PAPERS AND PROCEEDINGS

AND

REPORT

OF THE

ROYAL SOCIETY

OF

TASMANIA,

FOR

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PRINTED AT THE "MERCURY" STEAM PRESS OFFICE, HOBART TOWN.
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THE responsibility of the statements and opinions given in the following papers and discussions rests with the individual authors, the Society as a body merely places them on record.

Contents.

Errata.

Page 4.—Line 5, for Charles "G." Beddome read Charles "E.," &c.

Page 8.—Presentation No. 4, as above.

Page 10.—Line 2, last par. but one, for "pryites" read "pyrites."

Page 13.—Line 4, for "hopwoodi" read "Hopwoodi."

Page 13.—Line 10, for "my dearest aunts and her daughter" read "my dearest aunt as her daughter."

Page 13.—Line 14, for "he Society" read "the Society."

Page 21.—Last line of note, for "coralla," read "corolla."

Page 49.—Sixth line from bottom, for "Monedenta" read "Monodonta."

ROYAL SOCIETY.

MARCH, 1878.

The monthly evening meeting of the Society was held on Tuesday, March 12, the Right Rev. the Lord Bishop of Tasmania in the chair.

The Rev. Charles Rogers, LL.D., etc., etc., etc., Secretary Royal Historical Society, London, who had previously been nominated by the Council, was balloted for, and declared duly elected as a Corresponding Member.

The Secretary (Dr. AGNEW), brought under notice the usual monthly returns, viz.:—

1. Number of visitors to Museum, January. Total, 2,920.
2. Ditto, ditto, ditto, February. Total, 3,881.
3. Ditto, ditto, ditto, Gardens, January. Total, 5,391.
4. Plants and seeds received at Gardens during January and February:—From J. King, Esq., Superintendent Royal Botanic Gardens, Calcutta, seeds of *Cedrus deodar* and *Picea pindrow*. From Baron Ferd. von Mueller, seeds of two species of Palms. From the Botanic Gardens, Melbourne, 24 species Ferns. From Mr. Sparling, Forest Department, India, seeds of *Cedrus deodar*. From the Department of Agriculture, Washington, U.S., 40 species of seeds.
5. Plants sent from Gardens:—To Royal Gardens, Kew, 75 plants indigenous to Tasmania. To Mons. J. Verschaffelt, Ghent, Belgium, two large Tree Ferns. To Mons. A. van Geart, five Tree Ferns.
6. Time of leaving, etc., of a few standard plants in the Botanic Gardens, during January and February.
7. Books and Periodicals received.
8. Presentations to Museum.

Meteorological Returns:—

1. Hobart Town, from F. Abbott, Esq.—Tables, for January and February.
2. Swan Island, from the Marine Board.—Ditto for January.
3. Mount Nelson, from ditto.—Ditto for January and February.
4. Sydney, from H. C. Russell, Esq.—Printed Monthly Tables, from October, 1876, to June, 1877.
5. Melbourne, from R. J. Ellery, Esq.—Printed Tables from June to October, 1877.

The presentations to the Museum were as follows:—

1. From H. Lamb, Esq., M.H.A.—A Young Wedge-tailed Eagle (*Aquila audax*), aged about seven weeks. Taken from the nest.
2. From Captain Boon, barque Southern Cross.—Three Sea Snakes (probably *Platurus scutatus*), and a Star Fish from Coast of New Caledonia.
3. From Mr. J. M. Murray.—Specimens of Galena and Copper Ore from the Champion Bay District, Western Australia.
4. From Mr. N. Turner.—Two samples of dressed Tin Ore, from Mount Bischoff; and two ditto of Bismuth Ore, from Mount Ramsay.

5. From A. Simson, Esq.—Specimens of Crystals of Tin, Sapphire, Zircon, etc., from Gould's Country.
6. From Mr. T. J. Exton.—A Grey Flying Squirrel *(Belideus sciurus)* from Oatlands.
7. From the Rev. W. W. Spicer.—A young Brush Kangaroo *(Halmaturus Bennetii)*.
8. From Mr. Jno. Withrington.—A Halfpenny George II., 1753.
9. From Mr. S. J. Baynton.—Specimens of the native Truffle, from Kingston.
10. From Mr. P. Oldham.—A peculiar Fish, caught in 13 fathoms of water off Drouthy Point.
11. From Mr. C. Sutton, Tunbridge.—A sample of Mineral Water from that locality.
12. From Dr. Beccari, director of the Museum, Florence.—Eight prepared Skins of New Guinea Birds (named).
13. From Dr. James Cox, Sydney.—A stone-headed Spear, from a tribe of Aborigines on North coast of Australia.
14. From the Rev. W. W. Spicer.—A collection of Plants—49 species named by donor—from Kent's Group and Swan Island.
15. From Dr. James Hector, Wellington, New Zealand.—Skeleton of a Blackfish *(Globiocephalus macrorhynchus)*.

Presentations to Library :—

1. From the author.—Copy of a Handbook of the Plants of Tasmania, by the Rev. W. W. Spicer, M.A., etc.
2. From the Royal Historical Society, London.—Vol. 6, of the Transactions of the Society.
3. From the Office of Mines, Sydney.—Geological Map of the Hartley District, New South Wales.

The following papers were read :—

1. "Contributions to the Phytography of Tasmania," No. 5; by Baron Ferd. von Mueller, C.M.G., M.D., F.R.S., etc., etc.
2. "Further Notes on the Freshwater Shells of Tasmania, with a Description of New Species"; by Robt. M. Johnston.
3. "Notes on the Platypus *(Ornithorhynchus anatinus)*; by Morton Allport, F.L.S., F.Z.S. etc.

In reference to the subject of the latter paper, the Rev. W. W. Spicer read the following extract from a letter which he had lately received from Professor Rolleston, M.D., of Oxford :—"I have read with attention your Royal Society Paper (Proc. Royal Soc. Tasmania 1876, p. 162) on the poison gland of Ornithorhynchus. I should incline to think it analogous to the multifarious weapons which help males in the battle of sexual selection. The teeth and claws in which males so often differ from females do not differentiate the sexes in Platypus, and this claw may be supposed, with its appended gland, to have given a pre-eminence to males in which it was pre-eminently developed. I apprehend that in the cases where a lion's claw has been proved to have been venom-carrying, it had been smeared with animal matter from some previous meal. Any albuminoid matter, such as 'Woorara,' or putridity of any kind, if not too far gone in decomposition, will poison the lymphatics, or worse. Our present epidemic of hydrophobia brings the thing home to one."

Mr. Justice Dobson, in moving a vote of thanks to the authors of papers and donors of presentations referred in terms of regret to the great loss the Society was about to experience by the return of the Rev. W. W. Spicer to England. The Bishop cordially agreed with all that was said by Mr. Dobson as to the serious loss they were about to sustain by the absence of Mr. Spicer, to whom the special thanks of the Society were abundantly due, not only for his exertions on behalf of the Society, but

also for the work which he had just, as its author, presented to the library. He hoped, however, that the return of Mr. Spicer to his native country would not altogether sever those relations which had for some time existed between him and the Society.

The vote having passed, Mr. SPICER, in thanking the meeting for the very cordial and appreciative manner in which anything he had done had always been received at their monthly gatherings, expressed a hope that on his return to England he might still be able to do something for a society which would ever have his best wishes for its welfare. (Applause.)

The proceedings then terminated.

APRIL, 1878.

The monthly evening meeting of the Society was held on Tuesday, April 9, T. Stephens, Esq., M.A., F.G.S., in the chair.

The following gentlemen, who had previously been nominated by the council, were balloted for, and declared duly elected as Fellows of the Society, viz., Charles G. Beddome, Esq., of Sandy Bay, and James Backhouse Walker, Esq., of Hobart Town. E. P. Ramsay, Esq., F.L.S., etc., Curator of the Australian Museum, Sydney; and the Rev. W. W. Spicer, M.A., F.R.M.S., were elected as corresponding members.

The Hon. Secretary (Dr. Agnew) brought forward the usual returns for the past month.

1. Number of visitors to Museum, March, total, 2,420.
2. Ditto to Gardens, March, 4,462.
3. Plants and seeds received at Botanic Gardens during March:—From Messrs. Vilmorin, Andrieux & Co., Paris—36 packets flower seeds, in collections. From Baron von. Müeller—12 packets seeds from America. From Mons. J. Verschaffelt, Ghent—One box containing rhododendrons, etc., etc., all in good condition.
4. Time of leafing, etc., of a few standard plants in the Botanic Gardens during the month:—
5. Books and periodicals received.
6. Presentations to Museum.

Meteorological Returns—

1. Hobart Town, from F. Abbott, Esq.—Table for March.
2. Swan Island, and South Bruni, from the Marine Board—Tables for February; Mount Nelson ditto for March.

The presentations to the Museum were as follows:—

1. From H. M. Hull, Esq.—Fossil shell, from limestone brought from New Zealand.
2. From the Rev. J. White.—A sheet of Tapa cloth from Fiji.
3. From the Rev. J. E. Tenison-Woods, and the Rev. H. D. Atkinson.—Type specimens of new species of Tasmanian shells.
4. From R. M. Johnston, Esq.—Fossil shells from Cape Barren and Badger Islands, Bass' Straits.
5. From Mr. G. T. Johnson.—A large spider crab, from Eagle Hawk Neck, Tasman's Peninsula.

The SECRETARY, after some remarks as to the great loss the society would sustain by the absence from their meetings of the Rev. W. W. Spicer, observed that the subject had been brought forward at last month's meeting. At that time, however, Mr. Spicer had not resigned his seat at the Council, but subsequently he had done so. A special meeting of the Council was then convened, when the following minute was agreed to, and was conveyed to Mr. Spicer before his departure:—"The Council of the Royal Society, having this day received, with great regret, the resignation of the Rev. W. W. Spicer, who is about to leave Tasmania, desire to place on record an expression of their sense of the loss the society will sustain by his departure. They feel that their best thanks are due to Mr. Spicer, not only for the large amount of special work which he has accomplished for the Museum and the society, but also for his labours generally in the cause of the natural history of the island. And, whilst thanking him for the past, the Council cannot but express a hope that in the future Mr. Spicer, as a corresponding member, will still maintain those pleasant relations which, during his stay in the colony, have existed between himself and the Royal Society."

The following extract from Mr. Spicer's reply, showing he would

probably still be an active member of the Society, was read:—I beg you will be so good as to communicate to the Council of the Royal Society my sincere thanks for the very flattering notice they have taken of my small services in the cause of science during my residence in Tasmania. I hope I may have an opportunity, as a Corresponding Member, to contribute still to the pages of your Transactions."

A paper "On some New Tasmanian Shells" (third series) by the Rev. J. E. Tenison-Woods was read. In the introductory remarks, the learned author observes, "The following new and very interesting species were, for the most part, collected by the Rev. H. D. Atkinson, and, with a few exceptions, at Circular Head. An accurate knowledge of that fauna has long been a desideratum, and science may be congratulated on having such an industrious and painstaking collector as Mr. Atkinson settled there. The other species are from different collectors as noted at the end of each diagnosis. The list shows the spread of the Eastern Australian coast fauna into North Tasmania—while in the new species the recognised Tasmanian molluscan facies is not materially departed from."

A paper "On certain Tertiary and Post-Tertiary deposits on Flinders, Barren, Badger, and others Islands in Bass' Straits," by R. M. Johnston, Esq., was read.

Mr. Stephens remarked that although "raised beaches" (mentiou of which was made in the paper) along a coast showed that land had actually risen, they afforded no proof that the process of elevation was still going on. Mr. Stephens also showed by means of a diagram how tracts of land could be swept away even by recent diversion of currents caused by artificial means, quite irrespective of any general rising or sinking of the land.

The proceedings closed with a vote of thanks to the authors of the papers, and the donors of presentations.

MAY, 1878.

The monthly evening meeting of the Society was held on Tuesday May 14. His Excellency the Governor occupied the chair, and, notwithstanding the inclemency of the weather, there was a fair attendance of the Fellows.

The Hon. Secretary, Dr. AGNEW, brought forward the usual monthly returns, viz.:—

1. Number of visitors to Museum during April—total, 3172.
2. Ditto to Garden during April—total, 4395.
3. Plants and seeds received at Botanic Gardens:—From the Royal Gardens, Kew, 100 varieties willow, most of which are alive. From Mr. James Dall, Nelson, New Zealand, 7 species of New Zealand, tree ferns. From Mons. Jules Cock, Ghent, Belgium, 43 species seeds, principally coniferæ. From J. Lidbetter, Esq., Bombay, eight species Indian coniferæ. From Mr. Wm. Bull, London, 55 varieties, lily and iris bulbs. From Mr. C. F. Creswell, Melbourne, one box imported herbaceous plants, about one half of which are alive. From Captain W. Willett, 63 packets, imported seeds. From the Melbourne Botanic Gardens, nine packets seeds of coniferæ.
4. Time of leafing, etc., of a few standard plants in the Botanic Gardens during the month.
5. Books and periodicals received.
6. Presentions to Museum.
7. Meteorological Tables.

a. Hobart Town, from F. Abbott, Esq.—Table for April.
b. Mount Nelson, from the Marine Board.—Table for April.
c. Melbourne, from R. J. L. Ellery, Esq.—Printed tables for November, 1877.

The presentations to the Museum were as follows:

1. From Mr. Thos. Dale, New Norfolk.—A water-worn rock specimen from the drift gravel, near New Norfolk.
2. From Mr. W. F. Davidson, Bagdad.—A Half-penny of George I., 1722.
8. From Mr. G. H. Latham.—Three stone Axes, from New Zealand.

A specimen of marble, cut and polished, was placed on the table for inspection. In calling attention to this specimen, Mr. Stephens remarked that though the term "marble" was sometimes restricted to altered or metamorphic rocks, it also included all limestones used for ornamental purposes, the black and grey limestones from the carboniferous rocks of England and Ireland being extensively utilised. The specimen before the meeting was from the so-called "Devonian" limestones of Maria Island, and would bear comparison with many marbles of the same class which have attained high favour. It had been furnished by Mr. Robert Robinson, of Spring Bay, whose name was familiar to many Fellows of the Society, and it was to be hoped that he would be successful in this attempt to establish a new and permanent industry in Tasmania.

The SECRETARY read a paper entitled "A few remarks on the distribution and growth of Queensland plants," contributed by F. M. Bailey, Esq., of Brisbane, a Corresponding Member of the Society.

His Lordship the BISHOP of Tasmania read an important paper on "Water supply in relation to disease."

Discussion ensued, in which His Excellency, the Bishop, Messrs. Stephens, Grant, Shoobridge, Swan, and others, took part.

Dr. HALL said he regretted that his infirmity of hearing had pre-

vented him from following His Lordship's remarks, for he was sure that the subject in such hands would be treated so as to produce a beneficial effect. In his (Dr. Hall's) capacity as Health Officer, such support was most valuable, for when respected and intelligent gentlemen took up sanitary subjects, it would have much more weight with Government, and local authorities than anonymous letters in the newspapers. In the paper to which the Bishop had alluded, read to the society by him (Dr. Hall) fifteen years ago this month, he had predicted that those diseases most influenced by impure water, would diminish by the recently improved supply. He had stated that on an average of the six years, 1857-62, the mortality from dysentery, diarrhœa, etc., had been 8 per cent. of the total deaths. Last year, with its very heavy death list, the proportion was rather less than half. Could other sanitary improvements be made to effect a similar reduction in other diseases he would go to his grave satisfied that his labours in the cause had not been fruitless.

Referring to some remarks as to certain diseases being propagated by germs carried about by the air, water, and other means the Secretary observed that although the "germ" theory of disease was a good working theory, it was well to recollect that its correctness had never yet been actually proved. He, himself had long thought, from many instances which had come under his observation, that disease of an infectious character could occur *de novo*—that is without the action of any pre-existing germ. Within the last few months Dr. R. W. Richardson, who was certainly second to none in the profession for learning, ability, and power of original research, had contributed to a scientific periodical a paper in which he attacked with much cogent reasoning the "germ" theory, and offered a carefully considered suggestion to the effect that infectious diseases were due to a poison secreted by the individual—the poison of the snake being adduced as an extreme example. The poison when formed might be conveyed from one individual to another by the air, by various fluids, or by personal contact; and acted, not after the manner of a ferment but, by producing certain (catalytic) changes in the secretion of the part to which it was applied. Particular portions of the body were affected by, and reproduced particular poisons, the skin for instance as to scarlet fever, the throat as to diphtheria, the mucous membrane of the bowels as to typhoid fever, etc. Poisonous secretions, however, in some cases might be the result of certain nervous influences inducing diseased local secretions, and thus disease of an infectious character might commence *de novo*. This theory, the Secretary thought, would in many instances afford an explanation of the occurrence of sporadic disease, the origin of which, in his opinion, was frequently inexplicable by the "germ" or *omne ex ovo* hypothesis. (See *Nature*, October 4, 1877.)

His Excellency mentioned he had recently when fishing caught two parr, one in the Derwent, the other in the Nile. From the finger-like markings of the former he thought it probable it was the young of the true Salmon, whilst the more spotted markings of the latter might favour the belief that it was the young of the *Salmo trutta*. In each case the young fish, after its accidental capture, was immediately returned to its home.

A vote of thanks, supported by the Chairman, was accorded to the Bishop of Tasmania. A similar vote to Mr. F. M. Bailey, and to the donors of presentations, closed the proceedings.

JUNE, 1878.

The monthly evening meeting of the Society was held on Tuesday, the 11th June, C. H. Grant, Esq., in the chair.

The Hon. Secretary (Dr. Agnew) brought forward the usual monthly returns, viz.,

1. Number of visitors to Museum during May, total 2,313.
2. Number of visitors to Gardens during May, total 4,266.
3. Plants, etc., received at Gardens:—From Dr. Hector, Wellington, New Zealand—6 packets seeds; from Mons. J. Verschaffelt, Ghent, Belgium—30 species ornamental forest trees, about two thirds of which are alive; from H. M. Hull, Esq.—nine species of seeds received from Landreth & Sons, Philadelphia; from the Royal Gardens, Kew—90 varieties of seeds.
4. Plants sent from Gardens.—To Mons. J. Linden, Belgium, four tree ferns.—To Mr. G. Brunning, Melbourne, one case plants.
5. Books and Perodicals received.
6. Presentations to Museum.
7. Time of leafing etc., of a few standard plants in the Botanic Gardens during May.

Meteorology—

1. Hobart Town, from F. Abbott Esq.—Table for May.
2. New Norfolk, from W. E. Shoobridge, Esq.—Abstract tables for January, February, March, April and May.
3. Bruni Island and Mount Nelson, from the Marine Board.—Tables for May.
4. New Zealand, from Dr. Hector.—Printed tables from various stations, August, 1877, to February, 1878. From Wellington—Tables from November, 1876, to April, 1878.

The presentations to the Museum were as follows:—

1. From Captain Hutton, Dunedin, New Zealand.—23 prepared skins of New Zealand birds.
2. From Mr. E. J. Baynton, Brown's River.—A white hawk (*Leucospiza Novæ Hollandiæ*).
3. From the Rev. G. B. Richards, Horton College, per T. Stephens, Esq.—Two fruit pigeons, from Duke of York Island.
4. From C. G. Beddome, Esq.—A fine prepared skin of the Goura pigeon, from New Guinea; a pair of shell armlets, and a carved calabash, used for holding Chunam, made by natives of New Guinea.
5. From Aug. Simson, Esq.—Some fine specimens of crystals of oxide of tin, from Marie Louise and Kunarra claims, Gould's Country.
6. From T. Smith Wright, Esq., Glenorchy—Specimens of tapa cloth, worn by Fijians. A Fijian necklace.
7. From D. Lewald, Esq.—A grey African parrot (*Psittacus erithacus*).
8. From C. G. W. Lloyd, Esq., New Norfolk—A large grub, with a curious fungoid growth from near the head. [This specimen is analogous to the so-called "Vegetable Caterpillar," of the colony (*Cordiceps Gunnii*), but the fungus itself is very different in form, being short, thick, and broad, instead of stem-like.]
9. From C. M. Maxwell, Esq.—Portion of the top of a pile from the wharf, with a treenail hole filled by a fungus which had grown there.

The Secretary called special attention to a very valuable work—"Researches on the Fossil remains of the Extinct Mammals of Australia," by Professor Owen—which had just been placed by Government in charge of the society for the purpose of easy reference by naturalists and others. The illustrations were shown to be most profuse, consisting of 132 plates and 62 wood-cuts. To this work the learned Professor had devoted his attention for the last 30 years; and in the prospectus he states "Only

300 copies have been printed, and the stones effaced, for as it is a work of reference chiefly, the number of copies has been limited to the estimated utmost demand. Its chief utility will be as a means of comparison, available in Australia and Tasmania, to the coming generation of colonial investigators of the Natural History and Geology of those countries; and to know that a copy was in the library of every public institution, where it might be accessible to such, would be the most gratifying return to the author.

Notice having been taken of the rare Ribbon fish recently caught on the North Coast, at Penguin Creek, the SECRETARY mentioned that Mr. Morton Allport, after a careful comparison of it with Dr. Günther's description of *Regalecus gladius*, had no doubt it was the same species. A similar fish had been washed on shore at Circular Head in 1856, and a drawing of it presented to the Museum by Dr. W. Story.

Mr. E. D. SWAN observed that Professor McCoy had determined the specimen to be a closely allied species, the *Regalecus Banksii*. A sketch of the fish (which measured 14 feet in length and about one foot in depth), by Mr. R. M. Johnston, and drawings from other sources of the allied Ribbon fishes of the Mediterranean, were laid on the table.

Conversational discussion, in which Mr. Grant, Mr. E. D. Swan, and Mr. E. J. Crouch took part, ensued as to presentations Nos. 1 and 4, and on other subjects.

A vote of thanks, proposed by Mr. HOPTON SCOTT, to the donors of presentations closed the proceedings.

JULY, 1878.

The monthly evening meeting of the Society was held on Tuesday, the 9th July, His Excellency the Governor in the chair.

L. A. Holden, Esq. and H. J. Brock, Esq., who had previously been nominated by the Council were balloted for, and declared duly elected as Fellows of the Society.

The Honorary Secretary (Dr. Agnew), brought under notice the usual returns for the past month, viz. :—

1. Number of visitors to the Museum, 2,414.
2. Number of visitors to Gardens, 4,503.
3. Plants received atand sent from Gardens.
4. Time of leafing, flowering, etc., of a few standard plants in the Botanic Gardens during June.
5. Books and periodicals received.

Meteorology—

1. Hobart Town, from F. Abbott, Esq.—Table for June.
2. New Norfolk, from W. E. Shoobridge, Esq.—Ditto.
3. Swan Island and Mount Nelson, from the Marine Board—Tables for May and June.
4. From Mr. Roblin—Abstracts and Results of observations registered at the Lighthouses, etc., during 1877.
5. From the Government Observatory, Melbourne—Monthly Record of observations registered at the Melbourne Observatory during January and February.

His Excellency presented to the library a recent work by R. A. Proctor B.A., entitled "The Universe, and the Coming Transits." Also a series of nine photographs of typical examples of certain of the South African races.

The Secretary read a paper by Mrs. Charles Meredith, descriptive of the form and character of several specimens of the sea *Annelida*, or "sea worms" found in the kelp at Prossers' Bay, and representative of the families of Nereididæ, Serpulidæ, and Terebellidæ. Generically they are to be classed under *Nereis*, *Sabella*, and *Terebella*, but it is probable that as to species they are new to science. All the species referred to in the paper were depicted by the writer in beautifully executed water-colour drawings, which were examined with great interest by the meeting.

Mr. T. Stephens read "Notes on a visit to the Hot Spring near Southport in 1877."

His Excellency thought Mr. Stephens' suggestion of decomposing pryites being the source of heat in this case, was probably correct, but he was not certain that this could apply to the hot water and mud springs in New Zealand, which extended over a very large area. These springs, which he had visited many years ago, presented some very peculiar features ; for instance, an individual seated in one with water at a comfortable temperature, might hold in his hand a net containing vegetables, and, without moving, could cook them by dipping the net in a boiling spring close to him. The deposit between the springs seemed to be a sort of *tufa*, or a mixture of lime and silex. The formation of the country in the immediate vicinity, appeared to be recent, and as far as he (the Chairman) could recollect there was no rock *in situ*, though Plutonic and Metamorphic rocks existed in the neighbourhood.

The Bishop of Tasmania agreed with Mr. Stephens in thinking that the decomposition of Pyrites was quite sufficient to account for the heat of the small spring described by him, but as to the larger area of the hot-well district, with which he was familiar in England, at Bath and Clifton, where the water was derived from the New Red Sandstone, he thought such chemical action alone was scarcely sufficient to account for the vast

amount of internal heat required. The same, too, would apply in a still greater degree to New Zealand where the phenomena were on a much grander scale.

The SECRETARY remarked as to boiling springs, and similar phenomena that the Yellowstone region of North America threw all the Geysers of Iceland, and the hot water and mud springs of New Zealand, into comparative insignificance. So great were the wonders of this extraordinary region, and so vast was the scale on which they occurred, that the United States Government had wisely reserved it for all future time as a public park and a play-ground for the American Nation.

After some further discussion a vote of thanks proposed by the Bishop, to the writers of the papers, and for presentations closed the proceedings.

AUGUST, 1878.

The monthly evening meeting of the Society was held on Monday, the 12th August, T. Stephens, Esq., M.A., in the chair.

The Hon. W. McLeay, F.L.S., of Sydney, who had previously been nominated by the Council, was balloted for and declared duly elected as a corresponding Member.

The Hon. Secretary, Dr. Agnew, submitted the usual returns, etc., for the month of July, viz. :—

1. Number of visitors to Museum, 2,623.
2. Ditto to Gardens, 4,473.
3. Plants and seeds received at Gardens from Baron F. von Müeller, Melbourne :—450 packets seeds, chiefly of European herbaceous plants, from Mr. J. F. Duthie, Superintendent of Botanic Gardens, Saharunpore, India ; a collection of seeds, principally N. W. Himalayian, from Mr. H. J. King, superintendent, Royal Botanic Gardens, Howrah, Calcutta, two pounds weight of *Cedrus deodar* seed.—From Messrs. Shepherd and Co., Sydney, 60 plants. From Dr. Hector, Wellington, New Zealand, 9 packets seeds.
4. Plants and seeds sent from Gardens :—To Messrs. Shepherd and Co., Sydney, one bundle plants and seeds.
5. Plants supplied for decoration of public places :—For St. Mary's Cathedral grounds, 50 plants. For Horton College, Ross, 50 do. For Railway Reserve, Domain, 20 do. For Church grounds, Prosser's Plains, 50 do. For General Hospital, Hobart Town, 106 varieties of plants. For Cascades Invalid Depôt, 40 trees and shrubs. For Church of England, Hamilton, 50 plants.
6. Books and Periodicals received.
7. Presentation to Library.
8. Ditto to Museum.
9. *Meteorological Returns*—

(a) Hobart Town, from F. Abbott, Esq.—Table for July.
(b) New Norfolk, from W. E. Shoobridge, Esq.—Abstract for do.
(c) From the Hobart Town Marine Board.—Tables from Mount Nelson for July ; Kent's Group for May, June, and July ; Swan Island for June ; and Goose Island for May, June, and July.
(d) Melbourne from R. J. L. Ellery, Esq., F.R.S.—Printed tables for March and April, 1878.

The presentations to the Museum were as follows :

1. From F. Bowden, Esq., per Justin Browne, Esq.—A Silver Coin (Rix Dollar) of the Empress Marie Therese of Austria and Hungary. 1780. The date of the coin is that of the death of the great Empress. Stated to be the only European coin used in Abyssinia.
2. From Mr. J. Chambers, Branxholme, a Pebble of Transparent Quartz, with black grains imbedded in its substance.
3. From Mr. Kellaway, Glenorchy.—Specimen of Flax used by natives of the Lower Herbert, Western Queensland, for making fishing lines, etc. A sample of *Pitcherry*, or *Pituri*, a native plant from the same locality, chewed by the aborigines for the purpose of producing intoxication.
4. From Mr. H. Gill, Rheban, East Coast.—Two Fishes, viz., a species of *Clinus*, and a specimen of the "sharp-nosed" Eel.
5. From Miss Cracroft (niece of Sir John Franklin)—Portraits of Sir John and Lady Franklin, and photograph of the Franklin Monument in Westminster Abbey.

