20 years' average, and about the same above last year.

Ozone mean, 7·79, was +·29 above the August mean of the previous 9 years, and a trifle more than 1865 had. It ranged from the minimum 5 frequently, to maximum 10 (saturation) on the 12th. So much atmospheric purity, with almost constant wind movement, genial temperature, and abundance of positive electricity, no doubt contributed largely to the very healthy character of this month.

Electricity had 37 positive indications, with a maximum tension of 5·5, and minimum of 2. Negative was registered 22 times, with extreme tension of 5·5 and 1. "Nil" was only recorded three times—on the first and second days of the month. August, 1865, had 38 positive and 24 negative records.

33 deaths for this month is —14 8-9 less than the average for August of the previous nine years, and seven less than the previous minimum (40) in August, 1860. Last year had nine more deaths than the present month.

Aug., 1866.	Ages.	July, 1866	Augusts.									Avg. 9 yrs. Augusts. 1857–1865.
			1865	1864	1863	1862	1861	'60Min	1859	58Max	1857	
1	Under 1	4	5	4	7	7	9	11	6	28	11	9 7-9
5	1 to 5	4	4	3	4	7	3	4	8	16	2	5 6-9
1	5 to 20	1	1	4	5	3	10	1	4	4	3	3 8-9
10	20 to 45	4	7	9	7	7	14	7	8	12	14	9 4-9
5	45 to 60	13	7	11	8	7	1	6	14	6	16	8 4-9
11	60 and above	28	18	10	10	12	11	11	8	8	8	10 6-9
33		54	42	41	41	43	48	40	48	74	54	47 8-9

"Under 1 year old" there was only one death, a child nine months old, long suffering from "*Hydrocephalus*" The nine years' average is nearly ten times as great, and the smallest number in any year previously was 4, in August, 1864. All sanitarians are agreed that the infantile deaths are the surest test of the healthiness of any season or climate.

At "1 to 5 years old" the deaths were slightly below the average, though less year and five others had all less.

At "5 to 20 years old," there was only one death, or little more than one-fourth of the average. Last year and 1860 had equally small numbers.

At "20 to 45" the mortality was a fraction above the average, only three years out of the nine having a greater number of deaths.

At "45 to 60" the deaths were greatly below the average, and only one year, 1861, had fewer.

At "60 and all ages above" the average was slightly exceeded, but was far less than August, 1865, had.

Below and above 45 years old the deaths were alike in number.

August, 1866.	Classes of Disease	July, 1866.	Augusts. 1865	1864	1863	1862	1861	'60 Min.	1859	'58 Max.	1857	Avg. of 9 yrs. Augs '57-'65.
3	1. Zymotic	6	1	9	4	3	15	10	9	7	7	7 2-9
8	2. Constitutional	6	3	4	6	8	6	4	7	9	15	6 1-9
12	3. Local	27	20	21	23	24	21	19	28	49	29	26
7	4. Developmental	12	12	6	3	4	6	6	3	4	2	5 1-9
3	5. Violent &c.	3	6	1	5	4	0	1	1	5	1	2 6-9
33		54	42	41	41	43	48	40	48	74	54	47 8-9

In the first or *Zymotic class of diseases* the deaths were less than one half of the nine years' average, though three times as many as 1865 had. None of the three, however, could be said to be influenced by climatic causes. Two were within a month after childbirth and from diseases consequent thereon. Deaths at this time are of very rare occurrence in Tasmania.

In the second, or *Constitutional class of diseases*, the deaths were above the average, six out of the previous nine years having a smaller mortality in this class. Three were from *Consumption*, and all of them born in Tasmania—a very unusual occurrence.

In the third, or *Local class of diseases*, there was less than half the average mortality, and far fewer than any year of the nine. In the first order of this class, *Diseases of Brain and Nervous system*, there was not a single death, which is most exceptional. Last year had nine deaths in this order. In the second order, *Diseases of the Heart and Organs of Circulation*, there was only one death of a woman aged 67. Last year had 5. In the third order, *Diseases of the Lungs and Organs of Respiration*, there were nine deaths, though five of them were chronic affections. 1865 had only 2. In the fourth order, *Diseases of the Organs of Digestion*, a single death only occurred, in a young man of 22 from *abscess of the liver*, received into hospital from a country district. Last year this order had 2 deaths. In the fifth order, *Diseases of the Urinary Organs*, there was one death—1865 had 2.

In the fourth, or *Developmental class of diseases*, the deaths were considerably above the 9 years' average, though much fewer than in 1865. Two were children, one year old, from *atrophy* the rest were from *old age*, aged respectively 63, 71, 74, 76, 79.

The fifth, or *Violent and Accidental class of diseases*, had deaths slightly above the numerical average, though only half the number that occurred in 1865. One died from *fractures of neck and thigh* caused by a fall from the roof of a house. A child two years old from *hemorrhage*, from a wound in the face. A man of 45 died from *tetanus* (lock-jaw), consequent upon a crushed finger, though at an unusually long period afterwards.

There was only one *inquest*—the death from the fall off the roof of a house. Last year had 6. The deaths in *hospital*, inclusive of the inquest case, were 14. Last year had only 8. Three of them were cases admitted from country districts. At the *Male Invalid Asylum* there were only 3 deaths this month, aged respectively 66, 79, 86. Last August there were 5. Of the 33 deaths, all occurred in the city division of the electoral districts.

In the first week only 3 died; in the second, 5; in the third, 12; in the fourth, 9; in the last three days, 4. The most fatal period of the month was the three days, 16, 17, 18, when 9 deaths occurred; the next was the three days, 26, 27, 28, when 7 died. No other three days had more than 4. On twelve days of the month there was not a single death.

The registered *Births* were 70, being + more than in 1865.

ROYAL SOCIETY.

SEPTEMBER, 1866.

The monthly meeting of the Fellows was held, on Tuesday, 11th September, J. Barnard, Esq., in the chair.

S. Sheehy, Esq., who had been previously nominated by the Council, was, after a ballot, declared to be duly elected a Fellow of the Society.

The Secretary (Dr. Agnew) laid on the table the usual monthly returns, viz.:—

1. Visitors to Museum, 998.
2. Ditto to gardens, 1,561.
3. Plants and seeds received at gardens:—
   a. From Royal Horticultural Society, London, per Dr. Milligan, 46 papers flower seeds, of which 30 are new to the gardens, 60 papers vegetable seeds, 34 new to gardens, seeds of Nicotiana Wiegandeoides, new to gardens.
   b. From Messrs. Handaside and McMillan, Melbourne, 25 plants.
4. Plants supplied from gardens for the decoration of public places:—
   a. To New Norfolk Asylum, 161 plants.
   b. To Franklin Island, 52 plants.
   c. To Brickfield's Invalid Depôt, 40.
   d. To Port Arthur, 51.
5. Time of leafing, flowering, and fruiting of a few standard plants in Botanic gardens.
6. Books and periodicals received.
7. Minerals received per Ethel, from London.

Meteorological Returns:—

1. Hobart Town, from F. Abbott, Esq.
   a. Table for August.
   b. Summary of observations for ditto.
2. Port Arthur, from J. Boyd, Esq.
   a. Table for August.
   b. Reading of Government schooner's barometer for ditto.
3. Swansea, from Dr. Story.
   a. Table for July.
4. Westbury, from F. Belstead, Esq.
   a. Table for August.
5. From the Hon. the Col. Secretary.

Observations made at Pietermaritzberg, Natal, during the year 1865.

The Secretary read the usual analysis of the Observatory records, together with those of births, deaths, &c., for August, by E. Swarbreck Hall, Esq.

The following presentations to the Museum and Library were brought under the notice of the meeting:—

1. From Mr. A. M. Nicol, two Medals, struck in commemoration of the cessation of transportation to Tasmania, 1853.
2. From Mr. H. M. Hull, specimen of Fossil Wood from Southland, New Zealand. Terebratula (fossil), from ditto.
3. From Mr. M. Allport, a Lamprey, from Brown's River; a Grebe.
4. From Dr. Milligan, specimen of Tasmanite, with pamphlet by A. B. Church, Esq., B.A., Professor of Chemistry, Royal Agricultural College, Cirencester.
5. Report on the Geology and Mineralogy of the south-east district of

South Australia, by the Rev. J. E. T. Woods, F.R.G.S., &c., &c., from the author.

6. From J. J. Bennett, Esq., British Museum, 1 vol. of "The Works of Robert Brown," bound in cloth.

7. From the Royal Astronomical Society, Memoirs of the Society, vols. 9 to 34 inclusive. Monthly notices of the Society, vols. 8 to 18 inclusive.

The SECRETARY brought under the notice of the Fellows the very handsome donation of books from the Royal Astronomical Society (see presentations), which by supplementing those already in the library will complete our series of these valuable works from the very beginning of the Royal Astronomical Society in 1822. He further informed the meeting that in future all the publications of this society would be forwarded to us as issued.

Mr. M. ALLPORT moved,and Mr. GOULD seconded:—"That a special vote of thanks be accorded to the Royal Astronomical Society for their very liberal donation." The motion was unanimously agreed to.

Dr. AGNEW mentioned that the collection of minerals for which an order had been sent some time since to Mr. Tennant, of London, had arrived, and were in course of arrangement by Mr. Gould.

Mr. GOULD presented the society with a report upon the geological structure of the country near Ilfracombe, and in doing so made a few remarks on the leading points referred to in the report. He spoke hopefully of the prospect of making some combination of Pyroligneous Acid Works with others for reducing the iron ore by means of the charcoal produced in large quantities, and available at a low rate. He sketched out the leading characters of the various formations occurring in the district, pointing out the economic applications of which the Serpentine was susceptible, both as an ornamental building stone of great beauty and value, and as a source of sulphate of magnesia. And referring to the various iron ores of which he had exhibited specimens at the last meeting of the society read the following copy of a report received from Mr. Foord:—

Melbourne, 86 Elizabeth-street,
7th June, 1866.

SIR,—I have examined the sample of iron ore submitted for assay, and I now beg to report the following results:—

The external characters of this mineral are those of magnetite, or magnetic oxide of iron; it conforms pretty closely to the fibrous variety described by Dufresnoy. Hardness over 6°, gravity 4·98, streak black, obedient to the magnet, and susceptible of permanent magnetism.

Like most of the examples of this mineral it has the sesquioxide of iron somewhat in excess of the formula for magnetic oxide, this excess appears to exist in the sample, partly or wholly as limonite.

Protoxide of iron	30·547
Sesquioxide ditto	66·151
Together	96·698
Difference of alumina, silicic acid, and water	3·302
In parts	100·000

Preceding determinations were made by permanganate of potassium. The sample is free from other constituents such as are occasionally present in magnetite.

Metallic iron, per cent.	70·00
Existing as protoxide	23·76
Existing as sesquioxide	46·30
	70·06

If this mineral exists in quantity, and under circumstances otherwise favourable for economic treatment, its high per centage of iron, and its freedom from all obnoxious constituents will render it of great value for iron and steel manufacture.