In noticing the presentations to the Library the Secretary called special attention to the very large number of valuable publications received from

various learned bodies and institutions, in England and America. In reference to presentation No. 3 to Museum, Mr. E. D. Swan pointed out that this plant had been proved by Baron von Müeller to be the *Duboisia hopwoodi*. "The active principle seems to be almost identical with Atropine, both as regards it action and its strength, and it is used in Sydney and Brisbane in place of that alkaloid." (*Nature*, 18th April, 1878.) Mr. Abbott mentioned we had in the Botanic Gardens an allied species, received from Baron von Müeller. As to presentation No. 5 the Secretary read the following extract from a note by the donor :—"You may possibly know too, that I lived with my dearest aunts and her daughter, to the end of her life here. Having ascertained that there is no portrait of either my uncle or my aunt in the building belonging to the Royal Society, which owes its origin to their united interest in its objects, I send to your care, for he Society, a copy of each. The one of my uncle you must have seen. It is engraved from the latest taken of him. That of my aunt is a fac-simile of the only one existing, and which, together with the original of the other, belongs to me. There was one portrait of her, taken by Negelen at the same time with that of my uncle, but he carried it away with him, and she never could be induced to sit again under any circumstances. I feel sure that both will have especial interest with those who recollect Sir John and Lady Franklin."

A letter from Professor Haast, of the Canterbury Museum, New Zealand, was read, from which the following extract is given in the hope it may attract the attention of some member of the Society who may be in a position to obtain specimens of the Native Tiger and Devil—the former especially being very much wanted for Museums in New Zealand and elsewhere. "I am in the midst of re-arranging our collections, and have already come across several duplicates which might be useful to you. Amongst them are skeleton and skin of Giraffe, middle size; skeleton of a Lioness, not full grown; and a *Rhea* skeleton beautifully mounted. These specimens are at your service. In return I should like some skins of the Tasmanian Tiger and Devil, and any other quadrupeds' skins and skeletons you can spare." Also "some of the implements and tools of the Natives," etc.

Mr. F. Abbott, junr., read "Notes on *Carduus arvensis* (*Cnicus arvensis* of some authors), or common creeping thistle; with a short reference to *Cnicus lanceolatus*, the Spear or Plume Thistle."

The paper was illustrated by reference to plates of the Creeping Thistle, very truthfully executed in a work "Theater of Plants," by John Parkinson, published in 1640; drawings of the plant by writers of recent date, were also laid before the meeting.

In the discussion which ensued, and in which several members took part, Mr. Swan remarked that attempts had been made to destroy the growth of the thistle by covering it with seaweed, but the result was a failure. It might, however, be advisable to give this experiment a further trial when practicable.

Mr. Stephens called attention to the somewhat singular circumstance that although the thistle was in the first instance carried from place to place by seed, yet when it became established in any particular locality, its extension took place principally by root growth, and only to a slight extent by seed. It was, therefore, of great importance to isolate the plant thoroughly, so that its seed should not be allowed to mix with that of the neighbouring crops, and thus disseminate the evil. Mr. Stephens also showed a sketch of the long-handled pliers made use of in England for the purpose of extracting the stems of the thistle before the seed formation took place.

Seeing that the word "Californian" as applied to this thistle was shown by Mr. Abbott to be a misnomer, the general opinion of the meet-

ing was that the old English term of "creeping" should be restored as being peculiarly appropriate and characteristic of the habits of the plant.

Mr. SWAN, after referring to the thoughtful kindness of Miss Cracroft in forwarding to the Society the valued present which had been laid before the meeting, observed he was sure every member who was aware of the deep obligation the Society was under to her uncle, would heartily sympathise with her in the respect and veneration in which she held the memory of Sir John and Lady Franklin, and he therefore proposed that a special vote of thanks be given to her for the presentation.

The motion, having been seconded by Dr. Perkins, was carried, and a special vote having also been accorded to Mr. Abbott for his valuable and timely paper, the proceedings terminated.

SEPTEMBER, 1878.

In consequence of the death of Mr. Morton Allport, no meeting was held this month.

OCTOBER, 1878.

The monthly evening meeting of the Society was held on Monday, October 7, T. Stephens, Esq., M.A., in the chair.

The Hon. Secretary (Dr. Agnew) brought forward the usual monthly returns, viz. :—

1. Number of visitors to Museum during Sept.—On Sundays, 1,284 ; on week days, 1,050 ; total, 2,334.

[Attention was called to the remarkable fact that the attendance of the public during the Sundays of the past month was greater than that on all the week days during the same period. The present was the first occasion on which this had occurred since the opening of the Museum on Sundays, about ten months ago.]

2. Number of visitors to Botanic Gardens in Sept. Total, 5,726.
3. Time of leafing, etc., of a few standard plants in the Botanic Gardens during September.
4. Books and Periodicals received.
5. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.—Table for September.
2. From the Marine Board.—Tables from Mount Nelson for August, South Bruni for September, Goose Island for July and August, and Swan Island for August.

The presentations to the Museum were as follows :—

1. From Mr. Wm. Barlow.—Specimen of Fossil Wood from the gravel pit, New Town Racecourse.
2. From James Scott, Esq., M.H.A.—A very fine specimen of silicified wood (part of trunk of a large tree just above the root) from Mount Morriston.
3. From Mr. Dawson.—Tin specimens from Waratah, No. 3 claim, Gould's Country.
4. From John Mitchell, Esq., M.H.A.—Specimens of Iron Ore from Pontypool, East Coast.
5. From Mr. W. R. Dyer.—Fossil Sharks Teeth from a Quarry at Ormond, Poverty Bay, New Zealand.
6. From Mrs. Watson.—A Calabash from Eastern Archipelago.
7. From Mrs. Watson, per J. Barnard, Esq.—A copy of the *General Evening Post* newspaper, September, 1773.
8. From Joseph Solomon, Esq.—A very large egg, weighing six ounces, laid by a Spanish fowl.
9. From Mr. P. Hill.—Two fossils (*Spirifers*) from the Mudstone, Castle Forbes Bay.

A specimen of double Epacris, from North West Bay, was exhibited by Archdeacon Davies, who had received it from Mr. H. Buckland. A similar specimen, from the same locality, had been formerly received by the Archdeacon from the Rev. H. D. Atkinson.

Mr. F. Abbott, Junr., exhibited two pretty Orchids, from the Botanic Gardens in full flower, viz., *Dendrobium nobile* from India, and *Leptotes bicolor* from Brazil.

A paper was read by the Secretary "On some new Mollusca," supplementary to a former one on the same subject, by the Rev. J. E. Tenison-Woods, F.G.S., F.R.G.S., etc.

A second paper by the same learned author, entitled "On some Tasmanian Fresh-water univalves," was also read. This was a long and valuable contribution, and, with the former paper, was ordered to be printed in the papers and proceedings of the Society.

The Chairman reminded the meeting that a communication had been presented about a year ago to the Society, by the Rev. W. W. Spicer

from Professor Owen, in which he expressed his great anxiety to be favored with specimens of the gravid uterus of the platypus. (*Ornithorhynchus anatinus*) in several consecutive stages of gestation. Specimens killed during the month of September, October, November, and December were much required in order to clear up several points which are still very obscure as to the gestation of this animal. A similar appeal had been made by the learned Professor, as long as thirty years ago, to Mr. Ronald Gunn and to Dr. Casey (then resident in Tasmania), but as yet without any response, and it was to be hoped that some country members of the Society would now kindly endeavour to meet Professor Owen's wishes, particularly as he had expressed a desire that, before he died, he should be enabled to carry out to completion the investigations he had formerly made and published on the subject. (Art. *Monotremata*, Cyclopædia of Anatomy and Physiology, 1841).

Some members having expressed their opinion that the question as to the animal being oviparous had long been settled in the negative, Mr. E. D. SWAN remarked that Professor McCoy, who would be recognised by all as an authority of the greatest weight, had recently written to the effect that he had received evidence of a most reliable character that the *Ornithorhynchus* was oviparous. It was, therefore, a point of the greatest physiological interest that this long-vexed question should be settled, and this could only be done by obtaining specimens under the circumstances referred to by the Chairman.

The meeting closed with a vote of thanks to the author of the papers read, and the donors of presentations.

NOVEMBER, 1878.

The monthly evening meeting of the Society, the last of the present session, was held on Tuesday, the 12th Nov., J. Barnard, Esq., in the chair.

The Secretary, Dr. AGNEW, brought forward the usual returns for the past month, viz.:—

1. Number of Visitors to Museum, 2616.
2. Ditto to Gardens, 5833.
3. Plants and Seeds received at the Botanic Gardens during October: —From C. H. Huber, France, 34 packets seeds; from Mr. F. M. Bailey, Queensland, seeds of *Eucalyptus Baileyana;* from Mr. E. B. Heyne, Adelaide, 200 packets seeds; from Mr. Lidbetter, plant of *Cephalotus follicularis.*
4. Time of leafing, flowering, and fruiting of a few standard plants in the Botanic Gardens during October.
5. Books and Periodicals received.
6. Presentations to Museum.

Meteorological Returns:—

1. Hobart Town, from F. Abbott, Esq.—Table for October.
2. New Norfolk, from W. E. Shoobridge, Esq.—Summary of Observations for October.
3. Coast Stations, from the Marine Board—King's Island, Tables for July, August, and September; Mount Nelson and South Bruni, Tables for October.

The presentations to the Museum were as follows:—

1. From Captain J. W. Johnson, barque Sea Shell—Two Bows, one Club, one Fishing Arrow, and a bundle of Poisoned Arrows, from Pentecost Island.
2. From Mr. W. F. Petterd — Fourteen new species of Tasmanian Land Shells.
3. From Mr. E. N. Spong—A curious sponge from King's Island.
4. From Mr. J. E. Baynton—Two Specimens of a Fungus, somewhat resembling the Morel of Europe, from a gully on Mount Wellington. (One of these specimens has been sent to Baron von Mueller for identification.)
5. From Mr. Yeoland—Three fine specimens of a species of Coral, from Long Bay.
6. From Mr. C. E. Beddome—Type specimens of a new species of *Succinea*, from Queenborough.
7. From Mr. J. C. Bethune, Dunrobin—Specimens of the Mountain Thrush (*Oreocincla lunulata*).
8. From the Rev. B. Stafford Bird—A Salmon grilse, caught off the Carlton Bluff.

(This fine specimen was caught in a net by the Rev. B. Stafford Bird, in the salt water, about fifteen miles to the east of the entrance to the Derwent.)

9. From Mr. B. R. Dyer—Specimens of curious shell-like cases made by the larva of an insect.

In reference to these specimens Mr. Dyer writes:—"Mr. Swainson, F.R.S., F.L.S., &c., &c., in his treatise on shells and shell-fish, gave a description and drawing, and also erected a new genus (*Thelidomus*) for the reception of what he supposed to be an entirely new and distinct form of fresh water shell. His disappointment must have been great when the observations of other scientists disclosed the fact that his supposed discovery was not a shell, but simply the home of a small freshwater insect, constructed with great skill out of small particles of sand cemented together with some glutinous substance. So true and

exact is the formation of a Helix imitated that Swainson may reasonably be pardoned for committing such an error, especially, considering he had not the opportunity of seeing the clever little insect which thus deceived him, and which is now known as "Swainson's mistake." It may be interesting to Naturalists to know the further distribution of these singular formations, which, hitherto, so far as I am aware, have only been found in India and Brazil. I had not heard of their presence in Tasmania before I discovered my first specimens, about nine months since, in a tributary of the Upper Huon River, where they abound in countless numbers. I had splendid opportunities of noticing the lively little insect which is the sole proprietor and tenant of its house. They are identical, in all respects, with those found in Brazil and India."

The SECRETARY read the original description of these "cases" from Swainson's Malacology; also, a notice of the genus *Thelidomus*, from Sowerby's Conchological Manual. Several specimens were placed under a microscope of low power, and examined by the members.

A letter from Dr. Milligan stating, *inter alia*, that he had forwarded some books for the Society, was read. Among those specially mentioned were Bewick's British Birds, 2 vols.; Bewick's Quadrupeds, 1 vol.; Crania Britannica (Dr. Davies), 1 vol., etc., etc.

A paper on the Land Shells of Tasmania, by Mr. W. F. Petterd, was read by Mr. Stephens, who prefaced the reading by stating that the writer was (unfortunately) not a member of the Society. The paper, however, had been forwarded to, and examined by the Council, and as it was considered to be of sufficient value and importance to entitle it to publication in the Transactions, he, by permission of the Council, accepted the responsibility of introducing it. On one particular point the author deserved great credit. It was a failing of many collectors to multiply exceedingly the number of species and even genera. Now, the man who properly reduces the number of species was as great a benefactor to science, as the individual who on the other hand makes two blades of grass grow instead of one, is to mankind. Mr. Petterd, he was glad to say, could happily be included among the former class, as a great number of instances could be pointed out in his paper, in which as many as three, four, or five forms which had previously been described as specifically different, had been comprised under the heads of single species.

The paper was one which admitted of little discussion, but it was remarked that, thanks to the labours of the Rev. J. E. Tenison-Woods, Mr. Legrand, Mr. Petterd, and Mr. R. M. Johnston, the Natural History of Tasmania, so far as the land, marine, freshwater, and fossil shells were concerned, was in a very advanced and satisfactory condition. Some parts of the island were certainly still unexplored, but it was probable that the greater number of specimens yet to be discovered could be classed with forms already placed under specific heads.

A vote of thanks to Mr. Petterd for his paper, and to the donors of presentations, closed the proceedings.

FURTHER NOTES ON THE FRESH-WATER SHELLS OF TASMANIA,

(With a description of New Species)

BY

ROBERT M. JOHNSTON.

[*Read* 12*th March*, 1877.]

INTRODUCTORY.

The publication of the Rev. J. E. Tenison-Woods' paper, in enabling collectors to determine and compare the catalogued fresh water species with those in their immediate neighbourhood, has been most valuable, and has given a healthy impetus to local observation. As the list, however, was only published by the Society but a year ago, it cannot be expected that any considerable addition could have been made to our knowledge in this particular study since that time. Still, as the types for the various species were mainly derived from southern habitats, it is possible that some varieties peculiar to northern Tasmania may have escaped notice, and consequently there may be a difficulty in the exact specific determination of certain of our northern varieties. Indeed, I find, with respect to *Physa*, *Lymnea*, and *Bithynella*, that the difficulties in the way of classification are very great, because of their extreme variability even in the same habitat. This difficulty is, unfortunately, increased where the full range of variability may have escaped the classifier's notice. Perhaps it is owing to this that Mr. Brazier's two species—*Paludestrina Legrandiana* and *P. Wisemaniana*, so far as written description is concerned, could not be identified by Mr. Woods, who could have scarcely failed to recognise them from Mr. Brazier's description had he seen the most common species from northern habitats. I am fully convinced, from a careful examination of the living shells in the neighbourhood of Launceston, that *Paludestrina Legrandiana* (Brazier), *P. Wisemaniana* (Ibid), *Bithynella unicarinata* (Tenison-Woods), *B. Tasmanicus* (Ibid), are simply the chief varieties of one species. As the classifier, who has frequently to be content with dead specimens and a meagre show of varieties, may find it difficult sometimes to know what may constitute permanent characteristics, it may be of some use to state my observations with respect to certain characters which, in my opinion, are very inconstant.

In the first place, I have noticed that the keel membrane characteristic of *B. unicarinata* (Tenison-Woods) and *Paludestrina Legrandiana* (Brazier) is not a reliable character. In the swamp drains, in Launceston, the four *varieties* may be

obtained in myriads on the submerged leaves of Triglochin and Potamageton. Indeed, varieties may be found abundantly which shade off imperceptibly from one to the other of the chief varieties. Again, size and degree of transparency, whether due to the shell or its covering, are very deceptive, as I find that, in the same neighbourhood, a particular species, as it approaches brackish or salt water, becomes thinner, more transparent, and, frequently, reduced to half the fresh water size. The aspect of certain shells is also much affected by local causes. Thus, shells in still water, fresh, where much dead wood is found, are invariably covered with a dark coat, and the shell is usually more solid. Where the water plants, Triglochin and Potamageton, abound, the shell becomes coated with a rusty brown color from decomposed vegetable matter.

Those shells which adhere to stones more or less exposed to the direct rays of the sun, are frequently bleached white, and become more solid in shell structure, and sometimes very brittle.

In the 1st Basin, Launceston, I have noticed that a small shell, which answers essentially to the description *Bithynella Legrandi* (Tenison-Woods), mimics closely the color of the rock upon which it adheres. There generally it is found with a white shelly lip. Perhaps this mimetic tendency may help to explain the extreme variability of the genus *Bithynella*, which is undoubtedly the most prolific fresh water genus in Tasmania. It is also the most generally distributed shell, and is found from the sea to 3000 feet above its level. *Physæ* and *Pisidia*, however, have a greater vertical range, as certain species of *Physa* and *Pisidium* abound in Youl's Lake, Ben Lomond, 5070 feet above sea level. The species are, however, very stunted at that height.

Although I shall presently describe one or two peculiar and remarkable shells—one of them, at any rate, of a rare genus hitherto known as confined to America and Cuba—yet, when we consider the wonderful minuteness of fresh water shells, the paucity of collectors, and the vast regions yet unexplored in Tasmania and Australia, it would be unwise to make wide generalisations upon our limited collections, however tempting it may be for individual observers to so. As yet, I believe, we are a long way off that completeness of knowledge of the fresh water shells of Tasmania to justify anyone in considering that our fresh water shells are exceptionally distinct from neighbouring regions, where, possibly, the same lack of knowledge also prevails.

As an illustration of how a classifier may be misled by

inconstant characters, I may refer to Mr. Woods' statement with respect to *Physa ciliata*—"*This ciliated form is quite exceptional in the genus, only one other being found in India.*" So far from being exceptional in Northern Tasmania, I have found the reverse to be true. Nearly all the species of *Physa* are ciliated, especially in young individuals, in the following localities, viz.: North and South Esk Rivers, Avoca, Distillery Creek, Racecourse Creek, Launceston; Lamont's Creek, Punch Bowl, Kerry Lodge Creek, Pools, St. Leonards; and First Basin, Deloraine; Circular Head, George Town. I have since learned, from Mr. Woods himself, that a ciliated shell, closely allied to a Northern species, abounds in the neighbourhood of Melbourne, thus adding another link to the fresh water fauna of the two near though isolated regions. It may be allowed, therefore, that the presence or absence of ciliæ is a very unreliable character. The ciliæ, as a rule, are so remarkably delicate that the mixing up of several specimens in the same box is apt to rub off every trace of those beautiful ciliated lines so conspicuous on the surface of the shell when carefully removed from the water.

I have noticed that in the young shell of *P. Diemenensis* (Sow.), the ciliæ are usually in two or three contiguous rows on the crown of the whorl immediately below the suture. In another species which I have not yet satisfactorily determined, I have counted as many as 25 rows disposed also in transverse curves on the last whorl. Sometimes, when washed off, the former growth of ciliæ has left a permanent wavy decussate structure on the transparent pale horny shell. This feature is another point which Mr. Woods states is peculiar in an Indian species. When we consider the delicacy of the ciliæ it is easy to understand that dead specimens, frequently handled or rubbed against each other, would reveal no trace to the classifier. Hence I maintain that the character is unreliable for classification purposes.

I have found a specimen of *Pisidium Tasmanicum*, with a white silvery-ciliated umbo, near Avoca. From Christchurch, New Zealand, I obtained a single specimen of a *Bithynella*, collected by Mr. T. R. Atkinson, and, although the lip is imperfect, I am satisfied that it is closely allied to *B. Tasmanica* (Tenison-Woods).* This, again, may prove another link in the distribution of fresh water shells.

In regard to limited distribution of peculiar forms, it must be borne in mind that fresh water shells hybernate during a

* Mr. Woods, subsequently to the reading of this paper before the Royal Society of Tasmania, had come to a similar conclusion, in referring, with others, the N.Z. species to *B. coralla* (Gould).

portion of the year; that the mature shells are rarely found on the shallow margins of lakes or pools, where collectors are often obliged to obtain their specimens; that the young of various species differ very materially in ornament and general form from mature specimens; that such a remarkable form as *Gundlachia petterdi (mihi)*, only 2 and 3 *mil.* long., and being transparent, is not to be found, even where conditions are favorable, without the aid of a keen experienced eye; and therefore, when we take all things into consideration (not forgetting the paucity of experienced collectors), we ought to be assured that the various districts have been fully worked up before instituting final comparisons with distant regions. Even then, the recent fossil deposits of fresh water shells on Barren and Badger islands show how important connecting links in time and space may easily be overlooked or ignored. It must be remembered that contiguous, though completely isolated, pools may easily be stocked with certain fresh water shells where the conditions are favorable.

That wonderful observer, Mr. Darwin—whose care and patience are such that nothing important, however apparently trivial, escapes his notice—writes:—"Some species of fresh water shells have a very wide range, and allied species, which, on my theory, are descended from a common parent, and must have proceeded from a single source, prevail throughout the world. Their distribution at first perplexed me much, as their ova are not likely to be transported by birds, and they are immediately killed by sea water, as are the adults. I could not even understand how some naturalized species have rapidly spread throughout the same country. But two facts throw some light on the subject. When a duck suddenly emerges from a pond covered with duckweed, I have twice seen these little plants adhering to its back; and it has happened to me, in removing a little duckweed from one aquarium to another, that I have quite unintentionally stocked the one with fresh water shells from the other. But another agency is perhaps more effectual. I suspended a duck's feet, which might represent those of a bird sleeping in a natural pond, in an aquarium where many ova of fresh water shells were hatching; and I found that numbers crawled on the feet, and clung to them so firmly that, when taken out, they could not be jarred off. These just-hatched molluscs, though aquatic, survived on the duck's feet, in damp air, from twelve to twenty hours; and in this length of time a duck or heron might fly at least six or seven hundred miles, and would be sure to alight on a pool or rivulet if blown across sea to an oceanic island, or to any other dis-

tant point. Sir Charles Lyell also informs me that a Dytiscus has been caught with an *Ancylus* (a fresh water shell like a limpet) firmly adhering to it; and a water beetle of the same family, a Colymbetes, once flew on board the 'Beagle' when forty-five miles distant from the nearest land. How much further it might have flown with a favouring gale no one can tell."

Where local conditions are favourable for the support of certain fresh water shells, it follows, from the remarks of the learned naturalist, that there is no reason why isolated pools throughout Tasmania may not be interstocked by means of beetles and birds. The paucity or richness of local feed, with difference in altitude, etc., will be sufficient to effect modifications from the parent type form such as we are accustomed to see in Tasmania. I may, therefore, prior to describing the new forms, sum up these few introductory remarks by stating that, in my opinion, when the laws which, according to our best authorities, determine the distribution and relation of forms elsewhere, seem not to be able to explain certain anomalies in the distribution of certain forms in Tasmania, that the cause is more likely to be due to hasty inference or the imperfection of material for the formation of sound opinion than that the wide, well-considered, and unanimous verdict of our best authorities should be mistaken. I am not, however, aware that there is anything anomalous in the distribution of the fresh water shells of Tasmania; although I am persuaded that the meagre, isolated *collections* in a new country should produce many forms which, because of the gaps, would seem very exceptional.

New Species.

(Sizes given in Millimetres.)

Gundlachia. (Pfeiffer.)

Shell thin, obliquely conic; apex inclined posteriorly; base closed for two-thirds by a flat horizontal plate; aperture semicircular. (*Woodward's Moll.*, p. 303.)

Gundlachia Petterdi. *n. s.*

Shell minute, thin, pale horn, diaphanous, spirally oblong in two distinct tiers, apex obliquely inclined posteriorly, concentrically striate and crossed by fine radiating liræ, apical tier more incrusted with confervoid matter, and appearing partially and obliquely exserted upon the basal tier; projecting portion of apical tier as well as one-third of the basal one closed by a flat horizontal plate, all in the plane of the original aperture of apical tier; outer aperture broadly ovate; lip of basal tier continuous, although modified at junction with apical tier; inner aperture semicircular, and

determined to a great extent by the original aperture of apical tier; inner lip with slightly raised rim continuous, simple. In the young state the shell is simple, and resembles the common *Ancylus* in the same neighbourhood. Long. $2\frac{1}{2}$—3, lat. $1\frac{1}{2}$—$1\frac{2}{4}$, alt. $\frac{1}{2}$—$\frac{3}{4}$. Animal pale yellowish, with broad roundish muzzle, two short subulate tentacles; eyes sessile behind tentaculæ; mouth with dark serrated horny jaws, tongue linear, oblong, teeth numerous, 96 rows $\frac{1\,5}{1\,8}$—1—$\frac{1\,5}{1\,8}$; laterals equal, hooked, and inclined away from saddle-shaped medial, as in *Avicula* (see p. 303, *Woodward*). Habitat, on dead leaves in a pool, 1st Basin, Launceston; isolated from the South Esk.

This is a most interesting genus, hitherto confined to America and Cuba. The Tasmanian species differs from the Cuban one, *G. ancyliformis*, in being smaller, and, relatively to length, broader; the former being three times as long as it is broad, the latter scarcely twice as long as it is broad. It also differs in the position and shape of inner aperture, the Tasmanian species being more central and more rounded anteriorly. An examination, under the microscope, of the animal proves that it is closely allied to *Ancylus*. The teeth in the latter are simply fewer and larger. Both *Gundlachia Petterdi* and *Ancylus Woodsii* feed on diatomacea. I found large numbers of the frustules of various species in their stomachs. I have dedicated the species to Mr. Petterd, who has materially enriched our Tasmanian collections.

Amnicola. Gould and Haldemann, 1839.

Shell ovate, conical turbinated, covered with an epidermis, not perforated; spire acute; whorls few, rounded; aperture large, orbicular, and straitened backward; peristome continuous, outer margin thin, simple; operculum horny, spiral or paucispiral.

Amnicola launcestonensis. *n. s.*

Shell solid, small, globosely conical, with a short, somewhat acute, spire; epidermis dark, granular; whorls $4\frac{1}{2}$, convex, rapidly decreasing; body whorl much inflated, forming two-thirds of the whole length of shell; suture deeply impressed, aperture widely ovate, peristome continuous, outer lip slightly reflexed, inner lip obliquely reflexed against body whorl, causing a faint approach to an umbilicus; throat bluish white, shelly; operculum horny, paucispiral. Diam.—Max. 5 mil., min. 3 mil. Habitat—Still water, though in communication with the South Esk; in caverns, cataract, Launceston.

I have somewhat doubtfully referred this species to the

sub-genus *Amnicola*. Woodward makes it a sub-genus of *Melania*, while in Chenu's work it is referred to *Paludina*. From examination under the microscope I find that the muzzle tentaculæ and foot more closely resemble *Paludina*; while the long, narrow, linear band (twice as long as in any of the genus *Bithynella*) of 120 rows of 3—1—3 denticulated teeth, relates it more closely to *Melania*. The eyes, however, are sessile on the outer base of tentacles, which, as well as the transversely wrinkled and projected muzzle, are tinged more or less with dark blue, as in *B. unicarinata* (Tenison-Woods). The shape of shell closely imitates the genus *Ampullaria*, but the animal has not the tentacular muzzle, the shortly-stalked eyes, nor the shelly operculum of that genus. In many respects it approaches the genus *Valvata*; but as the aperture of shell is considerably modified by last whorl, I think the reference to *Amnicola* to be most suitable.

Ancylus Woodsii. *n. s.*

Shell small, oblong, ovate, white, transparent, depressedly obliquely conical; concave posteriorly, convex anteriorly, apex subcentral, concentrically striate and crossed by faint distant radiating liræ; epidermis not visible or absent, surface dotted with very minute transparent bluish-white egg-like bodies. Long. $2\frac{1}{2}$—3, lat. 2, height $\frac{1}{2}$. Animal and teeth almost similar to *Gundlachia Petterdi*. Habitat—South Esk; Meander, Deloraine; Avoca, Launceston; common on the submerged living leaves of Triglochin.

A very minute shell, and distinct from the other two described species, easily recognised by its size, flatness, and apex position.

Var. A. Shell larger than the above, pale horny, rounded on side most distant from apex. Long. $5\frac{1}{2}$, lat. 3, height 2. Isolated pool, St. Leonards; periodically connected with North Esk flood waters.

Var. B. Shell narrowly oblong, pale horn, apex more elevated than ordinary type. Long. $3\frac{1}{2}$, lat. 2, height 1. Pool, St. Leonards.

Var. Y. Shell more solid, with black epidermis. Long. $3\frac{1}{4}$, lat. 2, height 1. Hobart Town. Mr. Petterd.

Ancylus Tasmanicus. (Tenison-Woods.)

Var. A. Thin, pale horn. 1st Basin, Launceston.

Bithynella nitida. *n. s.*

Shell small, elongate pyramidal, somewhat solid, pale flesh color, shining; spire acute; whorls 6, rounded; aperture ovate; peristome continuous; margin very slightly thickened and reflexed, free from body whorl. Long. 3, lat. $1\frac{3}{4}$—2. Fossil, Thunder and Lightning Bay, Barren Island.

Pomatiopsis Badgerensis. *n. s.*

Shell pyramidal, generally decollate, thin, scarcely opaque, pale fleshy white, inside tinted reddish brown; whorls, prior to being decollated, usually 7, subsequently average 5; decussate with irregularly raised liræ, and indistinct varices; suture deeply impressed, aperture roundly ovate, peristome continuous, margin somewhat thickened, inflated, and reflected; inner lip conspicuously reflected. Long. 10, lat. $3\frac{1}{2}$—4. Fossil, Badger Island. A much larger shell, and very distinct from *P. striatula*. Menke.

Planorbis atkinsoni. *n. s.*

Shell minute, irregularly flatly discoid, with an open shallow umbilicus, and sunken nucleus; whorls 4, angled, rapidly increasing, depressed; preceding whorls embraced, and slightly sunk in the last; last whorl flattened irregularly above, slightly convex below; somewhat obsoletely keeled above at abrupt expansion near suture, and constricted and sharply keeled at periphery; surface finely, obliquely arcuately striate; aperture nearly two-thirds of the breadth of shell, obliquely and narrowly cordate-acuminate, with channel formed by the sharply keeled periphery, and two grooves anteriorly and posteriorly formed by the projecting keel of preceding whorl; margins simple, approaching, and obliquely connected by a more or less distinct callus; upper margin obliquely produced. Diam., max. 5, min. $3\frac{1}{2}$, alt. 1. Habitat, common on leaves of Triglochin, South Esk, from Avoca to Launceston.

This shell is very distinct from *P. tasmanicus* (Woods), the whorls of which are not flattened above, although there is in most specimens from Circular Head a slight approach to a keel. It seems to approach *Anisus kermatoides* (D'Orb.); the concave flattened sides are, however, reversed in the Tasmanian species. Dedicated to Mr. T. R. Atkinson, of Launceston, an enthusiastic conchologist.

Planorbis scottiana. *n. s.*

Shell discoidal, very minute, thin, pale horny, somewhat flattened above and below; whorls 4, depressedly rounded, finely transversely striated, regularly increasing; suture moderately sunk; aperture obliquely raised, roundly lunate; peristome simple. Diam., max. $2\frac{1}{2}$ mil., min. 2 mil., height $\frac{1}{2}$ mil. Habitat, restricted to the same isolated lagoon in which *Gundlachia petterdi* is found. It differs greatly from *P. tasmanica* and *P. atkinsoni* in size and form.

I have dedicated this species to the memory of the late Hon. J. R. Scott, who was an enthusiastic naturalist, and did much for the natural history of Tasmania.

REMARKS ON SPECIES ALREADY DESCRIBED, AS REGARDS DISTRIBUTION, ETC.

ANCYLUS	CUMINGIANUS.	Bourg.	Not seen in the northern part of Tasmania.
,,	tasmanicus	Ten.-Woods	Pale horn variety. 1st Basin, Launceston.
LYMNEA	tasmanica	do.	Not seen in the North.
,,	huonensis	do.	Ditto ditto
,,	Hobartonensis	do.	Both abundant near Launceston. They are very variable in size and shape, and run into each other. I think they are merely varieties of the same species.
,,	Launcestonensis	do.	
,,	sp.	do.	Fossil. Badger Island. Too imperfect for description.
PHYSA	aperta	do.	Not seen in the North.
,,	eburnea	Sowerby	Invariably ciliated in all the creeks when fresh, common.
,,	mamillata	do.	These I believe to be varieties of the same species. Intermediate varieties occur in Little Hampton Lagoon, frequently ciliated.
,,	ciliata	Ten.-Woods	
,,	nitida	Sowerby	Varieties occur in the creeks about Launceston, closely approaching the description given.
,,	Bruniensis	do.	Not seen in the North.
,,	Vandiemenensis	do.	Common, 1st Basin, Launceston, ciliated, 3 rows on crown in young state.
,,	huonensis	Ten.-Woods	Not seen in the North.
,,	legrandi	do.	Abundant in all creeks in the north. Very variable in size, shape, and color.
,,	tasmanica	do.	
,,	tasmanicola	do.	Doubtful.
,,	huonicola	do.	Ditto.

With respect to the Tasmanian genus it is interesting to notice that *P. tasmanica*, when examined by me, showed a most peculiar arrangement of the lingual teeth. The medials are 2-cuspid, the laterals 4-, 5-, and 6-cuspid; the extreme ones having a resemblance to the closed digits of the hand.

BITHYNELLA.

There is some confusion with respect to the shells classed under *Paludestrina*, by Brazier, and under *Bithynella*, by the Rev. J. E. Tenison-Woods. The latter classifies them under

Bithynella, because the opercula in specimens examined by him were partly shelly. I have never met with a shelly operculum in the North. In fact, the Tasmanian species is intermediate between the *Littorinidæ* and *Paludinidæ*. The animal resembles *Paludina* in the long slender tentaculæ, foot, and short linear tongue, of 3—1—3 denticulated teeth (about 54 rows). It inclines to *Littorina* in the almost sessile eye lobes, and in the horny pauci-spiral operculum. The species are most variable, according to the altered conditions which affect them. The degree of brackishness has a marked effect upon them. *B. unicarinata* (Tenison-Woods), in the drain near to the Railway Station, has 6 whorls, moderately thick shell, covered with the reddish decomposed confervæ. About a mile distant, where the water is still more brackish, the same species is very delicate pale horn, transparent, 6 whorls, and not one-half the size of the larger species. The carina of epidermal membrane is never constant. Sometimes, in awl-shaped hardened spines, as in *P. legrandiana* (Brazier); in interrupted lines, as in *Bithynella unicarinata* (Tenison-Woods); in continuous lines, simple; in continuous or interrupted lines, fimbriated; and most frequently without any apparent carina, as in *Bithynella tasmanica* (Tenison-Woods), or its synonym, *Paludestrina wisemaniana* (Brazier). In fact, I am inclined to the opinion, as already stated, that the following four shells are merely varieties of one species:—

Bithynella unicarinata (Tenison-Woods).
Paludestrina legrandiana (Brazier).
Ditto wisemaniana (Ditto).
Bithynella tasmanica (Tenison-Woods).

And the following may be considered distinct species, although they are extremely variable:—

Bithynella legrandi	Ten.-Woods	1st Basin, common.
,, dulvertonensis	do.	Not seen in the North.
,, huonensis	do.	George Town Heads, Sorell, Circular Head.
,, dunrobinensis	do.	Doubtful.
Pomatiopsis striatula	Menke	Not seen about Launceston.
Assiminea tasmanica	Ten.-Woods	Ditto ditto.
Planorbis tasmanicus	do.	Not seen about Launceston, but have received specimens in abundance from Circular Head, where they were obtained by Mr. T. R. Atkinson. The aperture, however, is slightly angled at outer edge.

Unio moretonicus	Reeve	Most common in all streams.
Ditto sp.		Fossil, Launceston tertiary Basin.
Pisidium Tasmanicum	T.-Woods	Abundant in all streams. St. Leonards, 1st Basin, Lake Youl, Ben Lomond, Avoca.
Ditto dulvertonensis	do.	George Town Lagoon, York Plains, Little Hampton Lagoon.
Cyclas tasmanicus	do.	Not seen.

THE PLATYPUS.

The following notes on the Platypus (*Ornithorhynchus anatinus*) by Morton Allport, F.L.S., F.Z.S., etc., etc.

[*Read 14th March*, 1878.]

The majority of our indigenous mammals are gradually but surely becoming extinct, and, therefore, observations on their habits of life, though possibly of but trivial interest now, will in a few generations, be eagerly sought for and be as valuable then as a few authentic notes on the manners and customs of the Dodo or the Moa would now be to us.

An additional value is given to the minute life-history of marsupials and monotremes by the fact that they represent here in actual existence a condition of things which in the northern hemisphere is only known as a bygone world, and such life-history to the studious geologist may furnish a key that will unlock and display far more of the details of past eras than the most careful study of the few fossil remains of early European marsupials can ever afford.

On a fine hot evening at the close of last January I was sauntering, rod in hand, down a wild part of one of the small tributaries of the Huon, known as the Mount River, when my attention was directed to a disturbance in a still pool some 150 yards below, and directly afterwards I saw the low flat back of a Platypus resting on the surface. One bank happened to be a high one, and as a tree had fallen across the pool making a rude bridge some 10 feet from the water, a good opportunity offered for making observations of the creature's proceedings, the more so as the water was of such brilliant clearness as to render fly-fishing a heartbreaking occupation. Divesting myself of my rod and basket I crept silently through the scrub and reached the lower end of the log; then lying on it at full length, I crawled on, taking every opportunity of progressing while the Platypus was under water, and remaining as motionless as the log itself when he came to the surface, being ultimately placed in so good a position that I could, and did, for more than half an hour, watch all his movements. It was a large specimen and one of that variety which has very red fur on the sides. Down the centre of the pool, which was very deep in places, there was a long ridge of coarse gravel, consisting of stones each from an inch to four or five inches in diameter, and it was to this ridge of gravel that my friend's attention was altogether directed. The depth over the gravel was in the shallowest places about 2 ft. 6in., and his method of proceeding was to burrow his head and more than half the body amongst the stones, causing a small cloud of sediment to arise at each

dive as he worked his head and fore-feet about. He never remained under water longer than a trifle over half a minute, and stayed on the surface between the dives rather less than half a minute, as ascertained by careful timing during seven or eight dives. While under the water, whether burrowing in the gravel, or seeking a fresh spot in which to burrow, he emitted a large quantity of small bubbles, which, rising constantly to the surface, would have accurately marked his position, even if the clearness of the water had not enabled me to see him the whole time. The fur seemed to repel the water just as the feathers of a water-bird do, and appeared perfectly dry the instant the back emerged above the surface. He generally remained motionless on the surface except that the upper and lower mandibles were working rapidly with a lateral grinding motion, just as one might expect from the flat horny rudiments of teeth, and the nature of the articulations between the jaws. From the time I first saw him till he quietly sailed off for his burrow (which I subsequently found at the lower end of the pool) his operations lasted over three quarters of an hour.

Several times during his burrowing in the gravel, an English trout of nearly half a pound weight made his appearance on the outskirt of the cloud of sediment raised by the platypus, and darted on some prey which was too minute for me to distinguish—the fish evidently having no fear of its neighbour.

As the spawning time of our Tasmanian grayling was then commencing in the earlier rivers (of which the Mount River is one) I had a strong suspicion that the platypus was collecting ova for anything but a righteous purpose, and, therefore, as soon as he had cleared out for the night, I waded on to the upper part of the gravel bed where it was somewhat shallower, and brought a few handfuls on shore for examination; in this there were no eggs, but a large number of caddis grubs or pupæ of a small stone-fly belonging to the Phryganidæ, which appear to abound in some of our rivers, and these doubtless were the attraction, as I well remember dissecting specimens of the Platypus in which the curious cheek pouches were found distended with the cases of similar caddis grubs.

Although no fish eggs were found in this particular gravel bed, it bore so close a resemblance to a large trout rid, to rob which the whole of the animals operations so evidently fit him, that though an advocate for living and let live, I cannot conscientiously recommend the owners of trout streams to encourage the presence of the *Ornithorhynchus anatinus*.

ON SOME NEW TASMANIAN MARINE SHELLS.

By Rev. J. E. Tenison-Woods, F.L.S., F.G.S., Corresponding Member Royal Societies, Tasmania, Victoria, N.S.W.; Linn. Society, N.S.W., etc.

[*Third Series. Read 9th April*, 1878.]

The following new and very interesting species were, for the most part, collected by the Rev. H. D. Atkinson, and, with few exceptions, at Circular Head. An accurate knowledge of that fauna has long been a desideratum, and science may be congratulated on having such an industrious and painstaking collector as Mr. Atkinson settled there. A few other species are from different collectors, as noted at the end of each diagnosis. The list shows the spread of the eastern Australian coast fauna into N. Tasmania; while in the new species the recognised Tasmanian molluscan facies is not materially departed from.

New Genus, Iosepha.

Shell bucciniform, variegated, covered with a periostraca, spire short, acute, last whorl large, ventricose, with a posterior depressed groove at the suture producing a contraction at the lip, columella with one conspicuous plait.

This shell is a *Cominella* with a plait. It is very rare, small, and has its station on shallow rocks about Bass' Straits and North Tasmania. I only know of one species.

Iosepha. *nov. gen. Testa Cominellæ simillima, sed plica una conspicua supra columellam insignita.*

Iosepha tasmanica. *n.s. I. t. ovato fusiformi, parva, solida, opaca, carnea et albida; anfr, nucleo incluso,* 7 *convexis, angulatis, regulariter costatis et coronatis, regulariter, concinne striatis, striis distantibus, sup. cost. transeunt.; costis elevatis rotundatis, superne sulco conspicuo interuptis; nucleo* (2 *anf.) lævi. inflato; apertura ovata, postice attenuata, labro tenui, acuto; columella conspicue uniplicata, retro canaliculata; basi concava, spiraliter lirata.* Long. 10, lat. $4\frac{1}{2}$, long. apert 5, lat. $2\frac{1}{2}$ mil. Hab. N. Tasmania. W. Petterd, Loutit Bay, W. Kershaw, King's Island, T. D. Smith, Kent's Group, ditto.

Shell ovately fusiform, small, solid, opaque, flesh color and white, whorls, including the nucleus, 7, convex, angular, regularly ribbed and coronate, regularly and neatly striate, striæ distant, and passing over the ribs, which are raised, rounded, and interrupted above by a conspicuous groove; nucleus of two whorls, smooth, inflated; aperture ovate, attenuate posteriorly; labrum thin, acute, columella conspi-

cuously uniplicate, canaliculate behind; base concave, spirally lirate.

TROPHON SQUAMOSISSIMA. *n. s. T. t. fusiformi, scabra, sordide lutea, oblique plicata (ult. anfr. plicis, 8) conspicue spiraliter lirata; undique squamosa, squamis supra costas crebris, foliatis, aliter distantibus supra liris in lineis longitudinalibus transeuntibus; anfr.* 5, *superne angulatis, et carinatis; sutura profunde impressa; nucleo* 2 *anfr. striato; apertura anguste ovata, labro tenui, canali prælongo, aperto, declivo, columella planata, alba, lævi.* Long. 15, lat. 7, canali $3\frac{1}{2}$, spira $7\frac{1}{2}$ mil. Hab. N. Tasmania. Rev. H. D. Atkinson.

Shell fusiform, rough, dirty yellow, obliquely plicate (plaits in last whorl 8), conspicuously spirally lirate, scaly or squamose all over, scales very close and foliate upon the ribs or plaits, but distant elsewhere, passing over the liræ in longitudinal lines, whorls 5, angular above and keeled, suture deeply impressed, nucleus of two whorls striate, aperture narrowly ovate, labrum thin, canal rather long, open, and sloping, columella flattened, white, smooth.

Very distinct from any known form. The foliation on the plaits are very like varices, and connect the genus closely with *Murex* proper.

COMINELLA ALBO-LIRATA. *n. s. C. t. ovato fusiformi, solidiuscula, apice acuta, lamellose scabra, olivacea, liris albis, rotundatis, distantibus, eleganter spiraliter zonata; anfr.* $6\frac{1}{2}$, *superne angulatis, crebre longitud. lamellose striatis et indistincte costatis, lamellæ supra liras transeuntibus, ad suturam elevatis tortuosis, sutura linea alba lata conspicua; apertura late ovata, fulvo-purpurea; labro crassiusculo, intus albo maculato, ad suturam, angustato sed vix canaliculato; columella concava, planata, exacte definita, encausta, subtus, subumbilicata; canali brevi, subrecurvo.* Long. 20, lat. 10, spira. 10 mil. Flinders' Island. Aug. Simson and Edward D. Atkinson.

Shell ovately fusiform, rather solid, apex acute, lamellosely scabrous, olive, and elegantly spirally zoned with distant rounded white liræ (5 to 6 in last whorl, one on each whorl of the spire exclusive of the white band on the suture), whorls $6\frac{1}{2}$, angular above, thickly lamellosely striate lengthwise, and indistinctly ribbed; lamellæ passing over the liræ, more raised and twisted over the suture, suture conspicuously marked with a broad white line; aperture broadly ovate, deep brown purple; labrum rather thick, spotted white within under the liræ, narrowed but scarcely canaliculate at the suture, columella concave, flattened, exactly defined, enamelled, subumbilicate; canal short, subrecurved.

This is certainly one of the most beautiful of our smaller coast shells. The brilliant white raised liræ on an olive

ground give it a very elegant appearance. It is quite distinguished from every other Australian species by the close raised lamellæ which overlap and are curiously twisted at the suture.

Triforis fasciata. *n. s. T. t. parva, anguste pyramidata, polita, nitente, alba, una fascia fulva ad suturas late spiraliter cincta; anfr.* 11, 3—5 *carinis granulatis conspicue cinctis; carinis supra et infra majoribus, moniliformis, reliquis angustis vix granulatis; sutura lira conspicua insignita, apice lævi, decollato; apertura subquadrata; labro tenui; labio reflexo, canali producto et everso; ultimo anfr. carinis valde diversis et maculatis.* Long. 6, lat. $1\frac{1}{2}$ mil.

Shell small, narrowly pyramidal, polished, shining, white, but with one chestnut band which occupies about half of each whorl; whorls 11, conspicuously zoned with from 3 to 5 granular keels; keels larger above and below, making a kind of beaded margin to the whorls, the rest narrow and varying in thickness, with obsolete granules; suture marked with a raised line; apex smooth, decollate, aperture subquadrate, labrum thin, lip reflexed, canal produced and everted, last whorl with the keels of very different shape and spotted, the upper and lower ones thickened and nongranular, leaving a broad central area which is ribbed.

This shell differs from *Triforis tasmanica* nobis, in its color, shape, and curious granular keels. *T. tasmanica* is saturated reddish brown with three granular uniform keels.

Mitra Legrandi nobis. (Vide Proc. Roy. Soc. Tas. 1875.) I find since I wrote the description of this shell that it is often found of a larger size than the dimensions originally given, commonly about 4 to 5 mil. long. The coloring is also different. The last whorl is a rich golden reddish brown, with a broad white band in the centre, in the middle of which there is a fine but very distinct brown line. In the spire the whorls show but little of the color except at the sutures, but there is in the whole of the shell a kind of semi-transparency which is like fire stone or opal. It has been found at Circular Head by the Rev. H. D. Atkinson.

Mitra Teresiæ nobis (*loc. cit.*). This shell has also been found at Circular Head by the Rev. H. D. Atkinson. It was double the size of the type specimens described by me. I believe that this shell will be found very close to an undescribed *Mitra* which was erroneously identified with Sowerby's *Mitra vincta*.

Columbella dictua. *n. s. C. t. parva, anguste ovata, spira acuta, nitente, fulva, lineolis pallide luteis acute angulosis confertissime reticulata; anfr. nucleo excluso,* 7, *planatis vel*

vix convexis, sutura inconspicua; nucleo, $1\frac{1}{2}$ *anfr. globoso, lævi, apertura ovata, antice lata, labro haud acuto, labio reflexo.* Long. 9, lat. 4, spira 5 mil. N. Tasmania. Rev. H. D. Atkinson.

This species may be readily distinguished by its peculiar close reticulation of brown and pale yellow sharply angular lines. They form very fine acute zigzag markings of equal width, and extremely close together. In form it is like a very small *C. semiconvexa*. The color is very constant, and there are no cloudings or spots of any kind.

Erato pellucida. *n. s. E. t. lævigata, nitens, pellucida, sublactea, elongato elliptica, utrimque obtusa, spira depressa, inconspicua; anfr.* $3\frac{1}{2}$, *ultim. omnino superanti, labro crassiusculo, submarginato, cum anfractu ultimo partim juncto, medio autem producto et incurvo, intus minute, distanterque denticulato, apertura vix angusta, antice latiora; columella conspicue triplicata, plicis postice decrescentibus, ad basim eversa, et aperta, marginata et contorta, plica simulanti.* Long. $6\frac{1}{2}$, lat. 3 mil. Hab. Table Cape. Rev. H. D. Atkinson.

This beautiful little *Erato* is the only one known from Tasmania. It is highly polished and shining, and almost perfectly pellucid, with a slight milky clouding. The color, however, looks darker within, almost livid, but this, I am convinced, arises from the remains of the animal. There are three plaits on the columella which decrease posteriorly, and the base of the columella is twisted round so as to look like a fourth; the spire is only very slightly exsert, showing about $2\frac{1}{2}$ whorls; the teeth on the outer lip are numerous, but very faint and inconspicuous.

Rissoa (ceratia) punctato-striata. *n. s. R. t. parva, elongato turbinata, alba, subpellucida, nitente, ubique regulariter, æquidistanter, profunde striata, striis minute concinne punctatis, punctis creberrimis; anfr.* $6\frac{1}{2}$, *declivis, rotundatis, ultimo spira longe superanti (ut.* $5\frac{1}{2}$*—3), apice obtuso; apertura late pyriformi; labro tenui, antice parum everso, columella contorta et marginata.* Long. $8\frac{1}{2}$, lat. $3\frac{1}{2}$; long. apert. $3\frac{1}{2}$, lat. 2 mil. Table Cape. Rev. H. D. Atkinson.

This beautiful little species is mainly distinguished by its distinct and equal spiral grooves, which are very neatly dotted with close round pits like an extremely fine chain. The color is white but almost pellucid, and the shape is elongately turbinate. The mouth is quite entire and anteriorly exserted.

Bittium minimum. *n. s. B. t. minuta, tumide pyramidata, nitente, pallide badia; anfr.* 6—7; *planatis, regulariter crebre plicatis,* (13—15 *ult. anf.*) *et spiraliter* 3 *liratis, liris supra*

plicas nodosis, sutura vix impressa, apice obtuso; nucleo partim lævi et partim semper decollato; apertura semilunari, canali brevi, recurvo, basi concava angustata, lævi. Long. $2\frac{1}{2}$, lat. 1 mil. N. Tasmania. Rev. H. D. Atkinson.

Shell minute, tumidly pyramidal, shining, pale brown; whorls 6 to 7, flattened, regularly and closely plicate (13 to 15 plaits on last whorl) and spirally 3-lirate, liræ very nodose on the plaits, suture scarcely impressed but visible, apex obtuse, nucleus smooth partly and always partly broken, aperture semilunar, canal short, recurved, base concave, narrowed, smooth; columella twisted.

In color and ornament like *Bittium granarium*, but more tumid, and completely distinguished by its very minute size.

Drillia tæniata. *n. s. D. t. elongato fusiformi, turrita, spira quam apertura longiori, fasciis latis, fulvis vel castaneis, zonata; fasciis eleganter lineis angustis albis marginatis; anfr.* 7, *superne angulatis et costulis coronatis, undique spiraliter striatis, lineis albis sæpe liratis, super angulum sublævis, sed lineis curvatis (ab increm. sinus provenientibus) insignitis; apertura lata, sinu lato et profundo; labro tenui, labio exacte definito et encausto, canali brevissimo, aperto.* Long. 13, lat. 5; long. apert. 5 mil. Flinders' Island. Aug. Simson and E. D. Atkinson.

Shell elongately fusiform turretted, spire longer than the aperture, zoned with broad bands of brown or chestnut which are elegantly margined with narrow white lines, whorls 7, angular above and crowned with small ribs, spirally striate throughout, and with the white lines often lirate, nearly smooth above the angle, but marked with the curved lines of growth of the sinus; aperture broad, sinus broad and deep; labrum thin, lip exactly defined and enamelled, canal very short and open.

This *Drillia* is distinguished from the many described Australian species by its bands of color, and short coronate ribs. The color bands are not very conspicuous, even though narrowly margined with white.

Drillia agnewi. *n. s. D. t. elongato fusiforme, turrita, spira quam apertura longiore (10—16) crassa, sordide lutea, haud nitente (erosa?); anfr.* $7\frac{1}{2}$, *oblique costatis (ult. anfr.* 12), *et spiraliter liratis; costis, latis, conspicuis, a sinu depressis et evanidis; liris conspicuis, distantibus elevatis, supra cost. transeuntibus, in spira* 4, *ult. anfr.* 9—10; *apice decollato, apertura anguste ovato, sinu lato, profundo, labro acuto, producto, labio crasso, reflexo, canali recto, brevi.* Long. 26, lat 9; long aperturæ 10, lat $3\frac{1}{2}$. Hab. Table Cape. Rev. H. D. Atkinson.

This species differs from *D. Weldiana* nobis in its dull

yellow uniform color, and in the absence of any callus on the posterior part of the columella. The ribs are fewer, larger, and more distant, and the same differences apply to the liræ, and the outer lip is not thickened. The size is about the same.

Mangelia delicatula. *n. s. M. t. parva, anguste fusiformi, turrita, sub diaphana, parum nitente, pallide lutea, lineis rufis, tenue et irregulariter zonata; anfr. (nucl. incl.)* 8, *declivis, superne obtuse angulatis, crebre concinne, declivo costatis, et conspicue spiraliter striatis; costis elevatis, ad suturam persistentibus, in ultimo anfr.* 14; *striis subdistantibus, supra costas transeuntibus, sutura bene impressa; nucleo (3 anfr.) lævi, fulvo, polito; apice minute obtuso; apertura anguste ovata, sinu lato, labro tenui acuto, labio exacte definito, canali lato brevi.* Long. 9, lat. $2\frac{1}{2}$; long. apert. 4. spiræ 5. Long Bay, Hobart. W. Legrand.

Shell small, narrowly fusiform, turretted, subdiaphanous, shining, pale yellow, slenderly and irregularly zoned with red lines; whorls, including 3 nucleolar ones, 8, sloping, obtusely angular above, closely and neatly ribbed, and conspicuously spirally striate; ribs elevated continuous to the suture, sloping, 14 in last whorl; striæ subdistant, passing over the ribs, suture well impressed; nucleus smooth, fulvous, polished, apex minutely obtuse, aperture narrowly ovate, sinus wide, labrum thin, acute, lip exactly defined, canal wide and short.