Yours &c.,
GEORGE FOORD,
Chemist and Assayer.

C. Gould, Esq.,
Government Geologist for Tasmania.

Mr. Gould commented on the disposition of the iron ore in the course of two parallel lines, and remarked on the variations in its character according to the formation traversed. He also pointed out the identity of the Blue Hill Tier rocks with those largely developed at the great bend of the Gordon and in other parts of Western Tasmania, and the possibility of favorable conditions determining the existence of valuable minerals—this inference being supported by the known presence of copper and lead ores at Penguin Creek. He concluded by making a few remarks on the fossil species of Unio occurring on the banks of the Tamar.

In reference to the Trout ova taken from fish in the colony, Mr. M. Allport reported that in many the embryo fish were now visible under the microscope.

This was the more satisfactory as it would be conclusive evidence to all those to whom the ova had been forwarded that successful impregnation had taken place.

Mr. Abbott brought under the notice of the meeting a series of resultants derived from the 25 years' meteorological tables. He gave an extract from a table by Professor Dove, and compared the temperature of the various places therein enumerated with that of Hobart Town for the different seasons of the year, showing in a very striking manner the favorable character of the Tasmanian climate. He also read the following extract from a paper read by Mr. Glaisher before the British Meteorological Society:—

"The greatest mortality (from all causes) was coincident with a temperature of 30° to 35°, and the smallest 50° to 60°. The temperature of 65° to 70° being much more fatal than 55° to 60°."

It will be seen by the following that the temperature for Hobart Town coincides with that given by Mr. Glaisher as most favourable to health.

Hobart Town. Mean 54·45
Spring=53·99—Summer—61·95
Autumn=54·35—Winter—46·85

In conclusion Mr. Abbott drew the attention of the meeting to the very great amount of time and trouble required for copying and computing the abstract sheets of the 25 Years' Tables, for which he considered a special vote of thanks was due to Mr. Roblin, the Curator of the museum, and begged to move accordingly.

Mr. M. Allport had great pleasure in seconding, as he could testify to the very large amount of labour bestowed by Mr. Roblin upon the returns in question, and also to his readiness at all times to use his best endeavours in the interest of the society.

The motion was agreed to.

Discussion ensued in which Dr. Butler, Mr. Allport, Mr. Gould, Dr. Hall, Mr. Abbott and others took part, after which the usual vote of thanks to the authors of papers, and the donors of presentations having been passed, the meeting broke up.

METEOROLOGY FOR SEPTEMBER, 1866.

Private Observatory, Hobart Town.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced — Highest.	Lowest.	Self - registering Thermometers. — Highest in shade.	Lowest in shade.	Highest in sun	Lowest on grass.	Wind. — Direction from three daily registers.	Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	29·959	29·926	75	52	105·0	50·0	N W NW	·78	
2	29·922	29·594	72	49	102·5	48·5	N NW	10·68	0·15
3	30·061	29·998	67	45	99·0	42·0	NW	3·12	
4	29·964	29·703	66	38	83·0	34·0	NW N NW	5·99	
5	29·884	29·753	64	44	93.5	42·5	NW N NW	1·04	0·07
6	29·748	29·380	58	42	73·5	40·0	NWNENW	0·	0·06
7	29.656	29·322	53	39	60·0	39·5	SW W SW	10·41	0·45
8	29.956	29.925	51	36	88·0	33·0	SW NW	·78	0·06
9	29.739	29·461	61	36	91·5	36·0	NW	1·04	0.02
10	29.795	29·720	58	37	93·5	36·0	SW S NE	1·04	0·35
11	29.659	29·422	62	42	92·5	40·5	NW	1·30	0·02
12	29·832	29·736	55	37	89·0	36·5	NW E NW	·52	
13	29·872	29·762	64	34	96·0	33·5	NW	·78	
14	29·728	29·645	65	46	90·0	43·5	NW SE	·52	0·15
15	29·401	29·240	64	45	92·0	44·0	NW N	·52	0·12
16	29·504	29·355	59	43	90·0	41·0	NW N	1·04	0·01
17	29·453	29 362	60	41	97·0	35·5	NW W NW	3·38	
18	29·764	29·746	62	39	96·0	32·5	NE NW	1·04	
19	29·710	29·673	54	44	92·5	39·0	NW	8·33	
20	29·917	28·910	58	38	93·0	32·5	W SE	1·30	
21	29‘940	29·790	57	37	96 5	32.0	NW NE	1·04	
22	30·008	29·982	61	42	88·0	38.5	NW N	·78	
23	30·078	29·907	66	35	89·0	30·0	NW N	1·04	
24	29·942	29·918	61	46	60·0	41·0	NW SE	·26	0·25
25	29·992	29·845	63	45	92·0	40·5	NW SE SW	·52	
26	29·653	29·494	65	45	100·5	41·5	NW W	7·81	0·02
27	29·615	29·546	58	40	91·0	35·0	N SW	3·12	
28	29·651	29·587	67	44	106·5	40·0	SW NW W	1·04	
29	29·828	29·790	58	38	85·0	33·0	SW	5·46	0·14
30	29·670	29·580	55	34	77·5	31·5	NW SE SW	5·47	0·01
Monthly mean	29·730		52	·23	90.11	38·10	Total force	80.15	1.88.

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 Guage. 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:—

15th. Ash commencing to flower.
16th. Oak commencing to break into leaf.
20th. Grape vines commencing to break into leaf.
,, Montan Peony commencing to flower.
26th. Horsechestnut commencing to flower.
29th. Robinia pseudo-acacia commencing to leaf.

Barometer mean, 29·730in., being 0·048in. below the average.
Temperature mean, 52·23°, being 1·31° above the ditto.
Solar intensity mean, 90·11°, being 3·11° above the ditto.
Dew point mean, 41·9°, being 1·695° above the ditto.
Humidity of air mean, ·69, being ·7 per cent. below the ditto.
Elastic force of vapor mean, ·269, being ·021 per cent. below ditto.
Total amount of rain, 1·88in., being 0·01 above the ditto.
Increase of spontaneous evaporation on rainfall, 1·93in.
Mean amount of ozone, 8·22, being 0·46 above the ditto.
Electricity active on the 1st, 3rd, 4th, 5th, 8th, 10th, 12th, 13th, 17th, 20th, 21st, 22nd, 23rd, and 29th.
A large circle round the moon on the 23rd.
Eclipse, badly seen, of the 24th, for clouds.
Snow never absent from Mount Wellington.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR SEPTEMBER, 1866, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

No September of the previous nine years was so favorable to health and life as the present month. The deaths were less than in any former September on record by 20 per cent, and below the average of the previous nine years by more than 33 per cent. Atmospheric pressure, though constantly oscillating, had no extreme ranges; wind movement was constant, but moderate, and the quality of the air was most pure; electricity was abundant, and rain-fall sufficient. The month's mean was warmer than the average, with extensive daily extremes, the latter being the only phenomenon that apparently had any adverse effect upon health and life.

Atmospheric pressure mean for the month was 29·730, being only + ·048 above the mean of the 20 years' adopted standard. The maximum was only 30·078, recorded on the 23rd. This is the lowest maximum that has been registered since 1856. The minimum was 29·240, recorded on the 15th. In only nine, out of the previous 25 years, was a higher minimum noted. The range of the month ·838, is the smallest that has been registered since 1859. On twelve days in the month the barometer varied one-fifth of an inch, but the greatest movement on any day was only ·418 of an inch, recorded on the 9th. This is the smallest day range for any day in September of the previous ten years. When compared with the corresponding data in September, 1865, it is evident how much more favorable to health and life was the present month as regards atmospheric pressure.

Wind-force had a total of 80·15 lbs., which is + 31·52 lbs. more than 1865 had, and + 7·62 lbs. more than the average of the previous nine years. Nevertheless, there were no storms, the greatest pressure to the square foot having been 5·21 lbs., and that only recorded seven times out of the 90 observations recorded. The calms, 17, were —7·12 below the average of the previous eight years. Constant, but moderate, movement was therefore the rule. *South-west*, *west*, and *north-west* winds were alone more numerous than usual, the first and last being also greatly above the average in force, and the west very little below it.

Temperature mean, 52·23 degrees, was + 1·31 above the 20 years' average, though somewhat cooler than 1865 was, *i.e.*, —·09 of a degree. By the self-registering maxima and minima thermometers, the mean was only 51·28 degrees. This is the third month in succession in which this remarkably unusual occurrence of a lower mean by these thermometers, than by the three daily observed ones has been noted. The maximum, 75 degrees, was registered on the 1st; the minimum, 34, on the 13th and 30th. The month's range was consequently 41 degrees, which is greater than in any September since 1857. The mean of all the maxima, or high-day temperatures, was 61·47 degrees, being—1·80 degrees less than last year. The minima or low-night mean was 41·10 degrees, being —2·53 degrees less than in 1865.

The daily-range of temperature had a mean of 20·37 degrees, being + 2·35 above the 20 years' average, and + ·74 of a degree higher than 1865 had. The greatest range on any day was 31 degrees, recorded on the 23rd. This is the highest noted since 1856; that year, 1855, and 1841, only, having a higher range than the previous 25 years. The effects of these wide daily-ranges accompanied with a large amount of ozone, was to cause inflammatory affections of the respiratory organs, from which diseases seven deaths were registered, being one fourth of the whole month's mortality. Not one of the deaths, however, were under 28 years of age, and three of them were aged 63, 69, and 80 years respectively.

Solar-intensity mean 90·11 degrees, was + 2·43 above the mean of the previous ten years, though —.99 of a degree less than in 1865. The maximum was recorded on the 28th, being 106·5, which is—4·5 less than the maximum last year. The minimum was 60 registered twice on the 7th and 24th.

Terrestrial-radiation had a mean of 38·10 degrees, which is—·29 less than the mean of the previous ten years, and—2·07 less than 1865 had. The extremes were 50 degrees on the 1st, 30 on the 23rd.

Rain-fall amounted to 1·88 inches, being only + ·01 more than the average of the 20 years, though—·68 less than 1865 had; nevertheless, my rain-guage gave 2·38 inches for the present month — my guage, however, is on the ground in an open garden, while Mr. Abbott's is more elevated and confined. There were 15 days on which rain fell, being—0·27 less than the average of the previous eleven years, and—2·00 less than 1865 had. The greatest fall recorded on any day was ·45 of an inch on the 7th; but there fell sufficient on many other days, to cleanse the gutters and drains. *Snow* fell in the city on the night of the 7th, and at daybreak the ground and low hills about the city were well powdered with it, but it disappeared by ten o'clock in the morning. There were some slight squalls in the city, of rain, hail, and snow on the 29th. Snow was never absent from Mount Wellington during the month, and received several copious additions.

Humidity mean, 69, was —·7½ below the 20 years' average, and —2 less than 1865 had.

Elastic force of vapour mean, 269, is—11 less than the 20 years' average, and 8 less than 1865 had.