This may be distinguished from our many described *Mangeliæ* by the smallness and closeness of the ribs, by the distinct and distant spiral striæ, and by the lines of color. Its smaller size permit its being mistaken for *M. Meredithiæ* nobis; that shell is pure white, or the bands of color are not often seen. The ribs are also distant and fewer. *M. delicatula* is somewhat like *Bela mitralis* (Adams), which, however, is a larger and stouter shell.

Clathurella granulosissima. *n. s. C. t. anguste fusiformi, turrita, spira quam apertura longiore, solida, badia saturata, haud nitente; anfr.* 7, 2 *apicalibus sub lævibus, reliquis, conspicue costatis, et undique liratis; costis crassis, rotundatis, elevatis, ultimo anfr.* 8; *liris creberrime subtillissimeque granulatis, in spira* 3—4 *majoribus, æquadistantibus, sup. cost. transeuntibus, reliquis minutis, sutura bene impressa; apertura late ovata, sinu lato, inconspicuo; labro tenui, extus varice insignito, intus concavo; labio encausto; canali lato, tenuiter recurvo.* Long. $6\frac{1}{2}$, lat. $2\frac{1}{2}$. N. Tasmania. Rev. H. D. Atkinson.

This pretty species is somewhat like *C. sculptilis* Angas, but it differs from all other forms in having the fine spiral liræ

conspicuously granular, about every fourth one is larger than the others. The color is a uniform dull brown, and the longitudinal ribs are very conspicuous. The outer lip has a varix, but is hollow within. The sinus is very faint, and the canal a little produced and recurved.

Clathurella sculptilior. *n. s. C. t. subminuta, alba, ovato fusiformi, conspic. clathrata, hæud nitente, opaca; anfr. (nucleo incluso)* $4\frac{1}{2}$—$6\frac{1}{2}$, *rotundatis, crebre costatis, et creberrime liratis, costis angustis, sub elevatis, ultimo anfr.* 16; *liris conspicuis, parvis et magnis alternantibus, supra costas transeuntibus et ibi subnodosis, sutura impressa, lineis ab increm. sinus vix visibilibus; nucleo* ($1\frac{1}{2}$ *anf.*) *concinne sedtenuissime striato; apertura late ovata; labro incrassato, intus dentato, sinu lato; columella lævi, exacte definita, canali brevi, parum recurvo.* Long. $5\frac{1}{2}$, lat. 2; long. spiræ 3. Long Bay. Rev. H. D. Atkinson. Four fathoms.

This shell comes so close to *Clathurella sculptilis* Angas that I shall best define it by describing the differences. The ribs in our species are double the number; the sinus is not so deep, and consequently the lines that it leaves by growth near the suture are nearly straight, and they are not very visible. There is no smooth space below the sutures, and the liræ are very close and alternating. (In *C. sculptilis* they are all of one size and distant.) The lines of growth are not very visible. The nucleus in both species is white and finely groved of $1\frac{1}{2}$ whorls to where the normal sculpture of the shell abruptly commences; but in this species the groves are finer, and there is no trace of transverse sculpture. In Mr. Angas's shell it is coarse, and there are signs of sculpture. Neither shells appear to be very uncommon.

I must add to the Tasmanian fauna :—

Clathurella bicolor. Angas.

Clathurella sculptilis. Angas.

Both of these shells have been hitherto found only in or near Port Jackson. The Rev. Mr. Atkinson has found the former at Circular Head and the latter at Long Bay, so we may conclude that they both have a wide range, and probably extend through Bass' Straits. They do not appear to be at all uncommon.

Venus (Chione) macleayana. *V. t. ovata, crassa, pallide fulva, radiatim regulariter costata; costis rotundatis, lævibus, nitentibus, numerosis (30 circiter), antice latis, postice parvioribus et indistinctis; concentrice lamellosa, lamellis tenuibus, distantibus, parum elevatis, versus marginem crebris, crassis, irregularibus; natibus purpureis; ligamento conspicuo, elongato, fossa lata, sat profunda, rugosa; intus alba et purpurea con-*

spicue nebulosa, marginibus postice late dentatis, antice crenulatis. Long. 29, lat. 32, alt. 16. Bass' Straits. W. F. Petterd. King's Island, Flinders' Island. R. Gunn.

Shell ovate thick, pale fulvous, radiately regularly ribbed, ribs rounded, smooth, shining, numerous (about 30), broad in front, smaller behind and indistinct; concentrically lamellar, lamellæ thin, distant, slightly raised, close towards the margin, thick and irregular; umbones purple; ligament conspicuous, elongate; fossa broad, rather deep, rugose; shell conspicuously clouded white and purple within; margins broadly toothed posteriorly and crenulate behind.

This shell somewhat resembles some New Zealand forms, but it is distinct from any of them. The broad ribs and concentric lamellæ are very different from *V. australis* and *V. striatissima*, of Bass' Straits. The ribs are broad and the lamellæ very thin and distant, and the shell is much larger. It appears to be rare.

Bittium turboniloides. *n. s. B. t. minuta, turrita, acicularis, clathrata, sordide albida, subnitente; anf.* 9—12, *nucleo incluso, eleganter tricarinatis et crebre longitud. costatis; costis ult. anf.* 20—24, *conspicuis, carinis superantibus, supra eas transeuntibus et ibi nodosis; sutura sat impressa; nucleo* 3 *anfract. lævibus rotundatis; apertura semilunaris, basi lævis, conspicue concava.* Long. 5, lat 1 mil,

Shell minute, turretted, acicular, latticed, dull whitish, somewhat shining, whorls 9 to 12 including the nucleus, elegantly tricarinate, and thickly ribbed lengthwise; ribs in the last whorl 20 to 24, conspicuous, wider than the carinæ, passing over them and nodose at the junction, suture well impressed; nucleus of three rounded whorls; aperture semilunar, base smooth and conspicuously concave.

But for the *Bittium* aperture and columella this beautiful little species is very like a *Turbonilla*. It is very elegantly sculptured, the ornamentation being exceedingly close and fine, even proportionately for so small a shell. It was found at Circular Head by the Rev. H. D. Atkinson.

Mangelia alternata. *n. s. M. t. parva, fusiformi, subnitente, alba, et (in ult. anfr. tant.) maculis fulvis pallide lineata; anfr.* 6, *declivibus, superne angulatis, regulariter costatis, spiraliter crebre liratis, liris supra costas transeuntibus, haud nodosis, parvis et magnis alternantibus; sutura bene impressa, apice obtuso, nucleo lævi,* $1\frac{1}{2}$ *anfr., haud inflato, apertura spira paulo superanti, anguste elliptica, labro tenui, columella inconspicua vix encausta, sinu leviter curvato, per flexionem costulorum supra angulum anfractuum tantum insignito.* Long. 11, lat. 4; long. apert 6 mil.

Shell small, fusiform, somewhat shining, white, and in the

last whorl only marked with pale brown spots or lines, whorls 6, sloping, angular above, regularly ribbed, thickly spirally lirate; liræ passing over the ribs, but not nodose, and alternating large and small, suture well impressed, apex obtuse, nucleus smooth, of $1\frac{1}{2}$ whorls, but not inflated; aperture slightly longer than the spire, narrowly elliptical, labrum thin, columella inconspicuous, scarcely enamelled; sinus shallow and broad, distinguished only by a bending of the little ribs at the angles of ths whorls. Common. Circular Head. Rev. H. D. Atkinson.

Eulima marginata. *n. s. E. t. parva, tumide pyramidata, nitente, omnino lævi, subpellucida, lactea; anfr.* $8\frac{1}{2}$, *parum convexis, superne conspicue marginatis, sutura haud impressa; apertura anguste pyriformi; labro tenui, acuto, antice producto; labio exacte definito; columella contorta, postice recta et reflexa; apice sub obtuso.* Long. 9, lat. 4, long. apert. $3\frac{1}{3}$, lat. $\frac{1}{2}$ millim. Circular Head. Rev. H. D. Atkinson.

Shell small, tumidly pyramidal, shining, completely smooth, subpellucid, milky white, whorls $8\frac{1}{2}$, slightly convex, conspicuously margined above, suture not impressed, aperture narrowly pyriform, labrum thin, acute, produced anteriorly, lip exactly defined but not reflected, columella twisted, straight at the base, and a little reflected at the margin, apex subobtuse.

Eulima apheles. *n. s. E. t. elongata, pyramidata, lævi, nitente, opaca, alba, solida; anfr.* 10, *omnino planatis, politissimis, lineis incrementi tantum tenuissime rugosis; sutura angusta, haud impressa; apertura pyriformi, labro acuto, antice producto; labio reflexo, angusto, encausto, conspicuo; apice acuto, basi lineis tenuibus æquidistantibus spiraliter insignita.* Long. 14, lat. $4\frac{1}{3}$; long. apert 4, lat, 2 millim. Circular Head. Rev. H. D. Atkinson.

Shell elongate, pyramidal, smooth, shining, opaque, white, solid; whorls 10, quite flat, highly polished, only slightly uneven from the lines of growth; suture narrow, not impressed, aperture pyriform, labrum acute, produced anteriorly, lip reflexed, narrow, enamelled conspicuous; apex very sharp. base marked with three or four equidistant spiral lines.

NOTES ON CERTAIN TERTIARY AND POST TERTIARY DEPOSITS

On Flinders, Barren, Badger, and other Islands in Bass' Straits, by Robert M. Johnston.

[*Read 9th April*, 1878.]

SAND DUNES AND ELEVATED BEACHES.

Hitherto the more recent shell deposits upon the islands of Bass' Straits have been briefly referred to by various writers as "elevated beaches." Strzelecki groups the following formations under that head, viz.:—

1. Formation at Lake King, Gippsland.
2. Ditto between Cape Liptrap and Portland Bay.
3. Green Island, Bass' Straits. (100 feet high.)
4. Formation, south-west point of Flinders' Island.
5. Ditto, 10 miles south of Cape Grim. (100 feet high.)
6. Ditto at Table Cape. (70 feet high.)

Mr. Gunn also refers to the "raised beaches":—

7. At Hunter's Island, near Woolnorth, and several islands in Bass' Straits.

Recent investigations have shown, however, that most of the formations thus alluded to are not, properly speaking, "raised sea beaches." They are, for the most part, the remains of the floor of a vast but shallow sea of supposed miocene or oligocene age.

The Rev. J. E. Tenison-Woods, in a paper recently read before the Fellows of the R.S. of New South Wales, states:—

"To sum up all the evidence which has been gathered on this subject, we may say that our tertiary formations probably range through all the various miocene periods which are represented by different deposits on other portions of the globe. We may certainly conclude that the whole of the central parts of South Australia, the north of Tasmania, and the islands of Bass' Straits, were under the sea during that epoch. There is quite sufficient evidence to show that we have tertiary rocks of a lower horizon than the miocene. My own opinion is that the Muddy Creek beds, and those of Table Cape, Tasmania, should be classed as upper oligocene. I conclude this from the small per centage (8 per cent.) of recent species, the relations of the fossils, and the general facies."

There is also abundant evidence to show that this ocean floor has been slowly elevated above the level of the waters in which it was formed; and although this upward movement may not have been uninterrupted in one locality, yet there is

no doubt but that it has continued up to a very recent period, if it be not now going on. The extent of this movement also proves its slow and steady character; and that it has not been produced by a sudden alteration in the relations of sea and land is fully established by the sections exposed at Table Cape, on the islands in Bass' Straits, and in the various sections lying between Cape Leuwin and Cape Howe. If we turn to New Zealand we have there evidence of the movement in a direction southward and eastward ; and we may be sure it is far within the mark when it is stated that the upward tendency of the floor of the ocean in the southern portion of Australia must have affected not less than 3,900,000 square miles of the earth's surface. This is quite contrary to the popular notion which represents Australia as a vast, aged continent, which, in its inert senility, is slowly disappearing below the waters of Oceania. No doubt the exposure of such a large extent of palæozoic rocks in Australia, together with the great number of salt lakes and salt pans in the tertiary districts, may have given some color of foundation to this wide-spread impression.

The vertical movement of the earth's crust is often confused with other influences which help in determining the boundaries of land and sea. For example: the continuous action of rivers hollow out channels, and cause extensive deltas to be formed, which may conceal, to a great extent, the actual vertical movement. The natural waste around our coasts permitting a horizontal advance of the sea may often be mistaken for a sinking of the land ; and the gradual wearing away of some rocky headland, or the effect of the prevailing winds, may produce such extensive modifications, in the shape of sand dunes on land and sandbanks in the sea, as to make it very confusing to those who are not skilled in tracing cause and effect in geology. Even to the latter the signs are not always so apparent that they can at once be recognised. It requires a patient examination of particular districts, and a careful collation of what, often at first sight, may seem conflicting evidences.

These observations are sufficient to explain the local encroachment of the sea on our North-West Coast (as reported to this Society many years ago by Mr. Gunn), and to show that a local encroachment of the sea may be in perfect harmony with a slow vertical movement of the land upward.

The following islands were recently visited by me :— Waterhouse, Swan, Barren, Long, Flinders, Green, Kangaroo, and Badger. The various islands are under lease to different persons. Barren and Badger are now the homes of the half-castes. The original home of the aboriginals, " The Settle-

ment," on Flinders' Island, is the property of Mr. Gardiner, of Launceston, who has also a lease of the whole island.

The various islands of the group present nearly the same features botanically and geologically. With the exception of the mountain chain on Flinders' Island, running north and south—(the highest peak, Strzelecki, 2,550 feet); a few isolated conical peaks of recent igneous origin (the Patriarchs and others, 300 to 400 feet); Mount Monro, on Barren Island; and Chappell Island—the land is low lying, nowhere rising above 100 feet. The prevailing rock on all the islands is granite, through which a dark blue close-grained rock has been most curiously intruded—sometimes in continuous dykes and veins, at other times interspersed in a sort of network—in such a manner as to leave the observer in doubt whether the granite or the dark blue rock is the later of the two. The granite is frequently porphyritic. Crystals of *black tourmaline* are occasionally found several inches long, and over one inch in diameter. The largest crystals hitherto obtained have been got on Long Island. The surface of the larger islands—where not composed of loose sand dunes and vast brackish lagoons—is covered over with an impenetrable scrub of *Banksia*, *Callistemon*, and *Melaleuca*; and the saline herbs and shrubs of the order *Chenopodiacea* give a most singular character to the vegetation of all the islands. On the low coast flats *Mesembryanthemum æquilaterale* forms a continuous carpet. The half-castes are very fond of the ripe fruit of the latter, and of *Solanum laciniatum*. These fruits are pleasant, and of a sweetish-acrid taste when fully ripe, but are of a most nauseous taste when partially so.

The accompanying sections, giving the relation of the various rocks, will give a better conception of their geological character. A section of one island—say Green, Barren, or Flinders—may be taken as a type of the whole. If we take the rocks in a descending order—after passing through the humus, or the sand dunes now forming the surface of the low coast lands—we would find the following order :—

1(A). Consolidated sandstone, replete with shells of two or three small species of *Helicidæ* and other land shells. Sometimes 60 and 70 feet thick.

2(B). Elevated consolidated sea beaches and sandbanks, composed principally of the shells of species now existing. Average elevation, 40 to 50 feet above present sea level.

3. Turritella limestone, composed of the more or less perfect remains of shells not now existing.

4. Metamorphic schists, abutting upon the granite.

5. Granite.

Rocks 1 to 4 are all more or less unconformable to each other, and they abut against the granite axis on the eastern and western sides.

THE HELICIDÆ SANDSTONE.

This formation is of particular interest. It is found upon nearly all the islands up to a height of 100 feet, and for the most part it lies directly upon the granite. It varies in character from a coarse gritty sandstone, with minute worn fragments of marine shells, to a close-grained cherty or arenaceous limestone. It is found on Barren Island, forming a more or less precipitous coast line of horizontal strata, at intervals, between a point opposite Doughboy Island and Thunder and Lightning Bay. On Badger, Chappell, Green, and Kangaroo islands it is the prevailing rock, and invariably is found to lie directly upon granite or the upturned edges of mica-schist rock. The weathered portions present a curiously rough and honeycombed appearance, and frequently give out a sonorous metallic tone when struck by the hammer.

The most characteristic feature, however, is the imbedded remains of various species of *Helicidæ*, together with certain species of *Succinea*. In certain layers of calcareous clay—evidently the sediment of some ancient brackish lagoons—occurs a species of *Bithynella* in the greatest abundance. I believe the shell to be closely allied to the existing fresh water shell, *B. legrandi*.

In some places the remains of two small species of *Helix* seem to compose 20 per cent. of the mass of the rock. They are very similar to species now found in myriads in the shallow hollows filled with dead leaves in the drift sand of the dunes now forming. In communicating these facts to Professor Ralph Tate, he replied that "in the S.E. coast of this colony (South Australia)—and particularly I noted that the sandstones of Cape Northumberland (100 feet or more in height), were consolidated blown sand; in them I found two species of *Helices*. The two species of *Helices* from Cape Northumberland (both occur living on the spot) are among those you sent me."

It is, therefore, of much interest to find that the sand dunes, consolidated, enclosing certain species of *Helix*, should have such a wide range. In a dried-up lagoon, evidently of more recent date than the sand dunes, I found a species of *Physa*, and a species of *Pomatiopsis*, or *Blanfordia*. Of these and the other shells found in the consolidated sand dunes Professor Tate makes the following observations:—

PLEISTOCENE FOSSILS.

(From Badger Island.)

PHYSA TENUISTRIATA.	At any rate, a South Australian species.
BLANFORDIA STRIATULA.*(?)* *(Pomatiopsis.)*	Shows some characters which, if permanent, would justify its separation from the South Australian called as above. Mr. Woods gives no reason for its removal from this genus. It may be a *Pomatiopsis.*

(From Cape Barren Island.)

PALUDESTRINA SP. *(B. legrandi(?)* Woods.)	Occurs in the River Torrens, at Adelaide.
SUCCINEA STRIGATA.	Living species also sent from sand dunes now forming on the islands.
HELIX DIEMENENSIS. (Cox apparently.)	
Do. SP., allied to *H. Penolensis.* (Cox.)	

The existence of similar land shells in the dunes now being formed is hardly necessary to guide us to the conclusion that the *Helicidæ Sandstone* has been formed in a similar way, and under similar conditions. Everything points in the same direction. The minute fragments of shells, which are the chief cementing principle in the sandstone, are certainly marine; and I have frequently, in the associated coarser grits, obtained the somewhat worn body-whorl and aperture of the shells *Bittium granarium* and *Truncatella tasmanica*, species which now exist in the greatest abundance on the shores of the various islands.

The shells may now be classed as follows :—

FOSSIL—HELICIDÆ SANDSTONE.

HELIX STANLEYENSIS (Petterd)	Still existing.
Do. PICTILIS (Tate)	Ditto.
Do. WELLINGTONENSIS (Cox)	Ditto.
SUCCINEA AUSTRALIS (?)	Ditto.
BITHYNELLA NITIDA (Mihi.)	Doubtfully distinct from an existing form.

SUB-FOSSIL—BED OF OLD LAGOONS.

POMATIOPSIS BADGERENSIS (Mihi.)	May only be a variety of existing species.
PHYSA TENUISTRIATA (?)	Identical with Sowerby's *P. eburnea.*

OYSTER BED DEPOSIT.

On the same horizon as the *Helicidæ Sandstone* we may include the oyster bed deposit of Flinders' Island. This deposit is situated on the banks of the River Arthur, about two miles inland from its mouth. It is about thirty feet above high water level, and a fine exposed section shows that it is composed principally of regular layers of an enormous species of mud oyster, with which is associated *Venus aphrodinoides*, and species of *Rissoa*, *Fusus*, *Alaba*, etc., etc., all existing species. Enormous gum trees grow over them. The regular layers of heavy unbroken shells preclude the idea that they have been carried any distance, whether by wind or water. They plainly indicate that the estuary mud or sand in which they lived has been slowly elevated into its present position.

RAISED BEACHES.

These are found more or less concealed by the overlying *consolidated sandstones* on Badger and Green islands. The shells are all littoral, and are, when found, in consolidated masses. On Badger Island this old beach of shells lies against, and firmly adheres to the metamorphic schists.

The species are numerous, and seem to be identical with those now existing on the shores of the islands. These beaches are invariably about 40 or 50 feet above present sea level, and sometimes nearly a mile from the present shore line. On the east coast of Badger and Flinders there appears to be intermediate shell accumulations below the recently-formed sand dunes. In them I have frequently picked up *Pectunculus laticostatus*, slightly bleached and worn, together with *Cucullea corioensis;* but whether they now exist in the immediate neighbourhood or not I am not yet prepared to say. I never could pick one up on the margin of the sea that was not more or less worn or bleached, and it is possible they have been washed out of the older sands, upon which the sea may have encroached. It is clear, however, that both *P. laticostatus* and *C. corioensis* must have existed up to a very recent period on the east side of Flinders' Island.

There may, however, be a slight difference in the number of radiating ribs. Although I made allowance for the worn edges, there seemed to be fewer ribs upon those found by me on the islands named as compared with the fossil species at Table Cape. I am not sure whether the New Zealand existing species have invariably 29 ribs, like our Table Cape fossil species. It would be interesting to know. The sandhills on the east side of Flinders are protected by the native grass, *Spinifex hirsutus*. Their globose spiny heads are perpetually being blown out, wheel-like, to sea. When the long spine

penetrates the smooth sand, the whole head is speedily covered over by the drift ; and if the situation be sufficiently removed from the waves, it erects a barrier to further drift inland. There is reason to believe that the *Helicidæ Sandstone* was similarly protected.

I was much impressed with the numerous evidences of the recent elevation of the land, on taking a knapsack excursion, on foot—in company with my friend, Mr. T. R. Atkinson—from Badger Corner to Cameron's Inlet: *i.e.*, along the south and east coast of Flinders' Island. The country, for miles inland, consists of a series of sand hillocks, in ridges more or less parallel with the coast line. These ridges may be said to form a species of network along the eastern coast of Flinders' Island, the interspaces consisting of brackish or salt water lagoons, or the bottoms of recently dried-up lagoons. Some of these salt water lagoons are very extensive. The Pot Boil Lagoon and Cameron's Inlet still maintain a connection with the sea at full tide by a very narrow shifty inlet, but it is evident that they are but existing examples of the mode by which the other basins have been cut off from the receding sea. Their connection will also soon be closed up. Recent shells—particularly *Ampullarina fragilis*—are found round the margins of the inland salt water lagoons. On sinking through the turf of *Saliera radicans*, in search of water—(there are no fresh water streams on the eastern coast)—I passed through layers of decomposing seaweed three feet below the surface, some distance inland.

The characteristic shells exposed by the destruction, by the wind, of the inland sand dunes, are as follows:—

Bankivia varians	Most abundant.
*Philine aperta...	Common.
*Trigonia margaritacea	Abundant.
*Pectunculus rubens (Axinia radians?)	Ditto.
* ,, roseus (,, obligans?)	Ditto.
,, laticostatus	Ditto.
Arca trapezia	Ditto.
Leda crassa	Ditto.
*Cardium tenuicostatum	Ditto.
Cucullea cainozoica	Ditto.

Those marked with an asterisk are certainly now existing in the neighbourhood; but I could only get the others in a bleached and worn state along the shore, and it is very doubtful whether they are now living in the immediate vicinity.

I picked up a living specimen of *Turbo circularis* near to Cameron's Inlet. Professor Tate informs me that it is "a very rare South Australian form, and hitherto only recorded

from St. Vincent's Gulf." The new locality for this species will be interesting to conchologists.

RECENT BASALTIC TUFFS.

Basaltic tuffs, similar to the tuffs at Breadalbane, occur in the neighbourhood of the Samphar Rivulet, Badger's Corner. The beds are in some places stratified; and in them, and strewed along the shore, occur numerous trunks of fossil wood in a silicious state. The structure shows it to be somewhat allied to certain trees found by me in the lignite of Breadalbane. It certainly has no relation to the Pine family. Probably it may be allied to Casuarina, the structure of which it closely resembles.

TURRITELLA LIMESTONE.

Near to the Patriarchs, on Flinders' Island, at a place called the "Heathy Valley," occurs a limestone of which, through the kindness of Mr. Peter Gardiner, I have obtained some specimens, together with interesting particulars as regards distribution.

The limestone is entirely composed of the remains of shells. From their general appearance I judged, at the first glance, that they belonged to our wide-spread tertiary system; and I was confirmed in this supposition by the discovery, among the specimens, of the well-known forms—*Cucullea (Pectunculus) cainozoica* (Tenison-Woods), and *Nucula tumida*—so abundant in the Table Cape beds. The majority of the shells, however, present a different facies to those found at Table Cape, and the deposit will require to be carefully examined before we can determine its exact position in the tertiary series. The characteristic shells are:—A small species of *Turritella*, of the *T. Warburtonii* type; and a small nacreous turritella-like shell, of about 10 whorls spirally grooved, four grooves on each uniformly convex whorl. This last shell may yet be classed among the *Elenchus* group, to which, I think, it has some affinity. I have described these two species in a separate note, and I send specimens with this paper.

On nearly all the beaches of the various islands I have picked up waterworn pieces of fossil limestone, which may yet prove to be associated with the *Turritella Limestone*. The waterworn fragments washed ashore on Swan Island, from the sea bottom in the immediate neighbourhood, are very numerous. I infer that the kelp adheres to them, and during stormy weather they are by this means drifted on the beach. On breaking open some fragments on Swan Island I detected *Trivia europea*, together with one or two forms common to the Table Cape beds. It is remarkable, however, that in all

these fragments I could never trace a single specimen of the two characteristic shells belonging to the *Turritella Limestone* of Flinders' Island. I incline to the opinion that the *Turritella Limestone* may yet turn out to be the lowest member of the tertiary system hitherto found. I intend, at the earliest opportunity, to examine this deposit more minutely.

I have been informed by the Rev. Canon Brownrigg that a white fossiliferous limestone is exposed on the road from the shore to the Lighthouse, on Kent's Group. If the Lighthouse Superintendent were applied to for his kindly assistance, a number of specimens might be obtained for the Society's Museum, and for the use of those who may wish to study the subject. Perhaps some of the Fellows may have business relations there. If so, a box of specimens might easily be obtained by the first vessel which trades between Hobart Town and Kent's Group.

General.

From the foregoing remarks it is evident that there remains a great deal to be done before we can speak positively of the relations of the various beds belonging to the tertiary and post tertiary systems of Australia and Tasmania. The discovery, by Professor Tate, of *Salenia* and *Belemnites* in the Aldinga beds, is very significant. From this and other considerations the Rev. J. E. Tenison-Woods inclines to the idea that the Aldinga series may be "passage beds between our tertiary and secondary rocks." Be this as it may, it is clear that in South Australia, Tasmania, and the Bass' Strait islands we have a series of beds which form a complete chain of evidence, telling of the persistent elevation of the ocean bed from the earliest tertiary period to the present hour—a period sufficiently vast to encompass the extinction of nearly 92 per cent. of the organisms which first inhabited our tertiary seas, and to witness the introduction of a new series of species to take the places of those which have disappeared.

The Rev. J. E. Tenison-Woods, recently, in a paper read before the Linnæan Society of New South Wales, draws particular attention to the remarkable variability of the various species of the genus *Trochocochlea*. In giving the synonomy of *Trochocochlea australis*, viz. :—

T. concamerata (Gray.) | *T. striolatus* (Quoy, G.)
Monodenta australis (Lam.)—

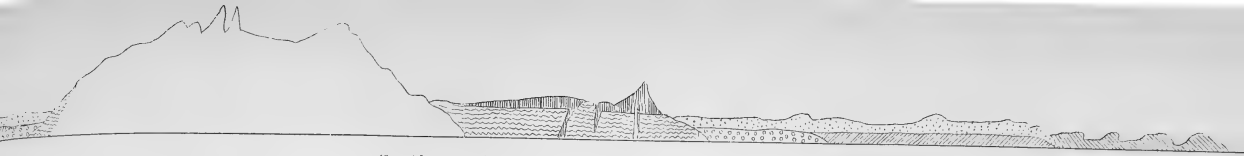
He states—"Turn over any flat stone at low water, and the under side will be found covered with it (*T. striolatus*—Quoy), of almost every size, shape, and color within the limits of the shell's character. I have seen some specimens more than an inch in diameter, some almost conical, some depressedly

turbinate, some white with green spots, some black and yellow on diagonal lines, and some dull olive with few yellow spots. . . . . It is a remarkable fact that the larger shells of these species are found in Southern Tasmania, and they become smaller, more decidedly ornamented, and highly coloured as they approach the tropics."

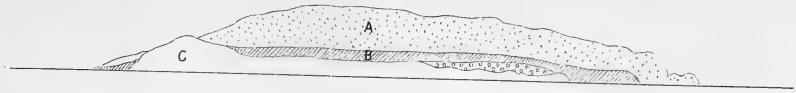
When we take into consideration the remarkable variability, under slightly different conditions, of various species at the present hour, and the vast period during which such changes have taken place in the facies of our Australian marine fauna, as to have caused the disappearance of 92 per cent. of the original tertiary species, it seems to me a difficult thing to assert that Australian geology has no reasonable evidence to offer in favour of evolution. To me—while making every allowance for the persistency of the lower forms of life, and of one or two particular types—the evidence of Australian geology appears to be in perfect harmony with the theory of evolution as represented by its best exponents.

As I understand the theory, original change of form (not hereditary change) only follows material change of the conditions affecting the immediate environment of particular organisms, whether vegetable or animal. There is reason to believe, therefore, that, as regards the lower organisms of the ocean which survive, the external conditions affecting them have not undergone any material alteration since the early epoch when the *Trilobite* peopled the depths of the ocean. Evolution, therefore, is in perfect harmony with facts which disclose the persistency of particular types. I am also fully convinced that it would be unscientific to look upon Australian fossil forms as in some manner independent and distinct from the past life of the world elsewhere. In the world's life-history the fossil forms of Australia are as purely colonial (as regards completeness and origin) as the European races of animals and plants which, within the last century, have occupied its surface.

It seems to me unwise to restrict our attention to the few widely isolated fragments of the past life of the world, as represented by Australian geology, when we take into consideration the evolution hypothesis—which rests upon the whole past changes of life on this earth of ours.



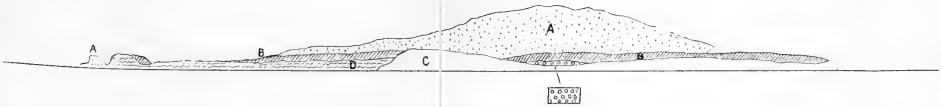
I *Section Flinders' Island.* *(South Side.)*



II *Section Green Island.*

A. Consolidated Sand dunes.
B. Elevated Sea Beach.
C. Syenite.

Syenite.
Basalt.
Elevated Beach replete with shells of existing species.
Consolidated Sand dunes. with shells of Helicidae,
Metamorphic schists.
Turritella Limestone.
Recent and Consolidated Sand dunes.



III *Section Badger Island.*

A. Consolidated Sand dune, replete with shells of Helicidae, Bythinia, Succinea.
B. Elevated Sea Beach, with remains of existing species.
C. Syenite.
D. Metamorphic schists.

Ideal Sections from Originals,
By R. M. JOHNSTON.
Drawn by T. R. ATKINSON.

A FEW REMARKS ON THE DISTRIBUTION AND GROWTH OF QUEENSLAND PLANTS.

By F. M. Bailey, Botanist, Queensland Museum; Corresponding Member, Royal Society, Tasmania.

[*Read 14th May*, 1878.]

The following notes on a few Queensland plants, I am in hopes may not prove uninteresting to some Members of the Society. Some of our trees, &c., are met with far away from what would be supposed their habitat, and not, so far as known, on intermediate country. Others again, which have always been supposed to have been introduced by cultivation are met with at so great a distance from where cultivation is being carried on as to make one think that mode of introduction impossible. Again the soil and situation in which we find a tree growing, are at times so very different that it would lead one to suppose them planted in these situations by the erring hands of man, and not by the unerring hand of nature.

In bringing this before your notice, I will do so by enumerating a few illustrative examples: a striking one, which has only recently been brought under my notice, is that of the *Lysicarpus ternifolius*, Muell. This small, valuable, timber tree I met with in abundance, on the broken, ridgy country, at the eastern foot of the main range, where the soil was dry, and the rocks cropping out in all directions. The trees and shrubs with which it was growing was such as are usually met with in similar places, *Casuarina*, *Eucalypti*, *Banksia*, *Acacias*, *Petalostigmæa*, *Daviesia*, *Pultenæa*, *Xanthorrhœa*, *&c.* Before this I had supposed the tree only to inhabit sandy knolls, such as are common on wide, open country, and are usually covered with scrub, composed of the following genera, viz: — *Acacia*, *Hakea*, *Grevillea*, *Myoporum*, *Capparis*, *Atalaya*, *Dodonœa*, *Hovea*, *Eremophila*, *Notelæa*, *&c.* The country surrounding these knolls is generally good for pastoral purposes, and has nothing in common with that first mentioned, with the exception that the underlying rock is said by Geologists to be the same in both places. Another curious instance of trees, as it were straying away from their supposed natural habitat was furnished by *Timonius Rumphi*, De C., two specimens of which I found a few years back, in one of the gullies of Taylor's Range, about 6 miles west of Brisbane. These trees were healthy and strong, and afforded good shade, although the leaves were not so large as those of the plant in its natural habitat. They seemed to have suffered nothing from frost, although the Orange and Lemon trees of a garden not more

than a mile away had suffered more or less every season. What makes the situation of this tree most remarkable is that so far as is known, it has never been met with outside the tropics, except in this solitary instance. How came it here? An Araliaceous tree, *Astrotriche pterocarpa*, Benth., is another which is found occasionally in a site far distant from its natural habitat, I found it on Mitchell's Pinches, in the Leichhardt district, which must be upwards of 300 miles south of Fitzroy Island, the only habitat given for it in the Flora Australiensis, and I may remark that so peculiar a tree, or rather tall shrub, no collector would be likely to pass unnoticed. Its beautiful leaves and rich, dark purple panicle would be sure to attract attention.

I have met a remarkably pretty fern, *Schizæa Forsteri*, Sprengel, in two very distant places:—First, in the dense scrubs of Maroochie, about 80 miles from Brisbane, in a northerly direction; and also in the dense tropical scrubs inland, from Trinity Bay. I believe I was the first to notice this Fern in Australia, which is somewhat strange, considering its delicate beauty. Some European writers on ferns, have confused it with Swarty's *S. dichotoma*, but besides the difference of habits in the two species, this latter is much more robust, and as far as Australia is concerned, is found only on the sandy land near the coast. It is wanting also in the pretty radiating fructification of *S. Forsteri*. While collecting a short time back at Tarampa, a station west of Brisbane, and about 60 miles from the coast, on an isolated hill, with an elevation of say 80 feet, the greater part of which was composed of loose rock, among which I could not find a particle of soil, I noticed amidst the scrub which covered the hill, many shore plants, and in particular *Sarcostemma australe*, Bth., which was growing luxuriantly, binding the shrubs together with its succulent, leafless stems. But on searching the scrub near, I failed to find either this or any of the other maritime shrubs. There is a curious fact respecting the flora about Maroochie, a rich locality before mentioned, situated in the great dividing range, and where I had a week's collecting, some few years back. Though far north, this place possesses a greater number of those plants, supposed only to belong to the cooler parts of Australia than any other part of Queensland I have seen. Here is one of the widely divided habitats of *Symplocos Thwaitesii*, and as far as known the only Queensland habitat of *Quintinia Verdonii*, F. Muell., a New South Wales tree. In a swamp I noticed also a large amount of broom-like shrub, *Viminaria denudata*, Sim., another southern shrub; in this swamp too, was a large amount of the beautiful, and most useful moss *Sphagnum obtusifolium*, Ehr.,

and *S. acutifolium*, Ehr. The Tasmanian plant, *Mazus pumilio*, Benth., was abundant on the low damp land, and the Fern so common in Tasmania, *Gramonitis Billardieri*, in the bed of the creeks, might be seen covering the rocks Some plants become naturalized so quickly, and spread with such rapidity over the face of the country that it makes it a difficult task to trace their introduction, or to state with certainty whether they are indigenous or not. For instance, the Red Head, *Asclepias curassavica*, Linn., with which hundreds of acres of Queensland soil are now covered. The Horehound *Marrubium vulgare*, which is to be seen in rich profusion, but generally confined to old sheep yards. The little bright-eyed Pimpernel, *Anagallis arvenesis*, has also secured a footing far and wide through the colony; some of our swamps and streams are full of the common Water-cress, *Nasturtium officinalis*, *Sium latifolium*, *&c.* The South Australian pest, *Cryptostemma calendulacea*, R. Br., has tried many times to gain footing here, but has failed hitherto. Should it however, once be carried into our far western districts it will in all probability, spread with the same rapidity it has done in the other colonies. All these, and many others doubtless are introductions. But there are others commonly thought to be introduced, as to which I think there is room to doubt, such an one is *Carpesium cernuus*, *Linn.*, a quantity of which I found growing on One Tree Hill, and from thence for some distance along the top of Taylor's Range, this genus seems to delight in locating itself in places far apart, some of the species being found in South Europe, Caucasus, Himalayan Mountains, and now in Australia. My reasons against its supposed introduction, are:—There is no settlement within some miles of the spot where I found it growing; therefore, it could not be brought into the colony in packing, the way in which doubtless, many weeds are introduced. Again from the nature of its achenes it would be most unlikely, if not impossible for it to have been brought adhering to clothing. The achenes are destitute of pappus or retentive hairs by which to adhere, and thus be carried to a distance. *Goodenia grandiflora*, Sims, I have found in company with the *Carpesium*, and until then was not aware of it being within many miles of the spot. With regard to the Cape Gooseberry, *Physalis peruviana*, Linn., I had always thought it an introduced plant, and accounted for its appearance at every fresh clearing by its being eaten by birds, and thus carried and deposited. But when at Trinity Bay in April last, I saw a plant growing in a small opening in the scrub on the Range, where the foot of the white man had not trod, three months previously, and where the seed from which this plant sprung, if introduced

must have been carried by a bird over 80 miles, which to me seems very improbable.

I shall now ask attention to a peculiarity of growth. It is always of the greatest importance that we should possess a correct idea of the various organs which make up the whole plant, and this can only be obtained by a close study of the function which they perform. But some have, as it would seem, a double or triple place to fill in the economy of nature. Thus, with regard to some of our *Loranthea*, they produce roots both under and above the part of the tree upon which they are living. These upper or aerial roots are rather modifications of the stem, and would seem to take an intermediate place between the creeping stem *Soboles* of Lindley, and the *Sarmentum* of Fuchs and Linnæus. This latter, as in the case of the strawberry, sends out its prostrate thread-like stems, which after stretching along the surface of the soil for some distance forms a fresh plant at its extremity. The soboles sends its creeping stem out in a horizontal direction, between the surface of the soil, and sends up new plants at various intervals. Like this latter subterranean stem, the root-like stems of some species of *Loranthus* in Queensland run along the surface of the bark of the tree upon which they are living, and form plants at various intervals, this root-like stem still extending, or perchance dipping below the surface of the bark and ramifying as the true root of the plant. Thus, it will be seen to resemble the soboles in mode of reproduction and growth, and the sarmentum in position, being aeriel not subterranean. I will now draw attention to a plant where a triple function seems to be performed by one organ. I refer to the roots, or what have been supposed roots of the small, leafless, epiphytical orchid, *Tæniophyllum Muelleri*, Lindl. Having one day brought a small plant of this minute and interesting orchid home with me from the scrub, I placed it with the stick upon which it was growing in an empty fruit bottle. In this position it has both flowered and fruited. The fruit is an angular capsule 4 or 5 inches long, with a short neck, and tapering towards the base, of a light green color, and is the most conspicuous part of the plant. The roots are of a very light color, almost white, and often more than one foot long. On one of the roots of this plant I have noticed a bud, formed at a part where there was a slight indentation, caused, I should think, by a stoppage of growth at some time. This bud is now forming a plant, therefore the supposed root is in reality a stem, and performing the triple functions of a root, stem, and leaf. It will be most interesting to watch the development of the much larger leafless epiphyte *Sarcochilus phyllorhizus*, F. Muell., for in all

probability the broad flattened roots of this plant, are after all, but a modification of the stem. I am in hopes of being able to watch the growth of this curious plant, as there are at present fine growing specimens at Bowen Park, the grounds of The Queensland Acclimatization Society, whose President, L. A. Bernays, Esq., F.L.S. takes a very deep interest in Phytology.

Brisbane, November 22nd, 1877.

WATER SUPPLY IN RELATION TO DISEASE.

By His Lordship the Bishop of Tasmania.

[*Read May* 14*th*, 1878.]

When we consider that water covers some four-fifths of the surface of the earth, and that the health of men depends upon its free and lavish use; when we consider again that, though the vast reservoirs of water are, for a wise purpose, salt and useless for drinking purposes, Nature has taken upon herself the work of a great distiller, we may well deplore the folly and apathy of communities of men who allow what was offered to them for their benefit to return thanklessly in waste to the ocean from whence it came. Nature has made the clouds her carriers of the purest distilled water, which has left all its salts behind, and then deposits her precious burden in the form of snow, or sleet, or rain, upon the tops of the mountain ranges and table-lands. Filtering through the porous strata of the hills, it reaches the impervious clays, and forcing its way horizontally it runs down the mountain sides. There comes man's opportunity for arresting its course as it flows past, and saying to it what Jacob said unto the angel in his mysterious conflict, "I will not let thee go, except thou bless me." It is folly—it is worse than folly, unless it be gross ignorance of sanitary laws, not to dam the streams at the mouth of the glens, and to construct reservoirs on such a scale for its accommodation that the poorest man and his family—and so much the rather, because it is poor and more likely to be ignorant—shall have enough and to spare of this life-giving element. Deprive him of it and what then? Just that which has been happening this summer among ourselves as a consequence? Drinking from stagnant wells, befouled by vegetable decomposition, animal refuse, and disgusting drains and miasmatic cesspools, and other forms of fever disease have been hovering over every household; scarlet fever and diphtheria break out, houses are rendered unwholesome, and the drunkard's thirst sets in.

It is a scandal to our civilization that Great Britain and her colonists should take no sufficient measures for purifying the sources of her domestic water supply. The alarm, indeed, created by the periodic visitation of the Almighty's scourge—the Asiatic cholera—and our more domestic typhoid diseases, led to the appointment of a Royal Commission of which Sir W. Denison was Chairman. I quote from their 6th Report the statement of their unanimous conviction, pages 140-1:—

"But where the organic matter comes from drainage it is a most formidable ingredient in water, and is the one of all others

that ought to be looked upon with apprehension when it is from the refuse of animal matter, the drainage of large towns, the drainage of any animals, and especially of human beings. . . . That such an unspeakably disgusting mode of infection is not only possible, but imminent, over a very large proportion of the inhabitants of Great Britain, is conclusively proved by the numerous analyses of drinking water recorded in the preceding part of this report. So far from the horrible practice just indicated being exceptional, it is the rule. As the result of our inquiries into the polluted waters of this country we are compelled to state that it is a widely spread custom, both in towns and villages, to drink either the water of rivers into which the excrements of man are discharged, or the water from shallow wells which are largely fed by soakage from middens, sewers, or cesspools."

The fact that the propagation of the Asiatic cholera was due to impure water is clearly shown by the comparison instituted between the tenants of two Metropolitan Companies who lived on the same sites on the south of the Thames, in exactly similar conditions. The Lambeth Company had used remedial measures. The Southwark and Vauxhall Company had not. Of the tenantry of the former included in 166,960 occupying 24,854 houses, we read, page 148:—

"By this experiment, it is rendered in the highest degree probable, that of the 3,476 tenants of the Southwark and Vauxhall Company who died of cholera in 1853-4, two-thirds would have escaped if their water-supply had been like their neighbours'; and that, of the much larger number—tenants of both Companies—who died in 1848-9, also two-thirds would have escaped, if the Metropolis Water Act of 1852 had but been enacted a few years earlier."

In various townships which, in my professional journeys, I have to visit, I find typhoid prevalent, and I try from inquiry to trace it to its source. In one instance, all the houses below the source of the detected impurity were infected, and those above escaped. Even ducks were observed lying poisoned upon the stream close to the source of the evil. Whether victims to the poison or not, their putrifying carcases were adding to it. In another township, the bright waters of the Tasmanian river were subject to be polluted by the contents of a mill-race, situated at the entrance of the township, as well as by irrigation-waters, necessarily charged with organic manures. A third district seems to me never free from low fever, and a terrible amount of mortality. I observed the river as I entered the village to be receiving the excrementitious poison of a large family, a member of which had been lying ill for months and dying from cancer.

I need not enter largely into the science of the subject. Disease may be engendered and propagated, whether by germs or by chemical action. Probably each theory is true. By some means or other, by the air or by water, these germs are

brought to some delicate portion of our animal tissue, say the throat, or some part of our mucous membrane, and finding there congenial elements—congenial in a chemical sense—organic changes are set up. We may take alcoholic fermentation as an illustration of what occurs. When yeast, in its active condition, is placed in contact with sugar in solution, what is called a biological reaction occurs. A re-arrangement of its atoms sets in, first decomposition, then re-composition; for what we call fermentation is nothing more than this chemical change. New organisms not only form but multiply endlessly in succession. What occurs during this process I take as a typical example; what the organism of the yeast plant does to sugar or honey in solution, organic germs do to the human system under given conditions. To an unhealthy subject, presenting favourable conditions for chemical change, these germs are not in themselves poison, but become poison; and by that I mean that they effect organic alterations which constitute disease. A family at Brighton or Sorell, or Evandale drink these germs in stagnant water, consisting of animal or vegetable decomposition. Sometimes it is easy, as I have found it to be, to trace the spread of fever with the breeding-ground of these germs. It was easy to do so at Battery Point before the recent rains came to carry off the decomposing refuse in the open drains. And it is no available objection when you point to families who suffer, though they live furthest from the foul drain or the loathsome stream from which the tea is drunk. If you did not drink the water charged with these death-carrying germs, the cow did, and you drank her milk, and while the vigorous members of your family resisted the infection, the germs found a convenient soil in the unhealthy or the delicate on which to grow and multiply. Disease differs according to the character of the germ, be it typhoid, diphtheretic, or scarlet fever. The infectant in each case is some organic matter which comes in contact with a suitable soil, and at once sets up chemical organic changes in the warm animal laboratory which we call disease. Now I say that the object of the physician is to cure, the object of the Sanitary Reformer is to prevent it.

You will remember that a few years ago a terrible and destructive outbreak of typhoid fever took place in England. It was traced to the infected water supply of a dairy farm in Buckinghamshire. A bill has just, I observe, been brought before the House of Lords which deals primarily with cattle disease. I am glad to see also provisions in that bill—the Duke of Richmond's—for the better regulation of dairies. It concerns all who are interested in the health of children (and who are not ?) to see that the quality of this, the most im-

portant domestic supply, be not endangered by vitiated water. The best energies of the State cannot possibly be so serviceably employed, or public funds so appropriately applied, as in providing an ample supply of pure water, and in protecting it, on its way to our homes, in town or country, by the severest penalties, from impurity and these germs of death. It is impossible to over-estimate the sanitary advantages of water. The penalty which Nature attaches to contempt of her provisions and neglect of her laws are not always immediate, but they are certain. As we go on drinking polluted water, or breathing impure air, the system is becoming more and more prepared to fall a victim whenever the avenging pestilence arrives. The powder is being stored and dried, waiting only the fatal spark. Call to mind the loss of children at Brighton, and more lately, at Sorell, where whole families have been well nigh swept off, and say whether there was not a preventible cause. Remember how many families were invaded when scarlet fever first broke out in Hobart Town. That was before the reservoirs were constructed, and the citizens had to draw their supplies from wells unprotected from the pollutions of sewers and other sources of poison. We shudder when we read of the 80,000 or 90,000 human beings slaughtered on the battle fields of Turkey, but there is not a single year when a larger number, relatively to the population, do not fall victims to modern barbarism. I say "modern barbarism," for old Rome was infinitely in advance of modern cities in practical cleanliness. We can fancy the profound sensation in the reign of Augustus which would have followed a report from the inspector of cloacal nuisances which contained the following passage:— "Some arrangement is required to direct the contents of the sewers along before filtering through stones, by which solid matters in suspension are arrested, undergo putrefaction, and pollute the atmosphere. The copious fall of rain we have had (*i.e.*, in February last) never swept the filth from sides of the greater part of the rivulet, though the centre channel was well flushed. During my frequent examinations of the rivulet, I have often observed refuse of all kinds thrown from the habitations bordering thereon into it. I also see organic refuse thrown from houses into the street-gutters shortly after they have been swept by the scavengers." This was the witness of your own "Officer of Health," written not long before an intolerable stench forewarned the inhabitants of Battery Point of coming mischief, before which not only the weaklings perished, but the strength of the young man has been bowed down. I know that we shall be met, as all reformers are sure to be met, by the cry of expense. Let me reply to this cry by quoting a passage from the Reports of your own Transactions,

1863, page 5. It is from a paper read by Dr. Hall, who said:—

"From the long list I shall select for illustration, Macclesfield, a manufacturing town of 63,327 inhabitants in the county of Cheshire. I cite this example specially, because the question of economy to the public purse is so well exemplified by the diminution of crime, the repression of pauperism, and the consequent elevation of the moral character, which has resulted from the vigorous measures undertaken by the zealous and enlightened municipal authorities of this town to improve the physical health and enjoyments of the people. The rate of mortality in this borough for the seven years before sanitary improvements were commenced was 33 in 1,000. At the end of five years afterwards it was reduced to 26 in the 1,000. In children under 5 years of age, however, the death rate was diminished 13 per cent. In funeral expenses alone, calculated from the returns of 232 burial-clubs, £8,729 was saved. But there were 28,420 less cases of sickness also, which effected a further saving of £28,420. The duration of life was, moreover, increased by 3 years. Crime generally was diminished 4 per cent., and drunkenness amongst the working classes became considerably less. The reporter Mr. John May says:— 'These figures viewed in any light whatever cannot fail to carry conviction in favour of the policy of energetic sanitary measures; and although landlords and cottage owners are, generally speaking, supposed to be objectors to what are necessarily expensive works, their personal interest is assuredly in favour of their execution. Houses are better occupied, tenants are less subject to sickness, rents are better paid, and repairs and dilapidations are diminished. I may add thereto, also, that the police, insurance, and poor rates, are likewise so much reduced, that ultimately the expenditure in waterworks, drainage, and other sanitary measures, becomes a wise economy. What would the City of Hobart save, if some of its worst streets could exhibit a decrease of 23 per cent. in trials for "drunkenness and disorderly conduct;" "60 per cent. in making use of obscene and profane language;" "58 per cent. in gambling;" and in summary charges of every class, 26 per cent.? What should we save in the support of widows and orphans, if the death rate of husbands and fathers was reduced in Hobart Town to what it is in the rural districts of Tasmania? Last year—the healthiest on record for this island—the death rate in the city of Hobart for both sexes, aged from 20 to 60, was about 23 per 1,000, of those living at that age, at the census of 1861; while in the country districts the rate was only 7 per 1,000 or less than one-third. Yet Ely in England has done more than this. Hydraulic skill in providing a copious and pure supply of water, and establishing a perfect removal of *effete* and injurious matters by good sewerage, in that town, has reduced its rate of mortality to less than that of the surrounding country, though previously it was very much in excess of it. Ely, moreover, does not possess the local advantages for sanitary engineering that Hobart city does. The money loss on the 148 men and women, aged from 20 to 60, who died in Hobart city, over and above the natural death rate of the country districts of the island, would surely much exceed the additional cost entailed upon us by the interest of the outlay on our new waterworks, and an equally

comprehensive and effective system of sewerage! 'A few years ago,' says the *Macclesfield Reporter*, 'statements such as these were received with little favour, indeed, many people affected to ridicule them. Now, however, such vital statistics have assumed an authority which prevents even the most ignorant from questioning their real value.' The President of the Social Science Association in his opening address at the meeting in Bradford in 1859 said:—'The benefits of improvements of dwellings, streets, courts, alleys,—of drainage, ventilation, supply of good water, removal of nuisances, piggeries, lay-stalls, bone-boiling, poisonous manufactures, with the whole array of noxious agencies, are now almost universally admitted. Yet many pause at the preliminary expense. It will therefore be a part of our inquiries to examine the pecuniary bearings of the whole subject, and show that a financial outlay on works such as these will be amply compensated by a financial return, in good measure, pressed down and running over."

In Tasmania, nature has furnished us with the most noble water-fields. The whole island is intersected with the finest water-breeders. The Southern Range, with its Mount Wellington, has a grand and terminating bluff; then the Western Tiers, the Eastern Tiers, and the mountain ranges to the N.E., offering their priceless service to the Ringarooma district on the one side, and the great and rich agricultural plains on the N.W. on the other. Look at our own Mount Wellington, that grand old warder of our city. There is a rainfall and snowfall stored there sufficient to supply the wants of a population indefinitely multiplied. There need be no stint of water if there were no stint of expenditure which would amply repay itself. No drain need be foul, no cistern need be empty, though, if I had my way, these cisterns, which are apt to become putrid, should be superseded by a supply of never failing water, under high pressure, supplied by cocks, that waste would be prevented or punished by a domestic flood. No one need be kept from healthy bathing, daily repeated. To public baths public wash-houses should be added, as in old Rome, and children saved from rheumatism, bred in the steam of soapsuds, from which men and boys make their happy escape on washing days in the nearest public house, and learn to drink. I pass over the fact too, that drunkenness comes as often from dirt as dirt from drunkenness. Each is its own parent. We talk now of enlarging our reservoirs, and the experiences of last summer, recorded in doctors' bills, and more sadly on churchyard tombs, enforce the duty. I do not doubt, however, what the old Romans would have done in spite of their ignorance of hydrostatic laws. They would have spent the public money upon excavating canals, and building aqueducts, which might divert the ocean-bound stream, irrigating and fertilising half-barren plains on its way to the centres of population. Why, if not prepared to do this, why not, as it gushes forth

from the slopes of Mount Wellington, at the juncture of porous and non-porous strata, catch it in spacious reservoirs, three-fold larger than at present, imprison it in aqueous granaries for the present demand and for future scarcity? "All the rivers run into the sea, yet the sea is not full; into the place from whence the rivers come, thither they return again." It is our duty to ourselves, and to our fellow-men that they shall not do so before they have been made, according to the purposes of a Divine Providence, to do their utmost to bless us with health, with cleanliness, with purity, with more abundant food, and with an increased capacity of enjoyment which is within the power of water to minister to mankind.

NOTES OF A VISIT TO THE "HOT SPRING," NEAR SOUTHPORT, IN 1877.

By T. Stephens, M.A., F.G.S.

[*Read 9th July*, 1878.]

About the middle of July, 1877, I had an opportunity of paying a visit to the thermal spring, near Southport, discovered not very many years ago by some splitters who were at work in the neighbourhood. Mr. Graves, who accompanied me, and who had kindly made all necessary arrangements for the expedition, had once previously visited the spot; and his general local knowledge was of great service in enabling us to find it without much difficulty.