Cloud mean was, 6·27, being + ·52 more than the 20 years' mean.

Ozone mean was, 8·22, being + 0·26 above the average for September of the previous nine years, and + 0·23 more than 1865 had. The range was from 9 maximum to 6 minimum.

Electricity gave 28 positive indications with maximum tension of 7·5, and minimum 2. The negative indications were 32 with maximum tension of 8 and minimum of 2. "Nil" was never recorded. No lightning seen, or thunder heard. On the night of the 19th, about midnight, many persons observed a slight vibration of the earth as though from an earthquake.

28 Deaths for September, 1866, is the smallest number ever yet recorded for this month; and of all the other eleven months for the previous nine years, only January, 1864, had a smaller mortality (24). In May, 1859, there were recorded 29 deaths, and the same number in October, 1861. The present month's mortality is —18 1-9th less than the average of the previous nine years.

Sept., 1866	Ages.	Aug., 1866.	Septembers. 1865	1864	1863	1862	61Min	60Max	1859	1858	1857	Avg. 9 yrs. Sept., 1857–1865.
3	Under 1	1	9	6	5	12	5	8	15	8	7	8 3-9
2	1 to 5	5	2	1	4	5	2	12	4	4	4	4 2-9
1	5 to 20	1	6	4	4	3	2	8	4	0	1	3 5-9
10	20 to 45	10	3	14	8	17	7	12	8	12	10	10 1-9
3	45 to 60	5	9	6	13	10	8	10	8	10	13	9 6-9
9	60 and above	11	15	6	8	9	11	15	11	8	9	10 2-9
28		33	44	37	42	56	35	65	50	42	44	46 1-9

Under "one year old" the deaths were little more than one-third of the nine years' average, and far less than any one year of the nine.

At "1 to 5" years of age, the mortality was less than half the average —1861, however, had only one, and last year and 1861 had the same number as the present year.

At "5 to 20," the deaths were not much above one-fourth of the nine years' average—1858, however, had not any, and 1857 had the same number; all the other seven years had considerably more.

At "20 to 45," the deaths were only a fraction below the nine years' average, four of the years having less, 1857 the same, the others more.

At "45 to 60," the deaths were less than one-third of the average, and but one year of the nine had fewer than double the present month's number.

At "60 and all ages above," the mortality was somewhat below the average—three of the nine years had less, one the same, and the rest considerably more, particularly last year.

Sept., 1866.	Classes of Disease	August, 1866.	Septembers.									Avg. of 9 yrs. Augs '57-'65.
			1865	1864	1863	1862	'61 Min	'60Max	1859	1858	1857	
1	1. Zymotic	3	6	5	4	4	5	11	12	3	3	5 8-9
7	2. Constitutional	8	5	9	9	15	3	18	12	10	5	9 5-9
17	3. Local	12	22	20	23	26	17	32	16	25	25	22 8-9
2	4. Developmental	7	6	3	2	2	9	2	7	1	8	4 4-9
1	5. Violent &c.	3	5	0	4	9	1	2	3	3	3	3 3-9
28		33	44	37	42	56	35	65	50	42	44	46 1-9

The 1st, or *Zymotic class of diseases*, had only one death, or about one sixth of the average. No year of the previous nine had less than three times as many, last year had six. It is remarkable, too, that the solitary death (Metria) occurred in an isolated healthy spot in one of the rural divisions of the registration-district.

The 2nd, or *Constitutional class of diseases*, had somewhat below the average of deaths, though last year and two others had a still smaller number. Five of this class were from *consumption*, but not one of the number was Tasmanian born. Though 1865 had only 3 deaths from this disease, two of them were natives of the island.

The 3rd, or *Local class of diseases*, had considerably less than the average of deaths, and only one year of the nine, 1859, had less, 1861, however, had an equally small number. Last year had many more. In the 1st order, *diseases of the brain and nervous system*, the deaths were 4, while 1865 had 11. The 2nd order, *diseases of the heart and circulatory system*, had 4 deaths, being one more than in 1865. In the 3rd order, *diseases of the lungs and respiratory system*, there were 7 deaths, while 1865 had but one. The 4th order, *diseases of the stomach aud digestive system*, had but one death, 1865 had one. The 5th order, *diseases of the urinary system*, had one death. Last year had four times as many. No other order of this class had any deaths this month, while last year had one in the seventh.

The 4th, *or Developmental class of diseases*, had only 2 deaths, a female, aged 64, and a child, aged nine months. The average is more than twice this number, and last year had three times as many as the present month.

The 5th, or *Violent and Accidental deaths* had only one death, a man, aged 40, registered "diffuse popliteal aneurism," but who had also phlegmonous erisypelas. From an accident there arose great hæmorrhage. necessitating the tying of the great artery of the thigh (femoral), and the subsequent amputation of the limb; the patient, however, died within twenty-four hours. Last year this class had 5 deaths, and the average for the nine years is 3·3-9.

One *Inquest* only was held on a death within this registration district, a man, aged 74, suffering from heart disease, but death was accelerated by exposure to cold. 1865 had 5. In *hospital*, the deaths were 9; last year had 14; none of those dying in hospital this month were from other districts.

At the *Male Invalid Asylum* there was only one death this month; last year there were three.

Of the 28 deaths, 18 were males, 10 females; one died in the Glenorchy, 2 in the Queenborough divisions of the district, the rest in the city.

The most fatal period of the month was the three first days, during which six deaths occurred; two other periods of three days in succession had five deaths each. The first three days of the month were the hottest, a modified hot wind blowing gently on the 1st, but more violently on the 2nd. On the 27th, when four deaths happened, there had been within the previous twenty-four hours a rapid fall of the thermometer as well as the barometer; three of the diseases causing death, were chronic, and of long standing, aged respectively, 22, the fourth 7, 80; was from acute disease of the lungs, aged 23.

In the first week 5 deaths took place; in the second, 8; in the third, 3; in the fourth, 11; in the last two days, 1.

The *births* registered were 55, being 21 less than in September, 1865.

ROYAL SOCIETY.

OCTOBER, 1866.

The monthly evening meeting of the Society was held on Tuesday, the 9th October, J. Barnard, Esq., in the chair.

The Rev. R. McLean, and J. Scott, Esq., M.H.A., who had been previously nominated by the Council, were after a ballot declared to be duly elected Fellows of the Society.

The following returns for the past month were laid on the table:—

1. Visitors to Museum, 748.
2. Ditto to Gardens, 2,578.
3. Seeds received—From Mr. C. F. Creswell, 70 papers.
4. Plants supplied from Gardens:—
   a. To E. M. Lloyd, R.E., for decoration of grounds of Royal Engineer Department, 103 plants.
   b. For grounds at salmon ponds, 235 plants.
   c. To A. Beames, Esq., Sydney, 50 papers colonial seeds.
   d. To L. Samuels, Esq., Sydney, 24 plants.
   e. To W. Forde, Esq., Sydney, 24 ditto.
5. Time of leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
6. Presentations to Museum.
7. Books and periodicals received.
8. List of specimens of Tasmanian gold and gems sent to Royal Exhibition Commissioners.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.
   a. Table for September.
   b. Summary and analysis of observations for ditto.
2. Swansea, from Dr. Story, table for August.
3. Westbury, from F. Belstead, Esq., table for September.
4. Ross, from M. Duncanson,Esq., tables for June, July, and August.

The SECRETARY read the usual monthly "Analysis of the Observatory records, together with those of Births, Deaths," &c., by E. S. Hall, Esq.

The presentations to the Museum and Library were as follows:—

1. From Mr. Horne,per Dr. Officer, two hermit crabs.
2. From Mr. G. W. Rex, one ditto.
3. From Mr. Baynton, Brown's River, jaws of small shark.
4. From Mrs. Ellis, Glenorchy, a specimen of native bread.
5. From Dr. Agnew, Van Diemen's Land almanack, 1832 and 1834, also a very curious old almanack for 1664, printed in London.

The SECRETARY intimated that he had been requested by Mr. Morton Allport, who was unable to be present, to lay before the meeting the following remarks in reference to an error in his (Mr. Allport's) report on the condition of the salmon ova on their arrival at the Plenty in May last:—

It may be in the recollection of some of the Fellows of the Royal Society now present, that in my report of the introduction of the salmon, read in May last, the following sentence occurs:—

"On the present occasion a large number of boxes were packed by Mr. Robert Ramsbottom, father of the Superintendent of the Plenty, the remainder by one of his sons and by Mr. Thomas Johnson. The boxes packed by Mr. R. Ramsbottom were all marked with his initials in pencil, and were found on unpacking to contain a far larger average of living ova than the others, though some of the latter were in better order than any of those brought by the Norfolk," and I then proceeded to draw certain inferences from these circumstances.

By the last mail I received from England a letter from Mr. Thomas Johnson in which he assures me that none of the boxes were packed by him, all having been packed by Mr. R. Ramsbottom, assisted by Mr. Youl, and that the initials upon the boxes had relation only to that portion of the ova which was taken from the fish by Mr. Ramsbottom. In justice to Mr. T. Johnson and Mr. Westal Ramsbottom, therefore, I have now to correct the error contained in my report, and entirely to exonerate them from all blame in reference to the packing. How that error first arose I am unable to ascertain, but my fellow Commissioners and Mr. William Ramsbottom were clearly under the same impression as myself, or they would have called my attention to the mistake long ago.

As to two facts no doubt can possibly exist, as Dr. Officer and Mr. Buckland can both testify, namely, the larger percentage of living ova in the boxes bearing initials, and as to the dead ova in the other boxes being gathered into masses.

Mr. Youl, in a letter written to the editor of *The Mercury*, says that a number of the boxes not initialled were placed at the top of the ice in the ice-house, and were no doubt subjected to far rougher usage whenever the motion of the vessel was great, and that this would account for the death and aggre. gation of the ova. This may be so, and it is likely that the ova once dead, and decomposition going on, many of them burst, and their contents spreading amongst others possibly matted them together, in the manner noticed by Mr. Buckland and myself.

The Secretary reported on Mr. Allport's authority that several young trout had recently been hatched at the breeding ponds, from trout born and impregnated in the colony, and Mr. Allport had been informed that some had been hatched from those which had been placed in ponds, under Mr. McArthur's care, on the other side of the island.

The Secretary in calling attention to the section of an Armstrong shell, recently presented to the Museum, observed it might be interesting to the Fellows present to be informed of the views entertained by Sir W. Wiseman as to the best method of protecting our port against the attack of an enemy. Sir William thought that this, regard being had to our pecuniary resources, could be best accomplished by the erection of two revolving iron turrets, shot proof, and armed each with two heavy rifled guns of greater power than any which a hostile cruiser would be likely to carry. The turrets being placed on sites commanding the entire harbor, their fire would destroy any ship approaching near enough to inflict injury on the town. Vessels protected with the heaviest iron armor, and carrying guns of the largest calibre, could alone contend (although at a disadvantage) against such forts, but ships of this kind are perhaps not likely to visit these distant waters. The turret might be rendered still more formidable by having deep earthen embankments thrown up in its front. These should be raised just high enough to present no obstacle to the fire of the guns, and would not only afford additional protection, but would so screen the turret that its summit alone—even at moderate distances an almost invisible object to fire at—would be exposed to the enemy. The expense of a turret of this kind would be about £10,000.

Dr. Agnew further observed that His Excellency the President was inclined from recent circumstances to think that no defence would be more effective than a steam ram, shot proof from iron plating, and capable of great speed. A vessel of this kind would not necessarily require guns; when prepared for action she could be guided by a crew of three or four hands, and, if driven at the top of her speed against an enemy's ship, she would inevitably sink her, no matter how heavily she might be protected, or how formidable her armament.

Mr. Lloyd (R.E.) had no doubt of the efficacy of the steam ram, but he feared the expense would be far too great for our means. He did not think the cost of one would be much less than £60,000. There would always, too, be the risk of something going wrong just as she was wanted, and then we should be utterly defenceless; on the other hand, with the simple arrangement of guns, mounted either on earthworks, or in iron turrets, no machinery was required, and everything was ready at any time for instant service. In the case, however, either of earthen forts, or iron turrets, it should be borne in mind that a certain number of riflemen would always be required to keep in check any of the enemy who might land for the purpose of annoying the gunners. In the case of a town situated like Launceston, he (Mr. Lloyd) thought that the use of the torpedo would be found to be the most effectual and the least expensive mode of defence. In the narrow channel of the Tamar, at points over which a ship must necessarily pass, torpedoes might be sunk in a manner to defy detection, and as they could be exploded at the right moment from the bank, their effects would be in the highest degree destructive to an enemy.

Further discussion having taken place on the subject brought under notice, and the usual votes of thanks having been passed, the meeting separated.

METEOROLOGY FOR OCTOBER, 1866.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced		Self - registering Thermometers.				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	29·772	29·726	57	41	72·0	30·5	NW SWW	·26	
2	29·850	29·803	64	43	105·0	39·0	NW SE	0·	
3	29·850	29·715	64	41	104·0	39·5	NW W	0·	0·05
4	29·641	29·557	71	48	105·0	46·5	NW SE	0·	0·15
5	29·829	29·826	60	52	66·0	50·0	SW SE	·78	0·14
6	29·965	29·937	63	51	94·0	50·0	SE E	·26	
7	29.987	29·955	69	47	106·0	45 0	N SE NE	·78	
8	29.837	29.539	64	48	95·0	43·0	NW NE N	1·04	
9	29.485	29·340	64	49	90·0	45·0	NW WN W	3·12	
10	29.427	29·287	59	44	101·5	43·5	NW W SW	1·56	0·03
11	29.638	29·516	54	42	92·0	39·0	SS W W	3·38	0·05
12	29·965	29·770	61	42	100·0	40·5	NW W	2·86	
13	30·209	30·133	67	40	109·5	38·5	NW N W	·78	
14	30·315	30·279	69	38	110·0	33 0	NW E SE	1·04	
15	30·305	30·151	64	38	102·0	34·5	NE SE S	1·04	
16	30·106	29·859	75	39	113·0	34·0	W NW SE	·78	
17	29·663	29 612	77	49	108·0	46·0	NW SE	3·12	
18	29·355	29·299	69	50	107.0	50·0	NW N	3·38	0·22
19	29·570	29·483	64	51	103·5	49·0	N SE W	3·38	0·03
20	29·493	28·301	67	45	101·0	42·5	NW	5·46	0·06
21	29·559	29·422	64	50	106·0	47·5	NW W	6·25	
22	29·643	29·500	62	45	96·5	39·5	NW SE	1·30	
23	29·441	29·343	55	48	57·0	46·0	S SE S	10·94	1·75
24	29·641	29·546	53	47	54·0	45·0	S	3·64	0·68
25	29·760	29·719	56	41	80·0	38·0	NE SE	·78	0.15
26	29·867	29·756	58	40	92·5	38·5	NW SW	3·12	0·03
27	30·081	30·008	63	38	104·0	33·5	NW SE	·78	
28	30·053	29 910	69	40	110·0	40·5	NWSW	3·12	
29	29·910	29·826	82	53	119·0	48·0	NW SE	1·30	
30	29·990	29·789	81	47	122·5	47·5	NW SE	1·04	
31	29.837	29·682	90	51	121·0	48·5	NW SE	1·30	

Monthly mean 29·746 56 ·03 98.30 42·32. Total force 66.59 3.34.

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 Guage. 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-five 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 :—

4th. Pailonia Imperialis commencing to flower.
9th. Carpinus commencing to leaf.
15th. Ailanthus glandulosus ditto ditto.
17th. Tilia Europœa ditto ditto.
20th Morus niger ditto ditto.
25th. Maclaura aurantiaca ditto ditto.
25th. Ulmus Campestris, seeds commencing to fall.
28th. Melia azederach commencing to leaf.

Barometer mean, 29 746in., being 0·038in. below the average.
Temperature mean, 56·03°, being 2·09° above the ditto.
Solar intensity mean, 98 30°, being 2·70° above the ditto.
Dew point mean, 46·3°, being 1·9° above the average.
Humidity of air mean, ·75, being ·02 per cent. above the ditto.
Elastic force of vapor mean, ·334,being ·034 per cent. above the ditto.
Total amount of rain, 3·34in., being 1·37in. above the ditto.
Increase of spontaneous evaporation on rainfall, 1·75in.
Mean amount of ozone, 8·10, being 0·18 on chromatic scale above the ditto.
Electricity active on the 1st, 10th, 12th, 14th, 16th 21st, and 30th.
Squally on the 11th with hail, rain and snow.
Thunder on the 3rd.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR OCTOBER, 1866, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

Though many of the meteorological phenomena were abnormal in character this month, yet, on the whole, the weather was most auspicious to health and life, and specially so to all children and young persons, and even to adults under 60 years old. Very aged and weakly persons constituted the principal mortality of this October, and in a greater proportion to the total deaths at all other ages, than any other October on record.

Atmospheric pressure did not undergo any extreme daily variations, the greatest being a fall of — ·318 of an inch on the 8th, which is less considerably than in any October of the previous eleven years. Nevertheless, there were 13 days on which the barometrical movements exceeded one-fifth of an inch. The maximum pressure, 30·315, was recorded on the 14th, and the minimum, 29·287, on the 10th; so that in five days there was a range of 1·028 inches, and more deaths occurred from 11th to 14th inclusive than any other consecutive four days in the month. The mean of the month was 29·746, which is — ·034 below the twenty years' adopted standard mean for October.

Wind-force was unusually moderate for this generally very boisterous month. The total force was only 66·59lbs., which is — 33·69lbs. less than the average of the previous nine Octobers. The diminution, moreover, was in winds from those quarters least favorable to health. *South-east*, *Sonth*, and *West* had all more than the average force, the other five points had all less. The strongest winds registered had 5·21lbs. pressure to the square foot, and were recorded three times only. *Calms* were 21 times registered, 14 of them being in the first week of the month. The nine years' average is — 6·22 less. October 1865 had + 20·30lbs. more wind-force than the present month. No *hot winds* occurred,though it is probable from some other of the phenomena that winds of that type prevailed on the last three days of the month on the Australian continent.

Temperature mean, 56·03 degrees, is 1·58 above the 20 years' mean for October, and + 2·36 more than October 1865 hed. The self-registering maxima and minima thermometers gave a mean of only 55·37 degrees. This is now the fourth month in succession in which this very unusual discrepancy has been noted. The maximum was 90 degrees on the 31st. Once before, during the previous 25 years, this thermometer attained the maximum of 91·5. This was in October 1845. No other October had a maximum exceeding 85·9. The maximum of the present month occurred in a very remarkable manner:—Both the previous days were hot, having maxima respectively of 81 and 82 degrees,—on the 31st at 7 a.m., the observed thermometer was registered at 64, and at 1 p.m., 67. In the interim did the intense heat of 90 degrees, recorded by the self-registering thermometer, occur ?—and that was just before 10 a.m., for shortly after that time a strong cold sea breeze set in, and reduced my ordinary attached-thermometer 23 degrees in two hours, the barometer rising rapidly at the same time. The mean of all the maxima, or high-day temperatures, was 65·65 degrees, while 1865 was 65·58. The mean of all the minima, or low-night temperatures, was 45·10 degrees, 1865 being 45·95 The minimum was 38 degrees, registered on the 14th, 15th, and 27th. Both 1865 and 1864 had the same minimum of 38. The month's extreme range was 52 degrees, being the greatest recorded, with the exception of October 1865, which had a range of 56 degrees. The self-registering maxima and minima wet-bulb thermometers had a mean of little more than four degrees less than the dry-bulb mean, being 51·08 degrees.

Daily-range of temperature mean, 20·55 degrees, is + 1·53 above the 20 years' average, and + 1·23 more than 1865 had. The extremes were, maximum 39, on the 31st; minimum 6, on the 24th. No October in the previous 25 years had so high a maximum. Last year was 38, and singularly enough occurred also on the 31st day of the month. In 1862, also, a maximum of 38 degrees was recorded. The first twelve days of the month had a mean of nearly four degrees less in daily-range than that of the whole month; on these twelve days only 8 deaths occurred, while on the remaining 19 days there were 27.

Solar-intensity had the mean of 98·30 degrees, being + 2·70 degrees more than the average of the previous 10 years, and + 1·12 higher than 1865 had. As cloud mean was above the 20 years' average, it is evident that the sun's rays must have been unusually intense while they were unobstructed. The maximum, 122·5 degrees, was noted on the 30th, and was higher than ever occurred before in any of the Octobers recorded. The minimum was 54 degrees on the 24th, which was a cold wet day, with a fresh south wind.

Terrestrial-radiation had a mean of 42·32 degrees, which is only + ·33 of a degree above the mean of the previous 10 years, but — ·84 of a degree less than 1865 had. The extremes were, maximum 50, on the 5th, 6th, and 18th; minimum 30·5, on the 1st.

Rainfall amounted to 3·34 inches, being + 1·37 more than the 20 years' average for October. Only 1861, in the previous 25 years, had a greater rainfall, *i.e.*:—5·04 inches. There were twelve wet days, being—2·90 less than the average of the previous 11 years. The greater part of the deposit fell on the 23rd, 24th, 25th,—*i.e.*, 1·75, ·68, ·15, respectively. This gave a thorough cleansing to the sewers and city rivulet, and approached very nearly to a flood. *Snow* was never absent from Mount Wellington during the month. On the 11th it was coated afresh to its base, and showers of mixed snow, hail, and rain fell even in the city, but did not whiten the ground.

Humidity mean, 75, was + 2 more than the 20 years' average.

Spontaneous-evaporation considerably exceeded rainfall, being 5·09 inches.