The most direct *route* from Southport is by boat up the Lune, as far as the tidal water extends. Landing on the right or western bank of the river, a track is followed for a mile or more, until a convenient crossing can be effected by means of a fallen tree. The country here, as far as one can see, is quite level, and thickly wooded, with much fine timber and tolerably dense scrub, the open spaces being usually wet button-grass marshes. There was no time available in those short days of winter for any geological examination of the immediate neighbourhood, and no rock was seen *in situ*, but the ground was thickly covered in places with large rounded boulders of greenstone, and waterworn pebbles of quartzite. After going a little astray, we at last came upon a small stream, the water in which rapidly sent my thermometer up from 45° to 72°; and following up this clue for some 200 or 300 yards through the scrub, we arrived at a spot where the heated water was briskly bubbling up in the bed of the stream. At the surface the temperature proved to be 82°, and at the bottom, a foot lower, 83° 5′; and though this is, perhaps, hardly high enough to justify the name of "Hot Spring," it must be remembered that the temperature of the air in the shade at the time was 45°, and that there was ice nearly half an inch thick on some of the shallow pools in the bush track, not a mile distant. The water of the spring is evidently cooled rapidly by the water of the stream in which it rises; and it would be impossible either to ascertain the maximum temperature, or to obtain a sample sufficiently pure for analysis, without putting down a tube to the depth of a few feet, or adopting some other means for keeping it apart.

It is not easy to give satisfactory explanation of this phenomenon; and until I know more of the underlying formation I can only suggest that it is probably caused by the decomposition of pyrites, or other metalliferous products, in

the rocks through which the water makes its way to the surface. It is almost unnecessary to say that there are no traces of recent volcanic action anywhere in the district. Of the sedimentary rocks of the neighbourhood, none are older than the Upper Palæozoic, and the volcanic rocks associated with them belong, probably, to an epoch immediately succeeding the carboniferous period.

ON SOME TASMANIAN FRESHWATER UNIVALVES.

By the Rev. J. E. Tenison-Woods, F.L.S., F.G.S., Hon. Member Royal Society, New South Wales; and Hon. Corresponding Member Royal Societies Tasmania, Victoria; Adelaide Phil. Society, etc., etc.

[*Read 7th October*, 1878.]

On the 9th August, 1875, I read before this Society a paper on the Freshwater Shells of Tasmania, which was incorporated in the Proceedings, and appears in the volume for 1875, p. 66. In dealing with certain of the univalves, I stated my reasons for regarding them as true *Bythiniæ*, and for not including them in the genus *Paludestrina*, of D'Orbigny. Since that time I have been able to compare the Tasmanian shells with good types of the European *Bythinæ*, and I have come to the conclusion that our shells differ in so many important respects from them that they cannot be considered the same. I do not think, however, that they should be considered as *Paludestrinæ*. That is a genus erected for South American shells, characterised thus:—

Shell semi-globose, thick, solid, with a short obtuse spire, and few smooth whorls; aperture large, oval, entire; peristome continuous, inner lip callous. Animal with subulate tentacles, at the external base of which the eyes are situated. The operculum is horny, oval, and paucispiral. Small species found in fresh or brackish waters in the West Indies or South America.* (See D'Orbigny. *Mollusques de l'Ile de Cuba*, 1841, vol. 1., p. 199, and vol. 2., 1842, p. 7; also *Palæontologie Français, Ter. Cret.*). M. Chenu, in his *Manuel de Conchyliologie*, looks upon this genus as synonymous with one proposed by J. K. von Muhlfeldt (J. D. W. Hartmann. *Von Hartmannsruthi. System der Erd und Flusschnecken der Schweiz. Sturms Fauna* VI., *Heft* 5., p. 57), the etymology of which was derived from λίθος γλύφω, stone sculpture. It was separated by the authors as a division of *Paludina*, of which *P. naticoides*, *Ferussac*, was the type. Gray, in the *Philosophical Transactions*, 1835, p. 308, unites the genus *Lithoglyphus* with *Littorinæ;* but Pfeiffer, in 1841, in Weigmann's *Archifür Naturgeschichte* (Berlin Arch. 1, p. 228), retains it. Hermannsen, in his *Indicis Genera Malacozoorum* (Cassel, vol. 1, 1846; vol. 2, 1847-8), in vol. 2, p. 191, makes the genus *Paludestrina* a synonym of *Hydrobia*. The latter was, according to Mons. P. Fischer (*Journal de Conchy.*, 1878. Note *sur la synonomie*

* One has been described from New Zealand, by M. Crosse.

du genre Hydrobia et des genres voisins, p. 133*) only proposed nominally in 1821 (*Sturm Deutsch. Fauna, Heft* 5, p. 46), without any generic definition; and this name was followed by three other specific names, without authors, viz.:—*Hydrobia acuta, H. vitrea, and H. minuta.* Of these the first is a saltwater species, the second freshwater, and the third, says Mons. Fischer, is unknown. The idea of Hartmann was (says Mons. Fischer) to separate *Paludinæ* with spiral opercula from those of concentric structure, which is the division of *Vivipara* and *Bythinia* of authors.

The same author draws attention to the fact, with regard to *Paludestrina*, that Mons. D'Orbigny says expressly that he intended his genus to apply to marine and freshwater species, but that it included all the marine *Paludinæ*; so that *Paludestrina* became exactly synonymous with *Hydrobia*. It is probable that the only definition of Hartmann for the latter genus was that it was intended for *Paludinæ* with an elongate and acute spire. Subsequently he regarded it only as a sub-genus of *Paludina*. (1840. *Syst. Uebers, ita Hermannsen loc. cit.*)

Dr. P. P. Carpenter, in his most careful and elaborate *Catalogue of Mazatlan Shells*, which is one of the British Museum catalogues, at page 30 has the following references:—Genus *Hydrobia, Hart. ut supra Phil. Hand. Conch. Leachia, Risso*, 1826. *Paludinella, Loven, (? Paludinella*, Pfeiffer†) Dr. Carpenter then remarks—and the observation is one which bears in an important manner on the subject of this paper—that the Mazatlan shells of *Hydrobia ulvæ*, after careful microscopic examination, are not seen to have the slightest specific variation from the British specimens, and it did not seem allowable to impose on them a new name merely from geographic considerations. Mr. J. E. Gray, in his *Guide to* the *Systematic Dist. of Moll.* (British Museum catalogues) p. 89, says of *Lithoglyphus* that Dr. Philippi has placed that genus, and *Hydrobia* with spiral opercula, as sub-genera of *Paludina;* but *Paludomus* with annular opercula he places as a sub-genus of *Melania.*‡ Mr. Gray does not define *Hydrobia* in the way adopted by Messrs. Adams, in their *Genera of Recent Mollusca*, though they both distinguish *Lithoglyphus* from that genus, and reject *Paludestrina.*

* This paper was written, but not published, before Mons. Fischer's article reached me. In consequence I have revised the whole of my MS., as the additional information it supplied was new and valuable, though our conclusions, formed independently, were nearly identical.

† This can hardly be, as Pfeiffer sustains the name *Lithoglyphus.*

‡ *Handbuch der Conch.*, 1853, pp. 167 and 168.

It may be as well if I give, in the very words of Mons. Fischer, what he says of some of the synonymous genera :— "*(Litorinella*, Braun, 1842.). Braun proposed this new genus for *Paludinæ* with spiral opercula. In 1845 Thoma applied the name *Littorinella* to the *Cyclostoma acutum* of Draparnaud *(Jahrbuch des Vereins für Naturkunde in Herzogthume Nassau, Heft.* 2, p. 125). We must conclude that *Littorinella* ought to be reserved for marine or brackish water shells. The genus *Paludinella* was erected in 1841 by Pfeiffer (*Wiegm. Arch.* 1, p. 227) for the *Helix littorina* of Delle Chiaje—a marine species regarded as a *Truncatella* by Philippi, and placed in the genus *Assiminea* by all modern naturalists. Relying on the marine habitat of Pfeiffer's type, Lovèn, in 1846, placed Pennant's *Turbo ulvæ* amongst *Paludinella;* but it is difficult to explain why, quite recently, Frauenfeld, Kreglinger, Kobelt, Paladilhe, &c., have distinguished all the little fluviatile *Paludinas* by the name of *Paludinella.* It is one of the most astounding blunders in nomenclature, and proves how persistently one author follows another without the least examination. The genus *Amnicola* of Gould and Haldeman *(Supplement to a Monograph of the Limniadæ*, p. 3. 1849) is defined thus :—Head proboscidiform, shell like *Paludina*, operculum corneous and subspiral. No species is named as a type, but it is certain that the authors had in view only fluviatile species. Ultimately Gould, in the *Invertebrata of Massachusetts*, characterised the genus with more detail, and took for a type *Paludinæ* with few whorls. Stimpson *(On Hydrobia*, 1865, p. 13) gives a figure of the operculum of *Amnicola*, and attributes to it a peculiar structure which is not found in pretended *Amnicola* of the old world. I consider, therefore, that the genus *Amnicola* should be restricted to American species. Frauenfeld has adopted a very arbitrary mode of distinguishing the genus all over the world, *i.e.*, the globular form and short spire. *Bythinella* is a genus erected by Moquin-Tandon in 1855. He divides the genus *Bythinia* into two groups. *(a). Bythinella*—shells with a cochleariform operculum, and an eccentric nucleus. *(b). Elona*—operculum paralleliform, nucleus central. In reality the genus is no more than *Bythinia* and *Bythinella*, the latter including all the little French fluviatile species with a spiral operculum. *Peringia* is a genus recently erected by Paladilhe for *Turbo ulvæ*, a marine species." The latter does not concern us, but I mention it lest its use should cause confusion.

From all these considerations, therefore, it will be seen that, in any case, the genus *Paludestrina* cannot be maintained under that name. It is not received by any modern system writer except Chenu, and even he admits the priority

of *Lithoglyphus*. But since *Lithoglyphus* (Muhlfeldt) and *Hydrobia* are both maintained, though probably under conditions different from those originally contemplated by these authors, it remains to be seen under which genus we are to place the small freshwater shells of Tasmania which I regarded as *Bythinia*. It seems to me that in this matter our safest and best plan is to follow the arrangement of Messrs. Adams, because that is the one which is generally adopted, and that seems to be most natural and most in accord with the claims of priority in the nomenclature. I admit, however, that where the claims are so various and on such different grounds, and where we do not follow the authors' definitions, there is too much confusion for any one to decide on a generic name from priority alone.

According to the authors of the *Genera of Recent Mollusca*, *Lithoglyphus* is placed in the family of *Littorinidæ*, and is thus defined:—Shell semi-globose, thick, solid; spire short, obtuse; whorls few, smooth; aperture large, ovate, entire; peristome continuous; inner lip callous; outer lip simple; umbilicus rimate. They add that the typical species of this genus is from the river Danube; a few other species are inhabitants of the fresh waters of South America, and have been described by Mons. D'Orbigny under the name of *Paludestrina*.*

It is very clear that this definition will not correspond with those of Tasmania with which we are now dealing.

Hydrobia, on the other hand, is placed by the same authors in the family *Rissoidæ*, and is defined thus:—Operculigerous lobe simple; operculum sub-spiral; shell elongately conical, thin, smooth, covered with an olivaceous epidermis; axis imperforate; aperture oval; peritreme continuous; outer lip simple, acute. Syn. *Leachia* (Risso), not Lesueur or Johnst. *Littorinella* (Braun). Example—*H. ulvæ* (Pennant, *loc. cit.*, p. 335). I may add that the animal has the eyes at the base of the tentacles, the foot is broadly wedge-shaped, the broad end under the muzzle. Messrs. Adams say that the tentacles are subulate. There are 30 species known—one from New Zealand, described by Gray (*H. Zelandiæ*), two described by Gould (*H. badia* and *H. egena*) and two by Mons. P. Fischer (*H. Saleana* and *H. Cumingiana*). There is one described from Western Australia named *H. Preissii* (Phil).

There can be no doubt that the most of our shells belong to this genus, as far as the shells can guide us; but further observations are required upon the animal. There is only one genus with which it can be confounded, and that is

* *Genera Recent Mollusca*, vol. 1, p. 320.

Paludinella (Pfeiffer), one of the family *Assiminiidæ*; but the shell in that case is umbilicate, and the eyes of the animal are on the middle of the tentacles.

But should the genus be called *Hydrobia?* Clearly not; because, as we have seen, this is meant to include marine shells, while ours are entirely fluviatile. *Bythinella* seems the only genus under which they can be ranged—that is, of course, if our species are similar to those described by Mons. Moquin-Tandon, from France. Some of our species differ in a remarkable degree, as I shall specify hereafter; but in the meantime I shall regard the majority as *Bythinella.*

In future, therefore, the shells inhabiting our fresh and brackish water, marshes, and streams, which have an appearance like very small *Paludinæ*, must be regarded as belonging to the genus *Bythinella.* They are generally entangled in the confervæ or green slime which lines the sides of the creeks and swamps, and sometimes in freshwater streams.* They must not be confounded with the American genus *Amnicola*, which has the axis of the shell perforate.

I must further remark that, since preparing my monograph, I have been able to consult Mr. John Brazier, and examine the type specimens of the two species described by him in the *Zool. Proc.* for 1871, p. 696, and named *Paludestrina Legrandiana* and *P. Wisemaniana.* It will be remembered, perhaps, that I said of them that I had been unable to find either of the above shells, or anything like them. Mr. Brazier was then in New Guinea, and I could not communicate with him. I find now that *Paludestrina Legrandiana* is my *Bythinia unicarinata*, and the solid, stunted, hair-like spines seen under the lens, spoken of by Mr. Brazier in his diagnosis, are the remains of the interrupted keel described by me. *Paludestrina Wisemaniana* is, I believe, my *Bythinia tasmanica*, which is common in all the creeks near Hobarton; but I think we should amend both descriptions by stating that the suture is well impressed, not grooved.

I find, also, that just before my paper was read to the Society—that is, in July, 1875—a paper was read by Mr. Brazier, on March 29, 1875, before the Linnæan Society of New South Wales, on some species of Australian and Tasmanian land and freshwater shells. In this paper I find I have been anticipated in some of my species. Mr. Brazier's *Amnicola Simsoniana* is my *Bythinia pontvillensis.* My *Planorbis tasmanica* is *Planorbis meridionalis* of Mr. Brazier's paper. I need scarcely say that I had no opportunity of seeing Mr. Brazier's paper, as it was not published until a

* River Jordan, at Brighton; Derwent, at Dunrobin.

long time after, and the whole volume in which it is incorporated did not appear until 1877.

I should remark, also, that Professor Tate has forwarded me many shells, collected by him in South Australia and Western Victoria, which come so very close to our Tasmanian species that, except in point of size and color, I really could not see any difference. Knowing what a very wide distribution our freshwater shells have in Australia, and how many I have found common to Tasmania and Victoria, I very much question if the whole of the species may not have to be reduced to one or two. But this should not be done until the animals have been carefully observed. The mere resemblance of shells is not sufficient, for, as Mr. J. E. Gray has well observed, shells in every way similar may belong to totally different genera. He says—"About 15 years since I first observed, in the marshes near the banks of the Thames, between Greenwich and Woolwich, in company with species of *Valvata*, *Bythinia* and *Pisidium*, a small univalve shell agreeing with the smaller species of the littoral species *Littorina*, in every character both of shell and operculum. Yet this very peculiar and apparently local species has an animal which at once distinguishes it from the animal of that genus, and from all other Ctenobranchrous mollusca. Its tentacles are very short and thick, and have the eyes placed at their tips, while the *Littorinæ*, and all other animals of the order to which they belong, have their eyes placed on small tubercles on the outer side of the base of the tentacles, which are generally more or less subulate." Taking this in conjunction with the preceding, we have here instances of univalve shells apparently belonging to the same genus, the one found in fresh, the other in salt, water, proving, when these animals are examined, to belong to genera essentially distinct."* He also gives similar instances among the bivalves. I may add that in making an examination of the animals of some of our land shells, with the aid of the experience of Dr. J. Cox, and the excellent drawings in his possession, I find that shells which I certainly regarded as no more than varieties are really quite different in the animals. It must, therefore, be only after a careful examination of the shells and animals here named that any alteration of the list should be determined upon by future observers.

Since the publication of my paper in the proceedings of this Society I have described a very small one in the proceedings of the Royal Society of Victoria, which was read August 9, 1877. It is a small species from Lake Connewarre,

* *Philosophical Transactions*, 1835, part 2, p. 303.

Geelong, named then by me, *Bythinia Victoriæ*. It will now stand as *Bythinella Victoriæ*. Its minute size, silky appearance, fine longitudinal striæ, and turbinately conical form, distinguish it from all its Australian congeners. The list of the genus for Tasmania will stand thus for the future :—

Genus.	
BYTHINELLA	Moquin-Tandon, 1855.
,, EXIGUA. = Paludestrina legrandiana (Brazier). = Bythinia legrandi nobis.	The name *Legrandi* is pre-occupied by restoring Brazier's name to my *Bythinia unicarinata*. It is the smallest Tasmanian species—hence the name *exigua*.
BYTHINELLA SIMSONIANA. = Bythinia pontvillensis nobis. = Amnicola simsoniana	Brazier.
BYTHINELLA DULVERTONENSIS. = Bythinia dulv. nob.	
BYTHINELLA LEGRANDIANA.* = Paludestrina legrandiana. = Bythinia unicarinata nobis.	Brazier.
BYTHINELLA DUNROBINENSIS. = Bythinia dunrob. nob.	
BYTHINELLA WISEMANIANA. = Paludestrina wisemaniana. = Bythinia tasmanica nobis.	Brazier.

It seems to me also not altogether improbable that this may turn out to be Gould's *Amnicola egena*, of New Zealand, or *Hydrobia preissii* (Phil.).

Thus far the shells are all of one type, and may possibly be varieties—a matter to which local naturalists are earnestly invited to give their attention, as well as to the animal, about which too little is known. The operculum is yellowish horny, with certain dark, black, and opaque spots, which I considered to be calcareous. There is another species to which I have not referred, because it is of such a different type :—

BYTHINIA HUONENSIS, *nobis*.

This shell, Professor Tate considers, should be made the type of a new genus. The animal was carefully observed by the Professor, who kindly placed his notes at my disposal. The foot is broadly ovate, truncate under the head. The muzzle is reddish brown, with a colorless lip. Tentacles long, subulate, eyes enclosed with brown near tip. Operculum calcareous, with a vertical submarginal claw. This peculiarity, combined with the turretted pyramidal form of the shell, makes it the type of a new genus, which I have

* This is, according to Mr. R. M. Johnston, only a variety of *B. wisemaniana*.

great pleasure in dedicating to the learned Professor. It is characterised thus :—

TATEA. *Gen. nov.*

Freshwater shells of elongate pyramidal form ; animal with a truncate foot, long tentacles, calcareous operculum, with a vertical submarginal claw.

TATEA HUONENSIS.=*Bythinia huonensis nobis.*

PLANORBIS MERIDIONALIS. (Brazier. *Proc. Lin. Soc. N.S.W.*, vol. 1, p. 20.)=*P. tasmanicus nobis.*

Since my monograph has been written, Mr. R. M. Johnston has carried on the subject with that zeal, industry, and accuracy which are characteristic of him. I believe he has discovered several new species. In reconsidering the whole subject, some new place will probably have to be found for the species which I described as *Ampullaria tasmanica.* (*Proceedings, for* 1876, p. 117.)

The *Limnea Hobartonensis* of my monograph, I find on comparison, to be quite undistinguishable from *L. peregra*, of Muller (*Vermium terrest. et Fluv. Leipsic*, 1773), one of the most wide-spread forms. An Australian habitat is, however, quite a novelty. We must suppose that it has been introduced from ships' water-casks.

I note further, that in my monograph the genus *Pomatiopsis* is by mistake printed *Pomiatopsis.*

THISTLES.

NOTES ON *CARDUUS ARVENSIS*,

(Cnicus arvensis of some Authors).

The common Creeping Thistle, with a short reference to *Cnicus Lanceolatus*, the Spear or Plume Thistle :

[*Read 12th August*, 1878.]

Carduus arvensis is perhaps the commonest of European thistles. It is well known under the names of "creeping," "wayside," "corn," and "vine," and latterly, in Tasmania, it has received the additional one of "Californian." Why this latter name should have been so long exclusively used for so common and well-known a plant, it is difficult to conceive, although it no doubt originated from the fact that some 20 or 25 years ago a shipment of barley, purporting to be the Oregon variety, was received from California, to which is attributed the introduction, or, at all events, the serious augmentation of this weed. It is certain that wherever this barley was used as seed, a plentiful crop of the thistle soon made its appearance, and has ever since held possession of the ground, and thus the term of Californian thistle originated. But the plant being so common in Europe in all grain crops, especially oats, and being one also that has followed cultivation to most parts of the world, it is not improbable that it may have existed in the colony at a very early date, there is however no evidence of its having been noticed before the time specified.

Although the late Mr. Wm. Archer, in some notes on this plant published in the Transactions of the Society for the year 1870, identified it with the common European creeping thistle, yet I believe the impression to be widespread that it is of comparatively recent origin, and that it is indigenous to California. So firmly is this opinion held that, when some years ago I received specimens of the plant to name, from a late warden of Bellerive (who has since passed away), and which were duly returned with the botanical and common names attached, I was told that I had made a great mistake, and that the plant could not be a native of England, but had come from California.

The plant is not indigenous to America, but has become common in Canada, California, and other parts, and is invariably spoken of as having been introduced from Europe. The term Californian Thistle is therefore not an appropriate one and should not be used, or, if used at all, should be kept in subjection to those by which the plant is known so well, not only in the present day, but hundreds of years ago. In Parkinson's "Theater of Plants," published nearly 250 years ago, it is figured as the "creeping, way, or vine thistle," and he alludes to it in the following terms :—"The rootes of this thistle are very small and whitish, running both deepe and farre about under ground like unto quicke grasse, but have no knotted joynts therein like it, but shooteth up heades of leaves from the branches of the roote, so that it will be as ill or worse than quicke to weede out if it be once got into the ground."

The retention of the name so far has had a tendency to mislead, as it has prevented persons interested in the matter from a ready

reference to descriptions of the plant in agricultural and other works, for it must be borne in mind that the term of Californian thistle is not applied to it out of Tasmania, but that under the heads of creeping, way, or corn thistle, it has been known and written of for hundreds of years, and no difficulty would be experienced in learning its history and habits. Besides, these names convey some idea of the character of the plant, the former denoting its well-known creeping habits, and the others the places generally infested with it, and on this account are the more appropriate.

So far I have confined my remarks to what may be termed the identification of the plant ; and this being attained, it will be easy for any one to acquire a knowledge of it, for a plant that has taxed the energies of farmers for hundreds of years has claimed attention at the hands of most, if not all, agricultural writers. In order, however, to make the subject more complete, I will append a few notes on the habits of the plant, and on the most approved methods of dealing with it.

As before stated, the creeping thistle is, perhaps, the worst of weed pests, and one that once introduced into ground, is extremely difficult to eradicate, on account of its power of multiplication by division of the root, every particle of which is sufficient to form a new plant. It has been asserted over and over again that it never quits a country where it has once become established, its powers of extension by seed as well as root are enormous. Some idea of both modes may be obtained by the following extracts :—

In the *Agricultural Gazette* for July 3, 1875, there is an article on the creeping thistle that goes into the life history of the plant. It appears that the idea is prevalent in England, as well as in Tasmania, that the plant does not perpetuate itself by seed, but entirely by root division. To refute this impression the proprietors of the *Gazette* instituted an experiment, the details of which, with diagrams, are given in the article as above, the following being simply a condensed account :—

"On September 2nd ten seeds were sown, which had all come up by the 22nd, and some had commenced to show their secondary leaves. By the time the prickly foliage became manifest the cold weather had set in, and all the plants apparently died. However, in February following a bud had just emerged through the ground, when two of the specimens were taken up, and drawings made of them. By June of the second year, whilst a strong shoot was growing above ground, a most extraordinary rhizomation was taking place below, which by the next season will produce a thicket of thistles derived from a single seed. It is not to be wondered at that the farmer has not observed seedlings of these thistles, as they are at first very small and inconspicuous, and both young and old plants die down in the winter. It is estimated that a plant in the third year will produce from 12,000 to 20,000 seeds, but fortunately these seeds are greedily devoured by the larvæ of some minute beetle, which eats them to such an extent as to render it difficult in some seasons to gather perfect seeds."

The following experiment, made by Mr. Curtis some years ago, and reported in the *Farmers' Magazine*, will illustrate the root growth, and its power of multiplication by even minute divisions.

Mr. Curtis, after stating an instance of a descending root, 19 feet long, having been taken out of a quarry, says :—"I planted a piece of root two inches long in my garden in April, and by November it had thrown out stolons on every side, some of these being 8 feet long, which had thrown up tufts of leaves 5 feet from the original root; the whole of the roots when dug up weighed four pounds. Notwithstanding the man used the utmost caution in digging it up in order to extract all the roots, in the spring fifty or sixty young plants made their appearance on the site of the old one.

In the above extracts sufficient has been said to show that it is no ordinary foe with which we have to deal. Although it may not be possible to entirely eradicate the plant, much may be done, by the adoption of proper measures, to lessen the evil. It has been shown that the plant increases in two distinct ways—by seed and by root division. It is by seed that the plant becomes disseminated, every seed falling in a favourable situation being capable, in the third year of its growth, of producing, as before stated, from 12,000 to 20,000 seeds, which from their pappiform nature will be scattered far and near, so that a very few plants maturing in some neglected place will suffice for the continuance of the evil.

Its increase and spread by root division is very often favoured by the ordinary farming operations, or by the means adopted for its destruction. Ploughing, or breaking up of land both favour its extension. Even in England, where the winters are much more severe than in Tasmania, laying down the land to bare fallow, unless followed by an unusually severe frost, does not tend to abate the evil. Ordinary hoeing or cutting with the scythe, if done at the proper season, may to a certain extent prevent its extension by seed, but will not materially diminish root action. Hoeing, indeed, often tends to the spread of the plant by dividing the roots, and to such an extent does this take place on badly-farmed land in England that frequently whole fields may be seen completely overrun with it. Cutting with the scythe is objectionable, and especially so if done early in the season, as it causes the plant to form underground buds in profusion, which soon break with renewed vigour.

The object to be attained in dealing with this plant with a view to its extirpation is a twofold one. Firstly, to prevent its dissemination by seed, and secondly, to attack the roots so as to lessen or destroy their vitality. To effect this the following practice is most in favour with good cultivators :—Where the land has become foul with this pest it should at once be laid down to grass and depastured by sheep or cattle for at least eight years. By this means the plant is kept in check by the browsing of the stock, which eat it promiscuously with the other herbage, and when the ground is again broken up it will be found if the plant has not been entirely destroyed that it has at least been greatly subdued, and that cultivation may be carried on at a minimum expense for thistle extraction.

As an instance of the benefit of laying down to grass, I will mention that on land occupied by Mr. Hull on the Brown's River Road, this thistle was introduced with the seed barley before referred to, and to such an extent had it spread that it threatened the destruction of a

young orchard. All efforts for its suppression tended but to increase the evil. Finally the land was laid down to grass, and the thistle has gradually disappeared, but it still remains rife in the hedgerows and roadsides in the vicinity.

To prevent its propagation by seed the plant should never be permitted to flower, but should be continuously pulled up before reaching that stage. The best time to effect this operation is when the shoots are from 9 inches to a foot high, and the operators should be provided with thistle gloves to protect their hands from the prickles with which the plant is furnished. Pulling is preferred to utting or hoeing because, if the operation is properly performed, the shoots will break off at their junction with the rhizome or root-stock, and if persevered in the rhizome will in time become blind and have a good chance of perishing. When the hoe, or scythe is used, the tops are cut at, or immediately below, the surface and the plant soon pushes forth a new shoot and will continue to do so everytime attacked, until late in the Autumn, when the upward growth for the season would naturally cease.

Although in theory it is held that if the leaf-growth of any plant be prevented for a time, the plant will eventually die, in practice, with some plants at all events, the time is so long that the theory may almost be said to fail. With the plant under consideration, especially if an old established one, the leaf-growth would have to be kept in check for an indefinite period before the root-stock would succumb.

An instance of how some plants retain their vitality under adverse circumstances is given in the *Gardeners' Chronicle* for May 18th, 1878, where it is stated that a bulb of *Psarum alexandrium*, which had been placed in the herbarium in 1839, and had thus had a rest of 35 years, had just been resuscitated by Professor Caruel of Pisa.