Elastic force of vapor mean, 334, was + 33 above the 20 years' average. Out of the previous 25 years, only 1858 had a higher mean, *i.e.*, 341. The range was, from minimum 154 on the 12th, to maximum 494 on the 31st. Though the mean of 1865 was 29 less than the present month, the extremes were both higher and lower, *i.e.*, 517 and 118.

Cloud mean, 5·88, was + ·26 above the 20 years' average, though — ·87 less than in 1865.

Ozone mean, 8·10, was + ·18 above the 9 years' average, though — ·78 less than October 1865 had. Consequently the present month, while even more free from zymotic diseases than that month was, had also a smaller amount of those acute inflammatory diseases of the respiratory organs than was then recorded. Saturation, 10, was registered four times, and the minimum was 6. Last year saturation occurred nine times, and the minimum was 7.

Electricity had 30 positive indications, with tension ranging from maximum 8·5 to minimum 2·5. In 1865 there were only 24 positive, with tensions ranging from 8 to 2·5. There were 27 negative, with tensions ranging from 8 to 1·5. Last year they were 36, with range of tension from 7 to 1·5. There were 5 "*Nils*" this month, while 1865 had only 2. No *lightning* was observed, but *thunder* was heard on the 3rd of the month.

The *Deaths* for this October, 35, were nearly 20 per cent. below the average of the previous nine years. Two years out of the nine, 1862 and 1861, had a smaller number, but the other seven had considerably more; 1865 had five more.

Oct., 1866	Ages.	Sept., 1866	Octobers. 1865	1864	1863	1862	'61Min	1860	1859	58 Max	57 Max	Avg. 9 yrs. Octs., 1857–1865.
6	Under 1	3	8	8	4	2	8	6	9	9	10	7 1-9
1	1 to 5	2	0	3	6	3	3	10	3	15	7	5 5-9
0	5 to 20	1	2	4	2	2	0	4	6	4	3	3
9	20 to 45	10	11	8	8	9	12	10	7	12	10	9 6-9
6	45 to 60	3	6	8	13	4	2	8	9	6	22	8 6-9
13	60 and above	9	13	10	16	10	4	7	7	11	5	9 2-9
35		28	40	41	49	30	29	45	41	57	57	43 2-9

In every group of ages, under 60 years old, the deaths were below the average of the previous nine years by more than one-third,—the average being 34,—while this month's amounted to only 22.

At " 60, and all ages above," the mortality was considerably above the average. 1865 had the same number, 1863 three more, but all the other sevenyears much less. Eight of the 13 were between 60 and 70 years old; 3 between 70 and 80; and 2 aged respectively 86 and 87 years old.

In no October of the nine years were the deaths under 20 years old so few as in the present month. This is a sure indication of the general salubrity of the weather.

Oct., 1866	Classes of Disease	Sept., 1866.	Octobers. 1865	1864	1863	1862	1861	1860	1859	'58 Max	'57 Max	Avg. of 9 yrs. Octs. '57-'65.
0	1. Zymotic	1	2	2	6	3	1	12	4	11	6	5 2-9
9	2. Constitutional	7	8	6	10	9	2	9	5	13	9	7 8-9
19	3. Local	17	17	22	26	12	17	22	28	23	30	21 8-9
5	4. Developmental	2	10	6	2	5	7	1	3	7	4	5
2	5. Violent &c.	1	[illegible]	5	5	1	2	1	1	3	8	3 2-9
35		28	40	41	49	30	29	45	41	57	57	43 2-9

In the 1st, or *Zymotic class of diseases*, no deaths occurred, which is of very rare occurrence indeed. October 1865 had 2, and the nine years' average is 5 2-9.

The 2nd, or *Constitutional class of diseases*, had somewhat more than the average number of deaths; seven of the 9 were from *Consumption*, two of the sufferers, having been born in Tasmania, females aged respectively 23 and 35.

In the 3rd, or *Local class of diseases*, the deaths were slightly below the average, though two more than 1865 had. The 1st order of this class, *Diseases of the brain and nervous system*, had 4 deaths, being one less than 1865 had. The 2nd order, *Diseases of the heart and organs of circulation*, had 7 deaths, being 3 more than in 1865. The 3rd order, *Diseases of the lungs and organs of respiration*, had 4 deaths, 1865 had one more. The

4th order, *Diseases of the stomach and organs of digestion*, had 4 deaths, 1865 had only 2. In no other order of this class were there any deaths this year, in last October there was one in the 7th order.

The 4th, or *Developmental class of diseases*, had 5 deaths, three of them from old age, the fourth a child five weeks old, the fifth three months old; 1865 had 19. The average of the nine years is 9.

The 5th, or *Violent and accidental class of diseases*, had 2, which is considerably below the average, and one less than 1865 had. One was *poisoning* from arsenic, taken in an attack of drunkard's delirium; the other found *drowned.*

The *Inquests* were three, last year had 4. In *Hospital* 8 deaths took place, 1865 had 15. Two of the cases were admissions from country districts, one a Sandwich islander from a whaler in harbor, two others from the Penitentiary. At the *Male Invalid Asylum* 7 deaths took place, aged respectively 58, 63, 66, 74, 77, 86, 87. Surely some of these long-afflicted, hopeless, and aged men ought to have been removed to the Hospital to die on beds somewhat more comfortable than straw ones can possibly be? In October 1865 there were only 4 deaths in this Asylum. Of the 35 deaths, 24 were males, 11 females. One death occurred in the Glenorchy division of the Registration-district; the rest in the City.

In the first week of the month the deaths were only 4; in the second, 11; in the third, 10; in the fourth, 3; in the last three days, 7. The most fatal period of the month was the nine days, 13th to 21st, when nearly half of the whole month's mortality took place. For any two consecutive days, the 13th and 14th, and 29th and 30th, had the greatest number of deaths, the first having 2 and 5 respectively, and the second 3 and 4.

The *Births* registered were 73, being 8 more than in October, 1865.

ROYAL SOCIETY.

NOVEMBER, 1866.

The monthly evening meeting of the Fellows was held on Tuesday, the 13th of November, F. Abbott, Esq., in the chair.

The Secretary, Dr. Agnew, laid on the table the following returns for the past month:—

1. Visitors to Museum 501.
2. Ditto to Gardens 2624.
3. Plants and seeds received at Gardens:—
   a. From G. Salier, Esq., 40 papers of New Zealand seeds, gathered by Mr. A. Begg.
   b. From A. Verschaffelt, Ghent, Belguim, 100 named varieties of Ranunculus, in good condition.
4. Times of leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
5. Books and periodicals received.

Meteorological Returns:—

1. Hobart Town, from F. Abbott, Esq.
   a. Table for October.
   b. Summary of observations for ditto.
2. Port Arthur, from J. Boyd, Esq.
   a. Table for September.
   b. Reading of Government schooner's barometer for ditto.
3. Westbury, from F. Belstead, Esq.
   a. Table for October.

The Secretary read the usual monthly analysis of the observatory records, together with those of births, deaths, &c., by E. Swarbreck Hall, Esq.

The Presentations to the Museum and Library were as follows:—

1. From G. Barnard, Esq., six prepared bird skins, and four packets seeds from Queensland.
2. From Dr. Officer, specimen of black-cheeked Falcon *(Falco melanogenys.)*
3. From C. A. Glover, Esq., Sorell, a collection of land and freshwater shells procured at Sorell.
4. From Sergeant Eccleston, R.A., a black snake and a whip ditto.
5. From Miss Stone, a collection of fossil shells *(Tertiary)* from Western Point, Victoria.
6. A young black snake and a lizard from Huon Road.
7.
8. From H. Hinsby, a young Echidna.
9. From Justin Browne, Esq., a collection of pamphlets by the late Rev. Wm. Day, chiefly in the Samoan language.

The following Memorandum from the Superintendent of the Botanic Gardens was read:—

Memo.

It would be desirable to draw the attention of agriculturists to the large collection of grasses &c., at present growing in the Royal Society's

Gardens, many of which it would be desirable to bring more extensively into cultivation. There are about 300 varieties of grasses, clover &c., ; 100 of wheat, oats, and barley; 200 peas and beans. 100 maize, and between 30 and 40 varities of tobacco. The greater portion of the above have been introduced during the present year, and it remains to be determined which will be best suited to the climate of Tasmania.

F. ABBOTT, Junr.

Mr F. Abbott, Senr., read some notes on Atmospheric Meteors. Discussion ensued, and after passing the usual vote of thanks to the donors of presentations the meeting broke up.

NOTES ON ATMOSPHERIC METEORS. By F. Abbott, F.R.A.S.

It may be well to remind the present meeting of the great amount of interest which is just now attached to Meteoric Astronomy. The period of speculation on the little understood objects, Meteors, dates from the time of Aristotle (330 B.C.), and, although observations upon them have been carried on ever since that time, little has been known, until recently, respecting their height, velocity, and composition.

That they are atmospheric will appear from their height, which ranges from 35 to 75 miles, or a mean of about 60 miles, their speed, light, and detonating properties being about equal to that of an electric spark.

That they are astronomical will appear from their annual appearance in unusual numbers on the 9th and 11th of August, and again on the 12th and 14th of November. These known dates have led to periods of prediction, from which it is ascertained that the November meteors return in their greatest magnificence every 33 years, so that their central conjunction with the earth has been estimated by Professor Newton, of Yale College, U.S., to occur as to-night or to-morrow night, 13th or 14th November, 1866, when may be expected a prodigious flight of meteors, the most imposing of its kind, and which may not occur again during the present century.

As these fertile periods of meteors have not, to my knowledge, ever been observed in Tasmania, it will be interesting to know if this prediction is verified. They are observed usually to diverge from Leo, which constellation will rise about 3 o'clock, a.m., at Hobart Town, but it will be well to look for them about midnight and sunrise.

For those who like to take part in this curious enquiry, I have brought some blank forms which may be filled up at the time of observation, according to the precept at the head of the columns.

METEOROLOGY FOR NOVEMBER, 1866.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced		Self-registering Thermometers.				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	29·433	29·290	62	50	99·0	49·0	NW W	5·46	0·08
2	29·583	29·394	62	47	90·5	45·0	N NW SW	5·72	0·21
3	30·074	30·003	60	42	100·0	39·0	NW NE SE	1·30	0·02
4	29·980	29·691	71	41	121·0	37·5	NW	6·25	
5	30·139	30·064	75	50	113·0	47·0	NW NE SE	1·76	
6	29·992	29·622	80	44	117.5	44·0	NW N	3·12	
7	29·924	29·818	77	52	107·0	50·5	NE SE SW	·52	0·06
8	30·084	30·057	59	38	95·0	35·5	NW SE N	·78	
9	29.975	29·846	62	46	85·5	41·0	NW SE SW	·78	0·11
10	29.837	29·754	55	47	61·0	50·0	NW S SW	3·12	0·31
11	29.837	29.776	63	49	86·0	49·5	SE	1·56	0·45
12	29.563	29·359	64	45	110·0	47·0	NE NW SE	1·30	0·19
13	29.778	29·556	56	43	62·0	42·0	S SW	8·31	1.68
14	30·001	29·930	56	44	107·0	41·5	SW SE	5·72	0·14
15	30·062	30·032	59	46	95·0	43·0	S SE	1·56	0·03
16	29·892	29·741	67	47	115·0	47·5	NW E S	1·30	0·15
17	29·665	29·630	56	45	99·0	47·0	SW W	3·12	0·04
18	29·892	29 868	65	47	109·0	45·0	SW SE	3·38	0·05
19	29·968	29·961	65	47	113·5	44·5	NW SE	1·30	
20	29·916	29·829	72	47	118·0	45·0	NW	1·30	
21	30·028	30·020	67	47	110·5	44·0	NE SE SW	1·04	
22	29·769	29·259	67	51	73·0	50·0	NW NE N	1·04	
23	29·815	29·595	67	51	110·0	49·0	NW W	1·04	
24	30·051	30·040	69	43	110·0	41·0	NW SE	1·76	0·02
25	30·052	29·846	70	50	106·5	48·0	N S	1·30	
26	29·718	29·625	66	48	108·0	45·0	NW W SW	3·64	
27	29·795	29·754	62	43	108·0	41·0	SW NE W	1·30	
28	29·748	29·597	61	44	103·5	40·5	N NE SE	·78	
29	29·456	29 291	66	46	97·5	43·0	NE NW SW	3·38	
30	29·810	29·755	66	44	106·0	45·5	NW	3·12	
Monthly mean	29·794		56	·46	101.23	44·58.	Total force	75.68	3.54

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 Guage. 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-five 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 :—

14th. First ripe Cherry gathered.
20th. First ripe Strawberry ditto.
24th. Black Mulberry in full blossom.
27th. Pomegranate commencing to flower.
27th. Bougainvillæa spectabilis in full bloom.

Barometer mean, 29 794in., being 0·073in. above the average.
Temperature mean, 56·46°, being 1·08° below the ditto.
Solar intensity mean, 101 23°, being 0·58° below the ditto.
Dew point mean, 46·3°, being 0·44° below the ditto.
Humidity of air mean, ·71, the same as standard for 25 years.
Elastic force of vapor mean, ·321,being ·004 per cent. below the ditto.
Total amount of rain, 3·54in., being 0·70in. above the ditto.
Increase of spontaneous evaporation on rainfall, 0·17in.
Mean amount of ozone, 7·92, being 0·36 of chromatic scale above the ditto.
Electricity active on the 4th, 5th, 6th, 24th 27th, and 30th.
A thunder storm on the 16th. Snow on Mt. Wellington during the months except from the 3rd to the 11th.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR NOVEMBER, 1866, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. By E. Swarbreck Hall.

Though the Meteorological phenomena this month, were in many respects abnormal, the deaths were nevertheless below the average of the previous nine years' Novembers. The air was pure and the rainfall large, so that in the Zymotic class of diseases there was not a single death recorded. On the other hand, atmospheric pressure underwent frequent and extensive daily perturbations; temperature, also, was considerably below the average, with wide daily ranges. The diseases, therefore, most influenced by the latter phenomena, were more fatal proprotionately to the whole mortality than usual.

Atmospheric pressure mean, 29·794, differed very little from the 20 years' adopted standard mean, being only +·069 higher. The maximum, 30·139, occurred on the 5th. No year since 1854 had so low a maximum. The minimum, 29·259, was noted on the 22nd, and was in no way remarkable. The month's range ·880, in 17 days was smaller than has been recorded since 1854. Nevertheless, the daily perturbations were more than usually great, the highest being a rise of +·680 of an inch on the 3rd. The next in amount was a fall of—·588 on the 22nd. Altogether, there were 15 days on which the movements of the barometer exceeded one fifth of an inch. These facts show how much an enquirer might be led astray in weighing the influence of atmospheric pressure on health and life, by depending on monthly averages, instead of scrutinising the daily variations. Persons suffering under hopeless diseases of long standing succumbed in great numbers to the rapid and extensive mutations of atmospheric pressure and temperature, as the analysis of the mortuary records from cancer, consumption, heart, and other chronic diseases will hereafter show.

Wind-force had a total of 75·68 lbs., which is—36·65 lbs. less than the November average of the previous nine years, and—61·22 lbs. less than 1865 had. Nevertheless, when the frequency and force of the winds from the different points of the compass are examined in reference to their salubrity, it is evident that the present month, with a force so much below what is usual, on the whole had a preponderance from those quarters from which the purest (most highly ozonised) winds blow. *South-east, south, south-west, west,* were noted 44 out of the 90 observations, but with 43·95 lbs. of the 75·68 lbs. total force, or considerably more than one half. Last year the three first of these winds had not so much force as in the present year, by 14·81 lbs. The greatest force noted was, 5·21 lbs. pressure to the square foot, recorded twice, one being a *south,* and the other a *north-wet-*wind. Only 6 *calms* were registered being—3·67 less than the nine years' average, and two less than 1865 had. Constant but moderate winds, principally from the healthiest quarters, characterised the present month, and had a neutralising effect on other less propitious meteorological phenomena.

Temperature mean, 56·46 degrees, is—1·33 below the 20 years' mean, and—2·77 less than 1865 had. November 1863 was nearly a degree colder, but no other November since 1854 was nearly so cold as the present year's. The mean of the self-registering maxima and minima thermometers, was again lower than the observed ones, being only 55·32 degrees. The maximum was 80 degrees, noted on the 6th. Last year the maximum was 95 degrees. Only four times in the previous 25 years, were there lower maxima than the present month had. The mean of all the maxima, or high-day temperature records, was 64·50 degrees, being —6 degrees below that in November 1865. The minimum temperature recorded was 38 degrees, which is one degree less than 1865 had, and from 3 to 8 less than any year since 1854. The mean of all the minima or low-night temperature records, was 46·13 degrees, being —2·64 less than 1865 had.

The mean *Daily-range of Temperature*, 18·97 degrees, is + ·13 above the 20 years' mean, though —3·74 degrees less than 1865 had. The greatest range on any day was 36 degrees on the 4th and 6th; and the smallest range on any day was 8 degrees on the 10th. Only 1865, 1864, 1846, 1843 had a greater range on any day in the month, than that of the present month.

Solar-intensity mean, 101·23 is,—·58 less than the average of the previous ten years, and —6·50 below last year's mean, the present month having been much more cloudy. The maximum was 121 on the 4th, the minimum 61 on the 10th. Last year the extremes were 129 and 71 degrees.

Terrestrial-radiation had the mean of,44·58 degrees, being —1·91 degrees less than the average of the previous ten years, and —1·90 below the mean of November 1865. The extremes were:—Maximum, 50·5, on the 7th; minimum 35·5 on the 8th. Last year the corresponding records were respectively, 51 and 39 degrees.

Rain-fall in the aggregate amounted to 3·54 inches, being + ·78 of an inch above the 20 years average for November, and + 1·51 more than 1865 had. On the average of the last 25 years November is much the wettest month of the twelve. Eight out of the 25 years, however, had heavier rain-falls than the present month. Four of them were consecutive:—1848, 1849, 1850, 1851. In 1849 the maximum of the 25 years, 8·94 inches, was recorded. Rain fell on one half of the days of the month, being + 2·18 more than the average of the previous eleven years, and + 3·00 more than 1865 had. On the ten days, 9th to 18th, rain fell every day, and very heavily on the 10th, 11th, 12th, 13th, their total being 2·73 inches and causing a partial flood. This thorough cleanings of the rivulet and the other sewer channels of the city, was an admirable preparatory preservative for the health of the community during the warm months of summer. *Snow* was seen on Mount Wellington every day of the month, except from 3rd to 12th, on the latter day the mountain was copiously mantled with a fresh deposit and a patch of it remained unmelted on the last day of the month.

Spontaneous Evaporation only slightly exceeded precipitation, being 3·71 inches. 1865 had 5·46 inches.

Humidity mean, 71, was + 5 more than last year, but exactly the same as the mean of the 20 years' standard.

Elastic-force of Vapor had the mean of 321, which is —6 less than the 20 years' average, and —11 less than 1865 had.

Cloud mean, 6·68, was + ·59 more than the 20 years' mean and + 1·09 above the 1865 mean.

Ozone mean, 7·92, was + ·36 above the mean of the previous 9 years, though —·54 less than 1865 had. No doubt the greater aerial movement in 1865 accounts for the preponderance. The point of saturation (10) was recorded three times in the present month, and the minimum noted was 6·5. So much ozone, low and variable temperature, and keen southerly winds, caused inflammatory affections of the respiratory organs—and the deaths in this class of diseases were above the average. On the other hand, the same weather was quite antagonistic to the diseases of the miasmatic order in the Zymotic class.

Electricity records were:—25 positive with tension ranging from 7 to 2·5; Negative 34, with 7·5 to 1·0 tension. Only one Nil. *Thunder* and *lightning* accompanied a rain storm on the afternoon of the 16th.

The *Deaths*, 36, for November 1866, are less than the average of the previous nine years, by 3 6-9 and one lower than in 1865. Two years of the nine, however, 1863 and 1859, had fewer deaths than the present year.

Nov., 1866	Ages.	Oct., 1866.	Novembers. 1865	1864	1863	1862	1861	60 Max.	59 Min.	1858	1857	Avg. 9 yrs. Novs., 1857-1865.
3	Under 1	7	4	4	7	12	9	7	4	3	6	6 2-9
1	1 to 5	1	0	2	1	6	3	8	3	7	6	4
4	5 to 20	0	2	6	4	3	2	5	2	3	4	3 4-9
9	20 to 45	9	7	12	6	9	11	9	11	12	14	10 1-9
8	45 to 60	6	8	9	5	6	7	11	4	7	5	6 8-9
11	60 and above	13	16	10	7	9	7	11	5	6	10	9
36		36	37	43	30	45	39	51	29	38	45	39 6-9

"Under 1 year old" the deaths were less than half of the nine years' average, 1858 had the same number, but no year had less.

At "1 to 5" years old, the mortality, 1, was only one-fourth of the average. Last year had not a single death in this group—1863 had the same as the present month, but all the rest had many more. At "5 to 20" the deaths, 4, were a few fractions above the average. 1865, 1861, 1859, had each only half the number of the present month but 1864. 1860 had both more. At "20 to 45" years of age, the mortality, 9, was below the average, though more than 1865 and 1863 had. At "45 to 50" the deaths, 8, were above the average, though the same in number as in 1865. "At 60 and all ages above" the deaths, 11, were above the average though 5 less than 1865 had, of the eleven, five were above 70 years old the oldest being 81.