As indicated by its second name of 'way' thistle, the plant is common in those localities and it is to such, in no slight degree, that its extension is due. The farmer is interested in keeping his land clean, for otherwise the crop would be seriously affected, and he would be a loser by his own neglect; but to waysides, hedgerows and waste places he does not extend his operations, naturally regarding them as out of his province, and thus it is that they become neglected and are the source of much mischief.

With reference to the soil on which the plant thrives best, although it will be found on most, yet it prefers a sandy loam, especially when this is in a state of cultivation. Being essentially a weed of agriculture it flourishes on cultivated ground, or on land that has been loosened to any depth. On pasture land it will scarcely obtain a footing, as the seedlings, even supposing they should appear, would be kept down by the stock. Too much care cannot be exercised in the selection of seed. It is from want of sufficient caution in this matter that many places become foul, as a very few patches of thistles, left to mature their seed in a crop of grain, may be the source of irremediable mischief. It is pretty certain that it was in seed grain that the plant first found its way to Canada, and thence to California and other parts of America. To California the credit is given of having introduced it into Victoria

and Tasmania, and by the same means it may not only find its way throughout the Island but to the most remote places.

It is a public injury that lands much overrun with the pest should continue to be cropped with grain of any kind, or that even hay crops should be taken from them. Better by far the land be laid down in pasture, by which means the risk of dispersion would be very much decreased.

A very good plan to adopt with suspected seed is to throw it into a cask or tank of water before sowing, stirring it gently for a short time. If it contain any thistle or other light seeds they will rise to the surface and may be skimmed off and burnt.

Some idea will be gained as to the extent of the evil which is so imminent, on reference to the article in the *Agricultural Gazette* before quoted, where it is stated that the annual cost to the farmers of Great Britain, for the spudding and hoeing of thistles alone, is not less than £125,000.

It would be interesting to ascertain whether the beetle alluded to as eating the seed in England is present in Tasmania. I am not aware that it is, but even supposing it to be here it is not always at work, and some seasons and places are more productive of thistle seed than others. Before closing these notes I am desirous of making a short reference to *Cnicus lanceolatus*, the common Spear or Plume Thistle, which in Tasmania is called the Scotch Thistle. My object in alluding to this plant is to point out that it is not the true Scotch Thistle. The plant recognised by botanists as the Scotch Heraldic Thistle is the *Onoperdon acanthium*, a specimen of which I now exhibit. *Cnicus lanceolatus* is unquestionably the Spear or Plume Thistle. It was figured as such in Parkinson 250 years ago, and still retains those names in modern works on botany. The plant, as pointed out by Mr. Wm. Archer, is not at all peculiar to Scotland, and in no way is the term applicable to it, except from the belief that it first found its way thence to Tasmania.

Whether the Act passed in reference to this plant is sufficiently explicit to ensure a conviction I am not prepared to say, but it could not be proved to be the Scotch Thistle, and therefore it would be desirable to have the names by which it has been so long known incorporated in that Act.

METEOROLOGY FOR JANUARY, 1878.

Private Observatory, Hobart Town.

Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.
(Registered for the Royal Society of Tasmania.)

Day of Month.	Bar. corrected for temperature instrumental error, and to mean sea level.		Thermometers (Reading).			Thermometers (Self-Registering.)			Relative Humidity. Per cent		Clouds.				Wind.				Rain in Inches	Spon. Evap.	Ozone. Chrom. Scale.
											7·30 a.m.		4·30 p.m.		7·30 a.m.		4·30 p.m.				
	7·30 a.m.	4·30 p.m.	Centigrade, 7·30 a.m.	Fahrenheit, 7·30 a.m.	Fahrenheit, 4·30 p.m.	Highest in Sun, 4·30 p.m.	Highest in Shade, 4·30 p.m.	Lowest on Grass, 7·30 a.m.	7·30 a.m.	4·30 p.m.	Character.	Amount.	Character.	Amount.	Direction from.	Force in lbs. per square foot.	Direction from.	Force in lbs. per square foot.	7·30 a.m.	7·30 a.m.	7·30 a.m.
1	29·926	29·940	12·5	55·0	72·0	90·0	72·0	38·0	93	82	N	10·0	K	10·0	S	0	SE	·52	·17		
2	29·963	30·079	16·5	62·0	68·0	110·0	76·0	38·5	67	68	K	6·0	0	0	W	·26	SE	·25			5·0
3	30·925	30·256	12·0	54·0	61·0	95·0	70·0	36·0	81	77	K	3.0	K	8·0	N	0	S	2·60			5·0
4	31·309	30·235	13·5	56·5	63·0	92.0	66·9	37·5	81	67	K	10·0	K	9·0	SE	0	SE	2·60			2·0
5	30·148	29·971	12·5	54·5	68·0	110·0	73·0	36·5	65	60	K	7·5	K	4·0	NW	0	SW	·65			4·0
6	30·190	29·195	14·0	58·0	70·0	108·5	74·0	37·0	61	68	K	4·0	0	0	N	0	SE	·52			4·5
7	30·121	30·069	13·5	57·0	73·0	95·0	78·0	36·5	76	54	0	0	0	0	S	0	SE	·52			2·0
8	29·974	29·935	15·0	60·0	64·0	85·5	72·0	37·0	71	88	K	10·0	KN	10·0	N	·26	SE	0			4·0
9	29·921	29·759	13·5	57·0	87·0	126·0	90·0	36·5	81	30	K	4·5	0	0	N	·26	SE	·26			2·0
10	29·859	29·871	16·0	61·0	64·0	95·0	84·0	39·5	82	77	KS	10·0	K	10·0	SE	·52	SE	·52		1·65	3·5
11	29·895	29·949	15·0	59·0	64·0	100·0	71·0	35·0	82	68	K	6·0	0	0	E	0	SE	0	·05		5·0
12	30·074	30·041	11·5	55·0	71·0	110·0	75·0	34·5	70	69	0	0	0	0	NW	0	S	·26			4·0
13	29·963	29·830	17·0	63·0	76·0	116·0	83·0	40·0	63	66	K	5·5	K	4·0	NW	·52	SE	·26			3·0
14	29·409	29·674	17·5	63·5	81·0	124·0	81·0	40·0	64	56	K	3·0	K	6·0	N	·26	NW	2·60			6·0
15	29·429	29·628	17·0	63.0	65·0	112·0	78·0	39·5	59	59	K	7·0	K	5·0	NW	5·21	W	5·21			2·5
16	29·937	29·052	10·0	50·0	63·5	110·0	68·5	35·5	68	55	K	8·0	K	3·5	S	5·20	SW	2·60	·01		6·5
17	29·935	29·855	12·0	54·0	65 0	100·0	70·0	39·0	60	59	K	2·0	K	5·0	NW	·26	SE	·52			4·0
18	29·567	29·625	15·5	60·5	73·0	125·0	82·0	40·5	67	54	K	3·5	K	8·0	NW	0	SW	2·60			2·5
19	29·635	29·556	15·0	59·5	62·0	105·0	70·0	40·0	54	62	K	3·0	KN	9·0	NW	10·42	N	·52			4·5
20	29·931	29·960	12·5	54·5	60·0	76·5	66·0	40·0	74	66	K	8·5	K	10·0	W	5·21	S	5·20		2·19	2·5
21	30·665	30·269	11·0	52·0	60·0	80·0	64·0	36·5	74	71	KN	10·0	K	3·5	S	0	SE	·52	·02		4·0
22	30·928	30·145	12·0	54·0	71·0	112·0	78·0	38·0	75	83	0	0	0	0	NW	·26	SW	·52			5·0
23	29·968	30·006	14·0	58·0	66·0	115·0	72·0	40·0	71	64	K	9·0	K	5·0	NW	0	NW	2·60			4·0
24	30·287	30·290	10·5	57·0	67·0	105·0	79·5	41·0	69	60	K	3·0	K	3·5	NW	0	S	·52			4·0
25	30·360	30·192	12·0	54·0	63·0	112·0	75·0	41·5	81	61	0	0	K	4·0	NW	0	S	2·60			2·0
26	30·035	29·890	15·0	59·0	70·0	95·0	77·0	42·0	71	78	K	10·0	K	5·0	N	·26	SE	·26			4·0
27	29·936	29·982	15·5	60·0	67·0	100·0	72·0	42·0	71	56	K	4·0	K	4·0	NE	0	S	·52			5·0
28	30·242	30·225	12·5	55·0	68·0	110·0	74·0	38·0	81	60	KN	10·0	K	2·0	S	0	S	·52			3·0
29	30·279	30·131	12·5	55·0	72·0	124·0	85·0	38·5	75	78	K	4·0	K	4·5	N	·26	SW	2·60			3·5
30	30·041	29·937	14·5	59·0	82 0	112·0	85·0	40·0	71	47	K	4·5	K	7·0	NW	·52	N	·62			4·0
31	29·942	29·870	17·5	63·0	76·5	120·0	82.0	42·5	83	84	K	10·0	0	0	SE	0	NE	·26		1·65	2·0
	Mean Press. 29·977		Mean 13·84	M'n. Tem. 63·07		Mean. 105·50	Mean 75·88	Mean 35·60	Mean. ·69		Mean for Month. 5·10				Mean Force 1·42 lb.				Tl ·25	Tl. 5·49	Tl. 117·0
	Greatest do. 30·925		Max. 17.5			Max. 126·00	Max. 90·00	Max. ·42·50			Prev. Character, K				Greatest Force 10·42						Me'n 3·80
	Least do. 29·409		Min. 10·0			Min. 76·50	Min. 64·00	Min. 34·50							Least Force. 0						
															Prevailing Direction. NW, SE, S						

The Meteorological form brought into use at the beginning of 1876 differs in some respects from the former one. It has been adopted with the view of assimilating the Hobart Town records more closely with those of stations in Europe, America, etc., in order to co-operate in a system of International Meteorology. Readings are added from the centigrade thermometer, that being the instrument generally used on the continent of Europe.

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

The direction of the wind is registered from currents at a height of 92 feet above sea level, and its force in lbs. per square foot.

The relative quantity of rain that fell under the different winds is registered each morning at 7·30 a.m.

The 35 years' standard tables are used for obtaining the difference from average.

FRANCIS ABBOTT, F.R.A.S., etc.

Time of leafing, flowering and fruiting of a few standard plants in the Royal Society's Gardens during the month of January, 1878.

10th.—Veronica angustifolia in full flower.
12th.—First Royal Apricot ripe.
16th.—Grevillea Robusta in full flower.
20th.—Jargonelle Pear ripe.
25th.—Black Mulberry commencing to ripen.

F. ABBOTT, Jun., Superintendent.

Results of observations taken at New Norfolk, in accordance with new forms, at 7·30 a.m. and 4·30 p.m.:—

Barometer, mean of two daily readings, corrected and reduced, 30·102in.
Thermometer, mean of 2 ditto, 64·72deg.
Ditto mean of maximum and minimum in shade, 63·96deg.
Dew point, mean position of 2 ditto, 50·20 deg.
Elastic force of vapour mean, of 2 ditto ·364.
Humidity of air mean of 2 ditto, ·60.
Solar intensity, mean of maximum temperature, 137·67deg.
Terrestrial radiation, mean of minimum temperature, 41·35deg.
Rainfall, ·21in.
Evaporation, 9·49in., in excess of rainfall, 9·28.
Clouds, mean amount of 2 ditto, 5·01. (Scale, 0—10.)
Ozone, mean ditto, 2 ditto, 7·21. Scale, 0—10.)

W. E. SHOOBRIDGE, Bushy Park.

JANUARY WEATHER, 1878, AT NEW NORFOLK, TASMANIA.

The year commenced with thick easterly weather and soft rain, ·11 inch, falling on the morning of the 1st, but the prospect of moist weather was soon dispelled, and before the first week was over it had set in dry and hot, the humidity of the air on 6th being down to ·30 per cent., with a mild hot wind and high barometer; and there were extensive bush fires on the hills around that continued burning during the whole month. On the 9th the temperature in shade was 95°, and the humidity at 4·30 p.m. was again down to ·30 per cent.

On the 13th, cool S.W. set in, and on 15th there were slight stormy showers that cooled the air, and cleared the smoke away, although only 0·2 inch of rain fell. Owing to the dry clearness of the air and S.W. wind, it was quite cold for a day or two, till, on morning of 17th, there was a white frost, the self-registering thermometers showing 28° on the grass, and 35° in the shade.

On 19th it was again stormy, cold, and threatening, and although only ·08 inch of rain fell here, yet there must have been more on the hills to the W., as the River Styx rose over 2ft. on night of 20th. Sea breezes set in again on 21st, and brought up on 22nd thick clouds and cool weather, but no rain, only hot smoky haze from the bush fires. A clear W. wind set it at 3 p.m. on the 23rd, and next morning there was a slight frost, the thermometer on grass being down to 31°. Sea breezes and hot smoky haze prevailed till 26th, when, after a threatened thunderstorm that did not come here, the wind changed on 27th to W. and S.W., but it only seemed to give the fires a fresh start, and there was hot hazy weather till 30th, when N.W. clouds threatened rain, but it still kept hot and dry, till 31st closed the hottest and driest month registered here for the last five years, there being only ·21 inch of rain for the month to 1·01 inches in January, 1877; 1·66 inches in 1876; 1·57 inches in 1875; and 1·25 inches in 1874. The spontaneous evaporation was 9·49 inches, and the mean humidity of air ·60 per cent. The mean of max. and min. in shade was 63·96 to 60·04 last January, and solar intensity 137·67 to 129·83.

W. E. SHOOBRIDGE, Bushy Park.

4th February, 1878.

METEOROLOGY FOR FEBRUARY, 1878.

PRIVATE OBSERVATORY, HOBART TOWN.

atitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E
(Registered for the Royal Society of Tasmania.)

Day of Month.	Bar. corrected for temperature instrumental error and to mean sea level.		Thermometers (Reading.)			Thermometers (Self-Registering.)			Relative Humidity. Per cent		Clouds. 7·30 a.m.		Clouds. 4·30 p.m.		Wind. 7·30 a.m.		Wind. 4·30 p.m.		Rain in Inches	Spon. Evap.	Ozone. Chrom. Scale.
	7·30 a.m.	4·30 p.m.	Centigrade, 7·30 a.m.	Fahrenheit, 7·30 a.m.	Fahrenheit, 4·30 p.m.	Highest in Sun, 4·30 p.m.	Highest in Shade, 4·30 p.m.	Lowest on Grass, 7·30 a.m.	7·30 a.m.	4·30 p.m.	Character.	Amount.	Character.	Amount.	Direction from.	Force in lbs. per square foot.	Direction from.	Force in lbs. per square foot.	7·30 a.m.	7·30 a.m.	7·30 a.m.
1	29·849	29·869	18·5	65·5	69·0	118·0	83·0	39·5	83	83	K	7·5	K	7·0	N	0	SE	·52	·36		4·0
2	30·064	30·058	13·5	56·5	62·0	93·0	78·0	34·5	93	72	N	10·0	NK	9·5	S	0	S	·26	·03		6·0
3	30·139	30·062	15·5	60·0	63·5	88·5	74·0	37·5	77	88	K	10·0	K	9·0	N	·26	N	0	63		6·0
4	30·130	30·219	13·5	57·0	53·0	68·0	63·0	34·5	100	100	N	10·0	N	10·0	S	·52	SE	2·60	·22		6·0
5	30·436	30·412	11·9	52·0	58·0	84.0	64·0	32·5	74	71	K	10·0	K	10·0	SE	·62	S	·52	·01		7·0
6	30·408	30·192	12·5	55·0	70·0	110·0	75·0	34·5	70	61	K	10·0	0	0	NW	0	S	·52			4·5
7	30·206	30·249	11·0	56·0	65·0	100·0	78·0	35·0	87	72	K	10·0	K	2·0	SW	0	SE	·52			5·0
8	30·273	30·239	14·0	58·0	71·0	114·0	77·0	38·5	76	57	K	10·0	0	0	S	0	S	·52			3·0
9	30·229	30·199	12·5	55·0	67·0	105·0	73·0	36·0	81	58	K	7·5	K	3·0	S	0	SE	2·60			4·0
10	30·065	29·870	17·0	63·0	79·0	114·5	84·0	38·5	72	63	K	5·5	K	4·5	NW	·26	SE	·52	1·00	1·44	2·5
11	29·704	29·706	17·0	63·0	59·5	——	79·0	38·0	100	72	N	10·0	N	10·0	SE	·26	S	2·60	·37		4·0
12	29·926	29·965	13·0	56·0	62·0	85·0	70·0	35·0	81	77	K	10·0	K	10·0	NW	0	S	·26	·01		6·0
13	30·274	29·975	13·5	56·5	70·0	95·0	75·0	35·5	87	73	K	7·5	K	6·5	N	0	S	·26	·54		4·0
14	29·941	30·034	12·0	54·0	55·0	95·0	72·0	34·0	87	87	KN	7·0	KN	10·0	S	·52	SW	5·21			2·5
15	30·293	30·256	8·0	47·0	64·0	100·0	68·0	33·0	79	63	K	10·0	K	3·5	NW	·26	S	·52			3·0
16	30·340	30·254	10·0	50·0	70·0	116·0	75·0	37·5	86	64	0	0	0	0	NW	·26	SE	·52			3·0
17	30·274	30·133	14·0	58·0	80·5	120·0	83·0	40·2	81	53	K	10·0	K	8·0	N	2·60	E	0			2·0
18	30·069	29·871	17·0	62·0	82·0	127·0	85·0	45·0	73	60	N	10·0	K	5·0	N	·26	NE	·26	·85		5·0
19	29·554	29·596	17·0	63·0	63 0	109·0	83·0	47·0	94	64	K	9·0	KN	10·0	NW	0	NW	·52	·04		6·0
20	29·821	29·854	13·5	57·0	65·0	96·0	73·0	42·5	76	68	K	10·0	K	7·0	NW	·52	NW	·52		·51	3·0
21	29·820	29·746	13·0	56·0	75·0	114·0	77·0	41·5	75	66	K	3.0	K	4·0	N	·52	NW	·26			5·0
22	29·712	29·517	14·0	53·0	86·0	128·0	88·0	40·5	76	36	K	10·0	KN	9·0	NW	·52	NW	2·60	·45		2·0
23	29·424	29·441	17·5	64·0	67·0	114·0	85·0	42·0	88	60	K	5·0	KN	8·0	N	0	NW	2·60			5·0
24	29·834	29·957	10·0	51·0	61·0	90·0	76·0	39·0	69	62	K	10·0	K	6·0	N	·52	NW	2·60			5·0
25	30·074	30·141	13·5	57·0	69·0	110·0	72·0	42·0	76	68	K	3·0	K	3·5	NW	·52	NW	0			7·0
26	30·241	30·240	12·5	55·0	69·0	98·0	75·0	40·0	87	78	K	3·5	0	0	S	·26	SE	·52			2·5
27	30·270	30·211	13·5	57·0	75·0	120·0	79·0	41·0	87	66	KS	5·0	0	0	W	0	SE	0			3·0
28	30·207	30·128	16·0	62·0	73·0	124·0	90.0	42·0	77	58	K	4·0	K	4·0	N	·26	S	·52		1·25	4·5

Mean Press. 30·036	Mean 13·71	M'n. Tem. 62·64	Mean. 101·14	Mean 77·0	Mean 33·45	Mean. ·75	Mean for Month. 6·73	Mean Force ·671b.	Tl 4·51	Tl. 3·20	Tl. 120.5
Greatest do. 30·436	Max. 18.50		Max. 127·00	Max. 90·0	Max. 47·00		Prev. Character, K	Greatest Force 5·21 lb.			Mean 4·30
Least do. 29·424	Min. 8·00		Min. 68·00	Min. 63·0	Min. 32·50			Least Force. 0			
								Prevailing Direction. NW, S.			

The Meteorological form brought into use at the beginning of 1876 differs in some respects from the former one. It has been adopted with the view of assimilating the Hobart Town records more closely with those of stations in Europe, America, etc., in order to co-operate in a system of International Meteorology. Readings are added from the centigrade thermometer, that being the instrument generally used on the continent of Europe.

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

The direction of the wind is registered from currents at a height of 92 feet above sea level, and its force in lbs. per square foot.

The relative quantity of rain that fell under the different winds is registered each morning at 7·30 a.m.

The 35 years' standard tables are used for obtaining the difference from average.

FRANCIS ABBOTT, F.R.A.S., etc.

Time of leafing, flowering and fruiting of a few standard plants in the Royal Society's Gardens during the month of January, 1878.

8th.—Kerry Pippin commencing to ripen.
12th.—Windsor pear commencing to ripen.
16th.—Bon Chretien pear commencing to ripen.
18th.—Greengage commencing to ripen.
27th.—Ash commencing to shed seed.
28th.—Sycamore commencing to shed seed.

F. ABBOTT, JUN., Superintendent.

METEOROLOGY FOR MARCH, 1878.

PRIVATE OBSERVATORY, HOBART TOWN.

Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.
(Registered for the Royal Society of Tasmania.)

Day of Month.	Bar. corrected for temperature instrumental error, and to mean sea level.		Thermometers (Reading.)			Thermometers (Self-Registering.)			Relative Humidity. Per cent		Clouds.				Wind.				Rain in Inches	Spon. Evap.	Ozone. Chrom. Scale.
	7·30 a.m.	4·30 p.m.	Centigrade, 7·30 a.m.	Fahrenheit, 7·30 a.m.	Fahrenheit, 4·30 p.m.	Highest in Sun, 4·30 p.m.	Highest in Shade, 4·30 p.m.	Lowest on Grass, 7·30 a.m.	7·30 a.m.	4·30 p.m.	7·30 a.m. Character.	7·30 a.m. Amount.	4·30 p.m. Character.	4·30 p.m. Amount.	7·30 a.m. Direction from.	7·30 a.m. Force in lbs. per square foot.	4·30 p.m. Direction from.	4·30 p.m. Force in lbs. per square foot.	7·30 a.m.	7·30 a.m.	7·30 a.m.
1	30·210	30·139	15·0	60·0	68·0	95·0	75·0	44·0	94	66	KN	10·0	K	7·5	S	0	E	·26			5·0
2	29·945	29·820	18·5	65·5	88·0	125·0	90.0	44·5	62	39	K	10·0	K	4·0	NW	·52	NW	·52			5·0
3	29·847	29·979	20·0	68·0	63·0	116·0	86·0	45·5	57	88	K	6·0	KN	10·0	N	·52	SE	·52			3·0
4	30·124	30·405	13·5	57·0	74·0	105·0	78·0	40·5	87	74	KN	10·0	0	0	S	0	S	·52	·06		6·0
5	29·755	29·907	17·0	63·0	66·0	110·0	78·0	42·0	78	60	K	7·0	K	7·0	S	0	W	2·60			3·0
6	30·242	30·152	8·0	47·0	64·0	112·0	69·0	38·5	79	63	K	7·5	K	4·0	NW	·26	SE	·26			3·0
7	30·058	29·899	10·5	50·5	64·0	110·0	73·0	37·0	80	77	K	6·5	K	6·0	NW	0	E	·26			5·0
8	29·871	29·646	13·5	57·0	72·0	107·0	72·0	51·0	71	68	K	4·0	K	8·5	N	2·60	W	5·21			3·0
9	29·832	29·902	10·5	51·0	60·0	101·0	68·0	45·0	69	59	KN	10·0	K	5·0	S	2·60	NW	2·21	·01		4·5
10	29·824	29·841	16·0	61·0	67·5	114·0	75·0	48·0	72	64	K	10·0	K	10·0	N	2·60	NW	·26		1·43	7·0
11	29·646	29·705	10·5	51·5	71·5	110·0	77·0	48·5	86	64	K	5·0	K	·2	W	·52	E	·26			2·0
12	29·732	29·795	16·0	61·0	75·0	114·0	79·0	50·0	82	49	K	3·0	K	4·0	NW	·52	NW	·52			5·0
13	29·877	29·681	12·0	56·0	75·0	112·0	81·0	42·0	81	55	K	7·5	K	10·0	NW	·26	N	2·60			2·0
14	29·764	29·663	15·0	60·0	66·0	110·0	74·0	44·5	76	73	K	10·0	K	9·0	N	·26	S	·52			2·5
15	29·925	29·889	11·5	53·0	61·0	112·0	70·0	40·0	86	67	K	7·0	K	8·0	NW	0	SE	·52			2·0
16	29·774	29 759	12·5	55·0	69·0	90·0	66·0	42·5	81	58	K	10·0	K	5·0	SW	0	NW	2·60			2·5
17	30·184	30·262	10·0	50·0	59·0	98·0	64·0	40·5	63	54	N	7·0	K	3·5	SW	·52	S	·52	·02		5·0
18	30·205	30·160	6·5	44·0	63·0	90·0	69·0	38·5	79	55	K	5·0	K	4·0	W	0	NW	·52			3·0
19	29·940	30·007	10·0	51·0	62·0	86·0	67·0	42·0	80	67	K	7·5	K	9·0	SW	0	W	·52			5·5
20	29·929	29 810	12·5	55·0	62·0	78·0	64·0	43·0	75	62	K	10·0	K	9·0	NW	·52	NW	2·60			3·0
21	30·184	30·158	10·5	51·0	62·0	103·0	78·0	41·0	69	62	K	7·0	K	5·0	S	0	S	5·21			2·5
22	30·290	30·235	8·0	47·0	65·0	110·0	72·0	36·5	86	67	K	9.0	K	5·0	W	0	S	5·21		1·63	5·0
23	30·235	30·067	11·0	51·0	77·0	115·0	81·0	39·0	80	59	0	0	K	4·0	NW	·26	NW	0			4·5
24	29.867	29·875	14·0	58·0	72·0	115·0	84·0	42·0	72	48	K	1·0	0	0	N	0	N	2·60			2·5
25	30·037	29 907	9·0	49·0	62·0	107·0	73·0	39·5	86	64	0	0	0	0	W	·26	NW	0			4·0
26	29·636	29·438	15·5	60·0	69·0	112·0	82·0	43·0	80	88	K	10·0	K	9·0	NW	0	N	0			3·0
27	29·472	29·459	11·0	56·0	62·0	82·0	71·0	40·0	65	67	K	9·0	K	9·0	N	·26	NW	0	·03		4·0
28	29·470	29·738	14·0	58·0	68·0	108·0	73·0	42.0	82	56	K	7·5	K	4·0	NW	·52	W	2·60	·01		4·0
29	29·940	29·857	11·0	52·0	69·0	108·0	75·0	40·0	80	73	K	10·0	K	7·5	NW	0	S	0			2·0
30	29·671	29·665	12·0	54.0	60.0	100·0	71·0	41·0	93	88	K	4.0	K	5·5	N	·52	S	·52	·30		5·5
31	29·826	29·813	13·0	56·0	56·0	93·0	64·0	42·0	81	87	K	10·0	N	10·0	SW	0	S	·26	·03	·43	3·0

Mean Press. 29·757	Mean 12·71	M'n. Tem. 60·83	Mean. 104·41	Mean 74·10	Mean 42·37	Mean. ·72	Mean for Month. 6·50		Mean Force ·75 lb.				Tl. ·51	Tl. 3·49	Tl. 117·0
Greatest do. 30·290	Max. 20.00		Max. 125·00	Max. 90·00	Max. 51·00		Prev. Character, K		Greatest Force 5·21 lb.						Mean 3·80
Least do. 29·438	Min. 6·50		Min. 78·00	Min. 64·00	Min. 36·50				Least Force. 0						
									Prevailing Direction. NW, S.						

The Meteorological form brought into use at the beginning of 1876 differs in some respects from the former one. It has been adopted with the view of assimilating the Hobart Town records more closely with those of stations in Europe, America, etc., in order to co-operate in a system of International Meteorology. Readings are added from the centigrade thermometer, that being the instrument generally used on the continent of Europe.

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

The direction of the wind is registered from currents at a height of 92 feet above sea level, and its force in lbs. per square foot.