Nov., 1866	Classes of Disease	Octr., 1866.	Novembers. 1865	1864	1863	1862	1861	60 Max.	59 Min.	1858	1857	Avg. of 9 yrs. Novs. '57-'65.
0	1. Zymotic	0	3	1	3	8	3	4	4	6	4	4
11	2. Constitutional	9	9	11	6	7	4	5	6	6	4	6 4-9
20	3. Local	19	21	20	16	22	18	36	13	22	26	21 5-9
3	4. Developmental	6	4	6	2	5	8	2	3	1	4	3 8-9
2	5. Violent &c.	2	0	5	3	3	6	4	3	3	7	3 7-9
36		36	37	43	30	45	39	51	29	38	45	39 6-9

The 1st, or *Zymotic class of diseases* had not a single death, being the only November in the ten years so exempt. Moreover the previous month of October was similarly characterised.

The 2nd, or *Constitutional class of diseases*, was not much short of being double the average. In the previous 9 years, only 1864 had as high a number of deaths. The 11 deaths were:—1 from *dropsy*, 4 from *Cancer*, 6 from *Consumption*. Of the latter, 2 were born in Tasmania. In 1865 the deaths from Consumption were only 4, but the previous year had the same number as the present one.

The 3rd, or *Local class of diseases*, had a mortality slightly below the average as well as less than 1865 had. The 1st order, "*Diseases of the*

Brain and *Nervous System*," had 4 de[illegible] 2 less than 1865 had. The 2nd order, *Diseases of the Heart and [illegible] of circulation*, had 6 deaths, which is 2 more than 1865 had. The 3rd order, *Diseases of the Lungs and organs of respiration*, had 7 deaths while 1865 had only 2. No doubt the low temperature, &c., of the present month will account for the difference. The 4th order, *Diseases of the Stomach and digestive system*, had but one death, while 1865 had 4. The 5th order *Diseases of the Urinary system*, had 2 deaths, being one less than 1865 had. In the remaining orders there were not any deaths, last year had one each in the 6th and 7th.

The 4th, or *Developmental class of diseases*, was some fractions below the average in its deaths, and 25 per cent. less than 1865 had. One was an infant which only survived its premature birth 13 days, the other 2 were old men, aged respectively 78 and 81 years.

The 5th, or *Violent and Accidental class of diseases*, had little more than half the average deaths, though 1865 had not any at all; one was a boy 11 years old who died from *the bite of a snake* on his arm, while bathing in a pond. He died in less than three hours not having any medical treatment. The other was a man of 46 thrown out of a cart, and the *spine fractured.*

Inquests were 3, two of them being the cases above alluded to, the third died suddenly from *Serous Apoplexy* while in a state of intoxication. In *Hospital* there were 11 deaths, being one more than in 1865. One was an admission from a country district. In the *Brickfields Male Invalid Asylum*, there were 4 deaths, respectively aged 61, 65, 77, 78, being 2 less than in 1865.

Of the 36 deaths, 22 were males, 14 females. Two died in the Glenorchy division of the Registration District, the rest in the city.

In the first week the deaths were 10; in the second, 7; in third, 10; in the fourth, 8; in the last two days, 1. For any two consecutive days the greatest number, 6, occurred on the 7th and 8th, when temperature fell rapidly from the maximum of the month, accompanied by a rapid rise in the barometer. Generally the deaths were more equally distributed throughout the month than is usual. Last year exhibited a marked contrast to the present, the deaths being first week, 14; second, 7; third, 10; fourth, 6; last two days none.

The registered *Births* were only 63 being—14 less than in November 1865.

ROYAL SOCIETY.

METEOROLOGY FOR DECEMBER, 1866.

Private Observatory, Hobart Town.

Day of month.	Bar. 37 feet abv. sea level, cor. & reduced — Highest.	Lowest.	Self-registering Thermometers. — Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind. — Direction from three daily registers.	Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	29·996	29·968	67	47	105·5	45·0	NW SE	1·04	0·30
2	30·152	30·087	57	47	62·0	44·0	NE SE	3·12	0·13
3	30·264	30·234	63	42	106·0	39·5	SE	1·30	
4	30·297	30·254	67	41	112·0	38·5	NW SE NE	1·30	
5	30·214	30·065	69	43	112·0	42·5	NW SE	1·30	
6	30·029	30·012	61	45	101·5	44·0	SW	7·80	0·05
7	30·074	30·062	62	40	108·0	37·5	W SE E	·78	
8	30·027	29·760	68	49	106·0	45·0	NE	3·64	
9	29·625	29·531	76	53	117·0	53·5	NW NE SE	·78	0·17
10	29·785	29·764	70	46	113·0	44·0	W SE NE	·52	
11	29·744	29·598	75	52	113·0	50·5	NW S E	1·30	0·92
12	29·775	29·737	67	54	78·0	50·0	SE E	1·04	
13	29·945	29·829	74	43	114·0	42·0	NW SE	1·30	
14	29·980	29·960	70	53	114·0	51·5	NW SE	1·04	0·05
15	30·122	30·095	70	47	113·5	45·5	E SE S	1·30	
16	29·906	29·814	59	50	60·0	53·0	SE SW S	·26	0·61
17	30·052	29·895	59	46	105·0	41·0	SE	1·30	0·05
18	30·071	30·013	67	45	111·0	42·0	NW E NE	1·04	
19	29·964	29·791	66	50	106·0	50·5	NW N NW	·78	
20	29·916	29·737	61	49	84·0	45·5	SW S SW	1·04	1·21
21	30·086	30·070	64	48	110·0	45·5	SW SE	3·12	0·10
22	30·118	29·997	70	52	113·5	51·0	NE SE	1·30	
23	29·851	29·615	80	53	120·0	50·5	NW	7·80	
24	30·011	29·902	75	52	105·0	50·0	NW SW SE	·78	
25	29·972	29·671	73	49	79·0	46·5	NW E W	·78	
26	29·630	29·394	75	51	115·0	50·5	NW	7·81	
27	29·779	29·655	68	57	102·5	49·0	NW	8·13	
28	29·885	29·849	73	53	109·5	49·0	NW W	13·02	
29	29·944	29·915	78	57	120·0	56·0	NW SE	2·86	
30	29·905	29·891	80	52	120·0	50·0	NW SE	1·30	
31	29·926	29·744	79	52	120·0	52·0	NW SE E	1·04	
Monthly mean	29·915		60·87		105·03	46·94.	Total force	80·12	3.59

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 Guage. 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-five 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 :—

12th. Common Privet commencing to flower.
15th. First bunch red currants ripe.
20th. First bunch black currants ripe.
25th. Melia azederach commencing to flower.
31st. Doyenne d'Ete Pear commencing to ripen.

Barometer mean, 29·915in., being 0·170in. above the average.
Temperature mean, 60·87°, being 0·25° below the ditto.
Solar intensity mean, 105·03°, being 2·06° above the ditto.
Dew point mean, 50·06°, being 1·04° above the ditto.
Humidity of air mean, ·69, being ·01 per cent. above the ditto.
Elastic force of vapor mean, ·368, being ·016 per cent. above the ditto.
Total amount of rain, 3·59in., being 1·86in. above the ditto.
Increase of spontaneous evaporation on rainfall, 1·38in.
Mean amount of ozone, 7·51, being 0·32 of chromatic scale above the ditto.
Electricity active on the 3rd, 4th, 5th, 6th, 7th, 26th, and 29th.
Heavy thunder, strong flashes of lightning, with much rain, on the 11th.

FRANCIS ABBOTT.

ANALYSIS OF THE OBSERVATORY RECORDS FOR DECEMBER, 1866, IN CONJUNCTION WITH THOSE OF BIRTHS, DEATHS, &c. BY E. SWARBRECK HALL.

While December, 1865, had the smallest mortality for any December of the last ten years, the present month's deaths were more numerous than any, except 1862 and 1859, and exceeded last year's by upwards of 66 per cent., and the average of the previous nine years by about 15 per cent. In the analysis of the different meteorological phenomena of the present month, contrasted with December, 1865, it will be seen, that atmospheric pressure, wind movement and its purity, heat of the sun, elastic force of vapour, were all less favorable to health than in 1865. The weather generally, however, was both pleasant to the feelings, and conducive to vegetation.

Atmospheric pressure had the very high mean of 29·915 inches, being + ·145 above the 20 years' standard mean, and + ·253 higher than December, 1865, had. Only December, 1855, out of the previous 25 years, had a greater mean pressure. The maximum, 30·297, occurred on the 4th, and the minimum, 29·394, was recorded on the 26th. Only 1855 had a higher maximum, and only 1862 and 1847 had higher minima. The extreme range of pressure for the month was only ·903 of an inch, and has often been exceeded; December, 1865, had a range greater by + ·180. The greatest movement in the mercurial column was a fall of - - ·408 of an inch on the 23rd, followed by a rise next day of + ·288. There were six other days on which the movement exceeded one-fifth of an inch. Continuous high pressure, with moderate deviations therefrom, either by rises or falls of the barometer, characterised this month.

Wind-pressure total was 80·12lbs., which is — 7·30lbs. less than the average of the previous nine years. *South-east* winds were the most numerous, but *north-west* had the greatest force. Though 1865 had a less total force than the present year, yet winds from *south-east*, *south*, *south-west*, *west*, the healthiest winds that blow, were about one-fourth more forcible than in the present December. The strongest winds recorded had 5·21lbs. pressure to the square foot, and were registered four times. There was a hot wind on the 23rd, but not of a very strong or oppressive character. There were only 9 *calms*, being — 4·25 less than the average of the previous eight years.

Temperature mean, 60·87 degrees, was —1·20 below the 20 years' average, though + 1·46 above December, 1865. The self-registering maxima and minima thermometers gave a mean below the observed ones, (as they have done consecutively since June last) *i.e.*, only 59·05 degrees. The mean of all the maxima or high-day temperatures was 69·13 degrees, being one degree less than last year. The minima or low-night temperatures had a mean of 49·00 degrees, whichis —00·15 less than 1865 had. The highest temperature recorded was 80 degrees in the afternoon of the 23rd and 30th, and the lowest was 40 degrees of the night of the 7th. The mean of the wet-bulb self-registering thermometer was 54·00 degrees.

Daily-range of temperature had a mean of 20·16 degrees, being —·39 less than the 20 years' average, and —·20 less than 1865 had. The greatest range of any day was 31 degrees on the 13th, and the smallest 9 degrees on the 16th. Though the present month was warmer on the whole, and had a smaller daily variation of temperature, and less ozone, yet inflammatory affections of the respiratory organs were more prevalent than in 1865, and caused four deaths, all young children, while 1865 had not any.

Solar-Intensity mean, 105·03 degrees, was + 1·06 above the average of the previous 10 years, and + 2·74 more than 1865 had, The extremes were 117 degrees on the 9th, and 60 degrees on the 16th. Last year they were respectively, 119 and 58.

Terrestrial-Radiation had a mean of 46·94 degrees, which is —1·30 less than the average of the previous ten years, and —·76 less than 1865 had. No year of the previous ten, except 1858, had so low a mean of this instrument. The maximum was 56 degrees in the night of the 29th, the minimum 37·5 on the 7th, a very wide range. Last year these extremes were only 53 and 42, or a less range by —7·5 degrees.

Rain fell on 10 days, being —2·09 less than the average of the previous eleven years, though one more than 1865 had. The total of rain guaged was 3·59 inches, being +2·27 more than the 20 years' average for December, and + ·16 more than 1865 had. It all fell during the first three weeks of the month, the ten last days being without a shower. On the 11th nearly an inch, and on the 20th somewhat more than an inch of rain fell, and on other days there fell enough to flush all water-courses and drains. A patch of *Snow* remained on Mount Wellington on the 1st day of the month, but was gone in a few days, and during the rest of the month snow never re-appeared.

Humidity mean 69, was + 2 more than the 20 years' average and + 1 more than 1865 had.

Spontaneous Evaporation was 4·97 inches, being less than in December 1865 by —·61 of an inch.

Elastic Force of Vapour mean, 368, is +14 more than the 20 years' average, and +24 more than 1865 had. The range was from 244 to 554. Last year, with almost the same minimum, the maximum was only 510.

Cloud mean, 5·32, was —·14 less than the 20 years' average, and —·98 less than in December last year. *Ozone* had a range from the minimum, 6, to the maximum 9. and a mean of 7·51, which though +·32 more than the average of the previous nine years, was less than 1865 by —·84. At the last meeting of the British Association a paper on ozone was read by Professor Daubeny, of Oxford In the discussion thereon, Mr. Glaisher, of the Greenwich Observatory, the eminent President of the Meteorological Society of London, and so well known for his investigation of the earth's atmosphere by balloon ascents, stated as a result of his observations :—" That where there was ozone he found abundant health, and where there was none a great deal of sickness prevailed." This is in accordance with at the result of my own experience for so many years in Tasmania. No records that I have seen, except those made in Madeira, can compare with this island for its abundance of nature's air-purifier, ozone.

Electricity this month was nearly equal to that of December 1865. There were the same number, 20, of positive indications with tension ranging from 3 to 7·5. Last year's tension was from 1·5 to 8. There were 37 negative indications this year, being one less than last. The tension respectively was, 1866, 1 to 6·5; 1865, 1 to 7. There were 5 "nils" this month, to 4 in 1865. *Thunder* and *lightning* with rain, occurred on the evening of the 11th.

The *Death* average for the nine years' Decembers, 1857-1865 is—44; the present month had 6 more; two of the 50, however, are not properly included in the list, one, an inquest case, was supposed to have perished in October last; the other, also an inquest case, belonged to the Clarence Plains district. The table shows that only 1862 and 1859 had more deaths than the present month. Last year, the healthiest December on record, had 20 less.

Dec., 1866	Ages.	Nov., 1866.	Decembers.									Avg. 9 yrs. Decs., 1857–1865.
			65Min	1864	1863	1862	1861	1860	59Max	1858	1857	
10	Under 1	3	8	11	3	13	9	10	14	7	15	10
4	1 to 5	1	1	1	4	5	4	3	10	7	7	4 6-9
7	5 to 20	4	5	4	4	3	3	4	2	3	3	3 4-9
10	20 to 45	9	7	7	6	15	10	7	17	15	6	10
6	45 to 60	8	2	8	11	8	9	8	13	4	7	7 7-9
13	60 and above	11	7	5	11	8	11	6	6	9	10	8 1-9
50		36	30	36	39	52	46	38	62	45	48	44

"Under 1 year of age," the number of deaths, 10 was exactly that of the nine years' average, and 2 more than last year had. At "1 to 5" years of age, the mortality, 4, was slightly below the average, but four times as many as

1865 had. At "5 to 20," the deaths, 7, were nearly double the average, two more than 1865 had, and above that of any year in the nine years tabled. At "20 to 45," the deaths, 10, were exactly the average number, though 3 more than in December, 1865. At "45 to 60," the mortality, 6, was below the average, though three times as many as 1865 had. At "60 and all ages above," the deaths, 13, were largely above the average, and in excess above any year of the nine. 1865 had little more than half as many as the present month.

Dec., 1866	Classes of Disease	Nov., 1866.	Decembers. 65 Mim.	1864	1863	1862	1861	1860	59 Max.	1858	1857	Avg. 9 yrs. Decs., 1857--1865
5	1. Zymotic	0	7	9	9	9	7	8	12	9	11	9
9	2. Constitutional	11	7	7	6	9	8	3	7	6	8	6 7-9
21	3. Local	20	11	15	18	25	20	19	32	21	23	20 4-9
10	4. Developmental	3	3	3	4	4	7	4	4	3	5	4 1-9
5	5. Violent &c.	2	2	2	2	5	4	4	7	6	1	3 6-9
50		36	30	36	39	52	46	38	62	45	48	44

In the first class, *Zymotic diseases*, the deaths, 5, were little more than half the average, and 2 less than 1865 had. Not one of the five deaths indicated a *generally* impure condition of the atmosphere, but there was no doubt in several of them, that the diseases causing death were generated by *local* causes. The first, a death from *typhoid fever* in a young girl, could only be ascribed to defective drainage. The same disease had been treated years before in young boys in the same residence, and one of them ended fatally. The second was death from malignant *scarlet fever*, in a child. This disease and measles have for some time past prevailed extensively and with great fatality in Melbourne. Many children convalescing therefrom have come to Hobart Town to recruit. Some cases of measles existing in Hobart Town have been directly ascribed to the poison imported, though none have ended fatally. In the case of scarlet fever, while the suspicion is strong of an imported origin, there were local defects, in drainage, rendering persons under its influence peculiarly susceptible to miasmatic diseases. Cases of scarlet fever have been long unknown to the medical profession in Hobart Town, and the last deaths recorded therefrom were in July and February, 1865, two isolated cases. In the first six months of 1864, however, 11 deaths were recorded, 5 of them in April. The third zymotic death was from metria or *child bed fever* in a woman of 24, in one of the rural divisions of the registration district. No doubt local causes for the existence of the disease could be traced in that case. The fourth zymotic death was in a youth of 19, from *erisypelas*, admitted into hospital from a country district. The fifth death was from *dysentery*, in a woman of 55, at the Cascade Factory. Though bowel diseases often prevail extensively in this summer month, no other death but the foregoing, was registered from this cause. Temperature and rainfall were both eminently conducive to general atmospheric purity this month, but while the sewerage of the city continues in its present most defective condition, we shall never be safe from pestilential diseases, whenever the meteorological phenomena are adverse to health.

In the second or *Constitutional class of Diseases*, the deaths, 9, were largely in excess above the average, only 1862 had as many, and last year had 2 less. Five of these deaths were from *consumption*, four of them young people from 16 to 27 years of age, and two of them born in Tasmania. Three deaths in this class were from *cancerous diseases of internal organs*. The last death, a girl of 14, was registered as from *dropsy and chronic rheumatism*. In the 3rd or *Local class of Diseases*, the 21 deaths were a fraction above the average, but nearly twice as many as 1865 had. In the first order, *Diseases of the Brain and nervous system*, there were 10 deaths, being 4 more than 1865 had; five of them were from apoplexy, aged respectively, 37, 42, 60, 67, 72. No doubt the very high atmospheric pressure before alluded to, conduced to death from this cause. Three children, two of them being under a month old, died from convulsions. Two men, 49 and 43 years old, died from brain disease. In the 2nd order of this class, *Diseases of the Heart and organs of circulation*, two persons, 57 and 58 years old, died, being the same in number as in December, 1865. In the 3rd order, *Diseases of the Lungs and organs of respiration*, the deaths were 5, four being young children from acute inflammations, the fifth being of a chronic character, terminating suddenly, in a man of 69. Last year had only one death, and that from chronic disease, in this order, though the weather was both colder and more variable, and therefore usually supposed to be more conducive to inflammatory affections of the organs of respiration. In the 4th order, *Diseases of the Stomach and Organs of Digestion*, a death from inflammation of the liver and bowels occurred in a woman aged 31. In 1865 there were two deaths in this order, but both from chronic diseases. In the 5th order, *Diseases of the Urinary Organs*, there were two deaths, aged respectively 23 and 64, both of a chronic character. Last year had no deaths in this, or any of the subsequent orders of this class. In the 4th or *Developmental class of diseases*, the deaths, 10, were more than double the average, and largely above any year of the previous nine, 1865 had only 3 deaths in this class. Three were children under four months old, the other six were from old age, being 60, 67, 71, 73, 78, 79, and 81 years old respectively. High atmospheric pressure, or rapid and extensive alterations of pressure, always extinguish the lives of many old and otherwise feeble persons. In the 5th, or *Violent and accidental class of diseases and deaths*, the number of deaths, 5, was considerably higher than the average. December, 1865, had only 2. One of these deaths was caused by burns, another by poison, (the accidental drinking of Burnett's disinfecting fluid,—chloride of zinc,) a third by a fall from a pony, (all children). The fourth was drowned in the river, from a boat run down by a steamer. The fifth was a newly born child found concealed in a cess-pool, supposed to have been deposited there in October last.

Inquests were 7, one of which died in Hospital, another at the Penitentiary. Last year there were only 4. In Hospital there died 12, including the inquest case. Four of them were from country districts. In December 1865 the deaths in Hospital were only half as numerous. At the Male Invalid Asylum at the Brickfields 2 died, 71 and 81 years old respectively. 1865 had the same in number. A woman aged 55 died in the Cascade Factory. One also died there in 1865. Of the 50 deaths, 26 were males, 24 females. It is seldom the sexes are so equally balanced as this, there being usually a great preponderance of males. Five died in the Glenorchy, 2 in the Queenborough divisions of the registration district, the rest in the city.

In the first week there died 12, in the second 12, in the third 11, in the fourth 13, in the last three days 2. The weekly distribution of the deaths is very equal, and it was likewise so in December 1865.

The *Births* registered were 51, being 10 less than in 1865.

ERRATA.

Page 3.—First line of second paragraph, for "+ 1·141," read "+ ·141."

Page 4.—First and second lines, fifth paragraph, for "Cloud mean 5·40, ·34 though slightly above the average for January of the previous eight years," read "Cloud mean 5·40, is — ·34 below the 20 years' average."

Page 9.—Last two lines of fourth paragraph, for "chacterised" read "characterised," and for "unusal," read "unusual."

Page 15.—Line 22, for "Liemophora" read "Licmophora."

Page 17.—Lines 4, 7, 10, for "Foraminifera" read "Foraminiferæ."

Page 33.—First line, fifth paragraph, for "+·88" read "+1·88." Third line, for "on any was 33" read "on any day was 33."

Page 35.—First line, for "hf" read "half."

Page 55.—First line, second paragraph, for "The second Constitutional" read "The second, or Constitutional."

Page 56.—First line, read "The 4th, or Developmental Class of Diseases had six deaths, all from old age," &c.

Page 58.—Presentation, No. 3, for "Echidua" read "Echidna."

Page 61. —After heading of Paper, insert name of author, Morton Allport.

Page 97.—First line, for "Pailonia" read "Paulownia."

Page 108.—Eighth line of first paragraph, for "proprotionately" read "proportionately."