The relative quantity of rain that fell under the different winds is registered each morning at 7·30 a.m.

The 35 years' standard tables are used for obtaining the difference from average.

FRANCIS ABBOTT, F.R.A.S., etc.

Time of leafing, flowering and fruiting of a few standard plants in the Royal Society's Gardens during the month of March, 1878.

10th.—Tips of Hornbeam commencing to turn brown.
12th.—Coe's Golden-drop Plum ripe.
14th.—Seckle Pear commencing to ripen.
18th.—Tips of Elm commencing to turn yellow.
20th.—Horsechestnut leaves turning brown.
24th.—Ash leaves commencing to fall.
30th.—Oak leaves ditto. Acorns ripe.

F. ABBOTT, JUN., Superintendent.

METEOROLOGY FOR APRIL, 1878.

Private Observatory, Hobart Town.

Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.
(Registered for the Royal Society of Tasmania.)

Day of Month.	Bar. corrected for temperature instrumental error, and to mean sea level.		Thermometers (Reading.)			Thermometers (Self-Registering.)			Relative Humidity. Per cent		Clouds. 7·30 a.m.		Clouds. 4·30 p.m.		Wind. 7·30 a.m.		Wind. 4·30 p.m.		Rain in Inches	Spon. Evap.	Ozone. Chrom. Scale.
	7·30 a.m.	4·30 p.m.	Centigrade, 7·30 a.m.	Fahrenheit, 7·30 a.m.	Fahrenheit, 4·30 p.m.	Highest in Sun, 4·30 p.m.	Highest in Shade, 4·30 p.m.	Lowest on Grass, 7·30 a.m.	7·30 a.m	4·30 p.m.	Character.	Amount.	Character.	Amount.	Direction from.	Force in lbs. per square foot.	Direction from.	Force in lbs. per square foot.	7·30 a.m.	7·30 a.m.	7·30 a.m.
1	29·732	29·769	13·0	56·0	59·0	84·0	62·0	40·0	75	66	K	7·5	KN	10·0	N	·52	NW	2·60	·69		8·0
2	29·740	29·644	10·5	51·0	58·0	75·0	60·0	36·0	74	74	K	7·0	K	7·0	NW	2·60	NW	·52	·01		3·5
3	29·890	29·857	11·0	52·0	60·0	75·0	64·0	37·0	64	71	K	7·5	K	3·5	W	·52	NW	2·60			3·0
4	29·937	29·914	11·1	52·0	61·0	70·5	64·0	37·0	80	72	K	10·0	K	7·0	NW	·52	NW	·52			3·0
5	29·097	29·937	7·5	46·0	67·0	102·0	72·0	35·0	79	78	0	0	0	0	NW	0	NW	0			5·5
6	29·907	29·819	9·0	49·0	74·0	105·0	77·0	36·5	80	65	0	0	K	9·0	N	0	N	0			4·5
7	30·171	30·198	13·0	56·9	58·9	77·0	44·0	40·5	71	81	K	10·0	K	10·0	S	0	S	0			7·0
8	30·231	30·332	12·5	55·0	68·0	96·0	70·0	37·0	93	94	KN	10·0	0	0	W	0	SE	0	·01		5·0
9	30·330	30·336	11·0	52·0	74·0	110·0	78·0	35·5	86	90	0	0	K	5·5	W	0	N	·26			4·0
10	30·342	30·359	12·0	54·0	60·0	110·0	75·0	36·0	87	83	0	0	K	5·0	NW	0	S	0			4·0
11	30·371	30·290	15·0	59·0	58·0	75·0	67·0	37·5	84	94	N	10·0	KN	10·0	S	0	SE	·52	·04		6·0
12	30·254	30·132	9·0	48·0	64·0	100·0	70·0	34·0	93	78	KS	4·5	0	0	NE	0	SE	0	·05		5·0
13	30·008	30·042	9·0	48·0	66·0	95·0	73·0	34·0	80	73	KS	3·0	K	3·5	NE	·26	S	·26		·50	4·0
14	30·028	29·849	8·0	47·0	66·0	104·0	75·5	33·0	79	73	0	0	0	0	NW	·52	SE	·52			4·5
15	29·898	29·790	8·0	46·0	65·0	100·0	70·0	33·5	86	64	K	9·0	K	2·0	SW	0	W	0			5·5
16	30·060	30·060	10·0	50·0	59·0	105·0	78·0	37·0	86	52	K	4·0	K	1·0	NW	0	NW	0			5·5
17	30·088	29·991	10·0	50·0	65·0	95·0	70·0	37·0	86	68	K	5·0	K	4·0	NW	·26	SE	·52			7·0
18	30·087	30·071	10·5	57·0	55·0	67·0	65·0	37·0	85	83	K	4·0	K	10·0	S	0	S	0	·11		6·5
19	30·076	29·876	12·0	56·0	56·0	75·0	64·5	37·0	93	93	K	10·0	K	10·0	S	0	S	0			5·0
20	29·924	29·913	12·0	55·0	59·0	75·0	62·0	37·0	93	93	N	10·0	K	10·0	SE	0	SE	0			6·0
21	29·926	29·764	12·5	55·0	60·0	68·0	62·0	37·5	100	94	K	10·0	K	10·0	S	·26	NE	0	·01		6·5
22	29·326	29·425	11·0	52·0	60·0	92·0	66·0	36·5	93	76	K	10·0	K	5·0	N	0	NW	2·60	·93		5·5
23	29·558	29·702	9·0	49·0	56·0	65·0	60·0	34·0	93	66	K	7·0	K	9·0	NW	·52	NW	2·60			3·0
24	29·640	29·725	10·5	51·0	57·0	90·0	63·0	36·5	74	87	K	7·0	K	7·0	NW	·52	NW	·26			4·0
25	29·400	29·445	10·0	50·0	61·0	66·0	63·0	36·0	87	72	KN	10·0	KN	9·0	N	0	NW	·26			4·0
26	29·508	29·435	6·0	43·0	61·0	95·0	66·0	33·5	79	67	KN	9·0	KS	10·0	N	0	NE	0	·01		3·0
27	29·503	29·432	5·0	42·0	65·0	79·0	68·0	36·5	86	64	K	8·0	K	10·0	N	0	NW	·26	·01		4·0
28	29·380	29·173	13·5	56·0	53·0	72·0	63·0	38·5	81	83	KN	10·0	N	10·0	N	·26	NW	·52	·66		6·9
29	29·054	29·250	11·0	52·0	57·0	73·0	59·0	34·0	69	95	K	7·0	N	10·0	N	·52	SE	·52			10·0
30	29·042	29·884	6·5	44·0	54·0	70·0	60·0	31·5	73	75	K	4·0	K	7·0	NW	2·60	NW	·52	·06	·45	6·0

Mean Press. 29·857	Mean 10·49	Mn. Tem. 55·90	Mean. 85·53	Mean 67·03	Mean 35·60	Mean 80	Mean for Month. 6·47				Mean Force ·38 lb.				Th. ·07	Th. ·95	Th. 153·50
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Greatest do. 30·429	Max. 15·0		Max. 110·0	Max. 78·0	Max. 40·50		Prev. Character, K				Greatest Force 2·60 lb.						Mean 5·10
Least do. 29·054	Min. 6·0		Min. 66·0	Min. 44·0	Min. 31·50						Least Force. 0						
											Prevailing Direction. NW						

The Meteorological form brought into use at the beginning of 1876 differs in some respects from the former one. It has been adopted with the view of assimilating the Hobart Town records more closely with those of stations in Europe, America, etc., in order to co-operate in a systematic study of International Meteorology. Readings are added from the centigrade thermometer, that being the instrument generally used on the continent of Europe.

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

The direction of the wind is registered from currents at a height of 92 feet above sea level, and its force in lbs. per square foot.

The relative quantity of rain that fell under the different winds is registered each morning at 7·30 a.m.

The 35 years' standard tables are used for obtaining the difference from average.

FRANCIS ABBOTT, F.R.A.S., etc.

Time of leafing, flowering and fruiting of a few standard plants in the Royal Society's Gardens during the month of April, 1878.

12th.—Elm leaves commencing to fall.
16th.—Chinese Chrysanthenum commencing to flower.
15th.—Coes fine late red plum ripe.
21st.—Mountain Ash leaves commencing to fall.
27th.—Black Mulberry leaves commencing to fall.
30th.—Seeds of Hornbeam ripe.

F. ABBOTT, Jun., Superintendent.

METEOROLOGY FOR MAY, 1878.

PRIVATE OBSERVATORY, HOBART TOWN.

Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.
(Registered for the Royal Society of Tasmania.)

Day of Month.	Bar. corrected for temperature instrumental error, and to mean sea level.		Thermometers (Reading.)			Thermometers (Self-Registering.)			Relative Humidity. Per cent		Clouds. 7·30 a.m.		Clouds. 4·30 p.m.		Wind. 7·30 a.m.		Wind. 4·30 p.m.		Rain in Inches	Spon. Evap.	Ozone. Chrom. Scale.
	7·30 a.m.	4·30 p.m.	Centigrade, 7·30 a.m.	Fahrenheit, 7·30 a.m.	Fahrenheit, 4·30 p.m.	Highest in Sun, 4·30 p.m.	Highest in Shade, 4·30 p.m.	Lowest on Grass, 7·30 a.m.	7·30 a.m.	4·30 p.m.	Character.	Amount.	Character.	Amount.	Direction from.	Force in lbs. per square foot.	Direction from.	Force in lbs. per square foot.	7·30 a.m.	7·30 a.m.	7·30 a.m.
1	29·780	29·744	11·0	52·0	69·0	90·0	68·0	38·5	80	77	K	10·0	K	7·0	NW	0	NW	2·60			5·5
2	29·558	29·472	13·0	56·0	56·0	90·0	66·0	40·0	65	75	K	7·0	KN	10·0	NE	2·60	NW	5·21	·01		4·0
3	29·748	29·765	8·5	48·0	56·0	75·0	53·0	37·0	73	70	K	7·0	KN	8·0	N	2·60	W	2·60	·01		4·0
4	29·779	29·816	13·0	56·0	57·0	94·0	66·0	40·0	61	57	K	7·0	KN	9·0	?	0	NW	5·21			4·0
5	30·145	30·267	8·0	47·0	56·0	87·0	63·0	34·0	79	70	K	5·0	K	7·0	NW	0	NW	0	·08		5·5
6	30·361	30·335	8·0	47·0	57·0	85·0	60·0	34·5	73	75	K	7·0	K	10·0	NW	·52	NW	2·60	·01		5·5
7	30·183	30·040	10·5	50·5	62·0	78·0	68·0	37·0	69	62	KS	7·0	K	9·0	NW	5·21	NW	·52			3·0
8	29·871	29·959	14·0	59·0	60·0	86·0	65·0	40·0	71	58	K	10·0	K	7·0	NW	·56	NW	·56			4·0
9	29·622	29·683	14·5	60·0	49·0	75·0	61·0	40·0	71	79	K	7·0	K	10·0	NW	2·60	NW	·52			4·0
10	29·861	29·862	5·0	41·0	49·0	85·0	57·0	33·0	78	62	K	3·0	K	7·0	N	·52	NW	·26	·03	1·0	7·0
11	29·586	29·448	7·0	45·0	59·0	80·0	64·0	36·0	79	40	K	8·0	K	10·0	NW	5·21	NW	15·62	·01		6·0
12	29·484	29·488	11·5	53·0	49·0	76·0	62·0	40·5	59	93	K	8·0	K	7·0	NW	20·83	SE	0	·03		3·0
13	29·648	29·528	10·0	50·0	50·0	75·0	58·0	38·0	63	100	K	5·0	KN	7·0	NW	5·21	NW	5·21	·17		9·0
14	29·555	29·643	7·0	45·0	48·0	76·0	54·0	33·0	67	93	K	6·0	N	10·0	N	2·60	W	0	·02		4·0
15	29·973	30·190	2·0	36·0	42·0	65·0	51·0	29·5	83	85	K	5·0	K	5·0	SW	2·60	S	0	·98		10·0
16	30·162	30·156	1·0	31·0	43·0	65·0	58·0	30·0	89	73	K	5·0	K	5·0	NW	·26	NW	0	·10		10·0
17	30·164	30·127	6·5	44·0	53·0	90·0	61·0	34·5	78	86	K	3·0	K	10·0	N	0	SE	0	·03		4·0
18	30·295	30·242	6·0	43·0	56·0	90·0	58·0	34·5	78	87	K	3·0	0	0	NW	0	NW	0	·03		6·0
19	30·293	30·240	5·0	41·5	54·0	85·0	58·0	33·0	84	80	K	10·0	K	3·0	NW	0	SE	0			3·0
20	30·313	30·196	5·0	41·0	54·0	75·0	56·0	33·5	84	75	K	7·5	0	0	SW	0	N	0		1·05	7·0
21	30·222	29·938	5·5	42·0	54·0	88·0	58·0	34·0	84	84	K	8·0	K	4·0	NW	·52	NW	0			6·5
22	30·133	30·108	7·0	45·0	48·0	65·0	53·0	35·5	86	93	K	10·0	KN	10·0	NW	·26	NW	0			5·0
23	30·103	30·088	7·5	46·0	41·0	65·0	53·0	36·0	80	93	K	9·0	KN	10·0	NW	0	S	0	·14		3·0
24	30·008	29·965	7·5	41·0	49·0	56·0	48·5	35·5	93	86	N	10·0	KN	10·0	S	0	SE	0	·05		10·0
25	29·948	29·926	6·5	44·0	51·0	74·0	54·5	34·5	86	80	K	9·0	K	5·0	N	0	S	·52	·02		6·0
26	30·077	30·072	2·0	36·0	50·0	90·0	54·0	31·0	91	80	K	4·5	0	0	NW	0	NW	·26			5·5
27	30·174	30·134	1·5	35·0	48·0	87·0	58·0	29·5	83	83	K	3·0	K	4·0	NW	0	NE	0			5·5
28	30·092	29·980	2·0	36·0	46·0	56·0	49·0	30·0	83	86	K	4·5	K	6·0	NW	0	NW	0			4·5
29	29·846	29·772	3·5	40·0	55·0	89·0	59·0	32·0	84	75	KS	6·0	K	6·0	NW	0	NW	·52			5·0
30	29·593	29·728	9·5	49·0	55·0	91·0	61·0	36·5	80	70	KN	8·0	K	6·0	NW	·26	N	·52			5·0
31	29·788	29·780	8.0	46·5	54·0	100·0	61·0	35·5	86	74	K	9·0	K	8·0	NW	0	S	0		·15	3·5
	Mean Press. 29·938		Mean 7·35	Mn. Tem. 48·83		Mean. 80·10	Mean 58·78	Mean 35·00	Mean 78		Mean for Month. 6·80				Mean Force 1·52 lb.				Tl. 1·72	Tl. 2·20	Tl. 168·0
	Greatest do. 30·361		Max. 14.50			Max. 100·00	Max. 68·00	Max. 40 50			Prev. Character, K and KN				Greatest Force 20·83 lb.						Mean 5·42
	Least do. 29·448		Min. 1·00			Min. 56·00	Min. 48·50	Min. 29·50							Least Force. 0						
															Prevailing Direction. NW						

The Meteorological form brought into use at the beginning of 1876 differs in some respects from the former one. It has been adopted with the view of assimilating the Hobart Town records more closely with those of stations in Europe, America, etc., in order to co-operate in a system of International Meteorology. Readings are added from the centigrade thermometer, that being the instrument generally used on the continent of Europe.

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

The direction of the wind is registered from currents at a height of 92 feet above sea level, and its force in lbs. per square foot.

The relative quantity of rain that fell under the different winds is registered each morning at 7·30 a.m.

The 35 years' standard tables are used for obtaining the difference from average.

FRANCIS ABBOTT, F.R.A.S., etc.

Time of leafing, flowering and fruiting of a few standard plants in the Botanic Gardens during the month of May, 1878.

15th.—First Dutch Medlar ripe.
24th.—*Coronilla glauca* commencing to flower
26th.—*Photinia serrulata*, ditto.
28th.—*Diosma alba*, ditto.
30th.—*Ailanthus glandulosus* leaves all fallen.

F. ABBOTT, JUN., Superintendent.

METEOROLOGY FOR JUNE, 1878.

PRIVATE OBSERVATORY, HOBART TOWN.

Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.
(Registered for the Royal Society of Tasmania.)

Day of Month.	Bar. corrected for temperature instrumental error, and to mean sea level.		Thermometers (Reading.)			Thermometers (Self-Registering.)			Relative Humidity. Per cent	
	7·30 a.m.	4·30 p.m.	Centigrade, 7·30 a.m.	Fahrenheit, 7·30 a.m.	Fahrenheit, 4·30 p.m.	Highest in Sun, 4·30 p.m.	Highest in Shade, 4·30 p.m.	Lowest on Grass, 7·30 a.m.	7·30 a.m.	4·30 p.m.
1	30·081	30·096	5·	41·5	46·	65·	55·	36·	92	79
2	30·269	30·243	4·	40·	50·	71·	54·	34·	84	74
3	30· 14	30·179	6·	43·	50·	90·	55·	37·	73	86
4	30·2 8	30·243	4·	39·	49·	86·	46·	31·	92	79
5	30·220	30·148	4·	30·	45·	86·	57·	31·	92	85
6	29·922	29·805	1·	32·	45·	94·	50·	28·	97	86
7	29·694	29 585	1·	34·	45·	64·	48·	31·	98	86
8	29 630	29·594	1·5	35·	47·	87·	57·	30·	91	100
9	29·614	29·591	5·	42·	51·	92·	56·	34·	84	86
10	29 683	29·711	2·	35·	54·	89·	54·	30·	83	80
11	29·518	29·314	1·	33.	44·	57·	51·	28·	68	86
12	29·221	29·156	1·5	35·	47·	56·	49·	29·	78	79
13	29·223	29 441	4·	40·	43·	65·	56·	31·	84	93
14	29 707	29 793	8·	47·	45 5	58·	52·	39·	97	93
15	29·914	29 945	1·	41·	47·	75·	54·	31·	92	79
16	29·968	29·915	1·	32·	47·	87·	51·	28·	89	86
17	29·883	29·774	4 5	40·	47·	64·	56·	34·	92	79
18	29·621	29·744	2·5	3··	48·	63·	52·	32·	83	93
19	29·542	29·720	8·	47·	53·	—·	56·	36·	100	100
20	30·000	30·025	9 5	54·	54·	—·	56··	37·	100	93
21	30·183	30·198	3·5	38·	46·	—·	52·	33·	91	70
22	30·219	30·222	3 5	38·	40·	—·	44·	32·	92	92
23	30·207	30·218	4·	39·	41·	83·	52·	33·	84	85
24	30·124	30 115	4·5	38·	40·	91·	55·	32·	92	89
25	30·140	30·098	1·	29·	43	90·	54·	30·	96	73
26	30·082	30·054	2·5	37·	49·	99·	55·	36·5	91	91
27	29·974	29 793	2·	36·	49·	90·	60·	34·	91	68
28	29·459	29·496	7·	45·	50·	74·	53·	37.	73	68
29	29·656	29 677	9·	49·	54·	92·	58·	40·	74	70
30	29·546	29·483	10·	5··	54·	62·	57·	38·	74	64
	Mean Press. 29·854		Mean 4·03	M'n. Tem. 43·85		Mean. 78·60	Mean 53·33	Mean 33·10	Mean 85	
	Greatest do. 30·297		Max. 10.00			Max. 99·00	Max. 60·00	Max. 40·00		
	Least do. 29·156		Min. 1·00			Min. 56·00	Min. 44·00	Min. 28·00		

Day of Month.	Clouds. 7·30 a.m. Character.	Amount.	Clouds. 4·30 p.m. Character.	Amount.	Wind. 7·30 a.m. Direction from.	Force in lbs. per square foot.	Wind. 4·30 p.m. Direction from.	Force in lbs. per square foot.	Rain in Inches 7·30 a.m.	Spon. Evap. 7·30 a.m.	Ozone. Chrom. Scale. 7·30 a.m.
1	KN	5·	N	10·	SW	0	S	2·60	·10		6·
2	KN	9·	K	4·	S	0	W	0			9·
3	K	9·	K	4·	N	·52	S	·26	·01		9·
4	K	5·	KS	6·	SW	0	N	0			8·
5	K	10·	K	2·	NW	0	N	0			4·
6	K	6·	K	8·	NW	0	N	0			6·
7	K	6·	K	7·	NW	0	N	0			4·5
8	K	5·	K	5·	NW	0	NW	0			4·
9	K	7.	K	7·	NW	0	NW	0			3·
10	K	3·	0	0	SW	0	W	0	·01	·12	4·
11	K	7·	N	10·	NW	0	NW	0	·10		4·
12	K	7·	K	10·	NW	0	N	0			5·
13	K	6·5	K	10·	NW	0	S	0	·02		6·
14	N	10·	KN	10·	SW	2·60	S	2·60	·73		10·
15	N	10·	K	7·	S	0	NW	·26	·33		10.
16	K	5·	KS	7·	SW	0	NW	0			5·
17	KN	10·	KN	10·	NW	0	NW	0	·05		8·
18	KN	10·	KN	10·	NW	0	S	0	·20		4·
19	N	10·	N	10·	S	·52	S	·26		·83	10·
20	N	10·	N	10·	S	·52	S	·52	1·30		10·
21	K	10·	KN	10·	W	0	S	0	·25		10·
22	K	10·	KN	10·	SW	0	SW	·26	·12		7·
23	K	10·	K	8·	NW	0	N	0	·02		6·
24	KN	8·	K	7·	NW	0	SW	·52	·02		6·
25	K	3·	K	4·	SW	0	SW	·52			4·5
26	K	4·	K	4·	SW	0	NW	0			5·
27	K	3·	K	3·	S	0	NW	·52			6·
28	K	8·	K	7·5	NW	2·60	N	·52			4·5
29	K	5·	K	10·0	N	·52	NW	·52	·06		6·
30	K	10·	K	10·0	N	2·60	NW	2·60		·45	6·
	Mean for Month. 5·70				Mean Force ·30 lb.				Tl. 3·96	Tl. 1·45	Tl. 190·5
	Prev. Character, K				Greatest Force 2·60 lb.						Mean 6·35
					Least Force. 0						

Time of leafing, flowering and fruiting of a few standard plants in the Botanic Gardens during the month of June, 1878.

15th.—*Maclaura aurantiaca* leaves shedding.
" *Iris alata* in full flower.
20th.—Privet leaves shedding.
25th.—*Lachenalia rosea* commencing to flower.
" *Crocus vernus*, ditto.
30th.—Black mulberry leaves all shed.

F. ABBOTT, JUN., Superintendent.

Results of observations taken at New Norfolk for June, 1878, in accordance with new forms, at 7·35 a.m. and 4·35 p.m.:—

Barometer.—Mean of two daily registers, corrected and reduced, 29·951.
Thermometer.—Mean of two ditto, 40·87 deg.
" Mean of max. and min. in shade, 41 62 deg.
Dew Point.—Mean position of two ditto, 37·36 deg.
Elastic Force of Vapour.—Mean of two ditto, ·222.
Humidity of Air.—Mean of two ditto, ·89.
Solar Intensity.—Mean of max. temperature, 94·24 deg.
Terrestrial Radiation.—Mean of min. temperature, 28·07 deg.
Rainfall —1·70 inches, in excess of evaporation ·70 inches.
Evaporation.—·91 inch.
Clouds.—Mean amount of two daily registers, 6·88.
Ozone.—Mean amount of two daily registers, 7·44.

W. E. SHOOBRIDGE, Bushy Park.

METEOROLOGY FOR JULY, 1878.

PRIVATE OBSERVATORY, HOBART TOWN.

Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.
(Registered for the Royal Society of Tasmania.)

Day of Month.	Bar. corrected for temperature instrumental error, and reduced to mean sea level.		Thermometers (Reading.)			Thermometers (Self-Registering.)			Relative Humidity. Per cent		Clouds.				Wind.				Rain in Inches	Spon. Evap.	Ozone. Chrom. Scale.
											7·30 a.m.		4·30 p.m.		7·30 a.m.		4·30 p.m.				
	7·30 a.m.	4·30 p.m.	Centigrade, 7·30 a.m.	Fahrenheit, 7·30 a.m.	Fahrenheit, 4·30 p.m.	Highest in Sun, 4·30 p.m.	Highest in Shade, 4·30 p.m.	Lowest on Grass, 7·30 a.m.	7·30 a.m.	4·30 p.m.	Character.	Amount.	Character.	Amount.	Direction from.	Force in lbs. per square foot.	Direction from.	Force in lbs. per square foot.	7·30 a.m.	7·30 a.m.	7·30 a.m.
1	29·593	29·531	5°	47°	51°	72°	54°	37°	93	93	K	10	N	10	W		W		·03		6°
2	29·541	29·697	9°	54°	52°	90°	60°	38°	93	100	K	10	KN	10	NW	·52	S		·03		4°
3	29·859	30·014	5°	40°	45°	65°	54°	36°	78	79	K	7	K	7	SW		S	·52	·35		9°
4	29·709	29·590	7·5	46°	51°	60°	53°	34°	73	74	K	10	KN	10	N	2·60	NW	5·21	·37		6°
5	29·759	29·806	6°	43°	46°	72°	53°	31°	77	79	K	7	K	7	NW	·52	NW	·26	·09		10°
6	29·804	29·840	9°	49°	47°	69°	60°	35°	86	86	K	7	KN	9	E	·26	N	·52	·01		4°
7	29·644	29·897	10·5	51°	54°	82°	56°	36°	74	65	K	7	K	5	W		N	·52	·01		4°
8	29·928	29·932	10°	50°	55°	65°	57°	36°	74	70	K	9	K	10	NW	·52	NW	·52			3°
9	30·204	29·845	7°	45°	55°	60°	54°	33°	93	74	0	0	0	0	NW		NW	·52			6°
10	29·658	29·620	14°	58°	57°	65°	59°	37°	71	93	K	10	N	10	NW	5·21	SW	2·60		·15	4°
11	30·122	30·154	5°	41°	52°	86°	60°	31°	78	78	0	0	K	4	S		SW	·52	·19		8°
12	30·182	30·154	3°	38°	45°	86°	62°	29°	77	73	0	0	K	4	N	2·60	SW	·52	·10		4°
13	30·032	29·945	5°	41°	49°	70°	52°	32°	54	74	K	4	K	7	NW	·52	NW		·01		4°
14	29·924	29·924	7°	45°	49°	70°	55°	34°	79	93	K	5	K	10	NW		SE				3°
15	29·982	29·875	4·5	40°	43°	85°	52°	31°	85	86	0	0	0	0	NW	·26	NW		·60		6°
16	29·902	29·703	2°	36°	46°	65°	50°	38°	91	93	K	3	K	7	NW	·26	NW		·20		5°
17	29·765	29·758	7°	46°	56°	80°	64°	37°	86	87	K	5	K	4	NW	·52	NW				3·5
18	29·678	29·541	4°	39°	49°	66°	62°	34°	92	93	N	10	KN	10	NW		W				3°
19	29·491	29·350	10·5	51°	49·5	58°	56°	45°	93	93	N	10	KN	10	SW		W		·80		7°
20	29·393	29·428	10·5	51°	56°	65°	58°	45°	86	75	K	10	K	9	W		NW	·52	·15		5°
21	29·696	29·663	10°	50°	54°	73°	57°	44°	74	80	K	7	K	10	NW	·26	NW		·01		4°
22	29·638	29·725	11·5	53°	53°	90°	62°	44°	69	61	K	8	K	7	NW	·26	NW	2·60	·04		3·5
23	29·813	29·725	7°	45°	57°	65°	61°	40°	79	88	K	7	K	6	NW	·26	N				3°
24	29·598	29·589	11°	51°	60°	86°	65°	42°	87	62	K	4	0	0	NW	·26	NW	5·21			3°
25	29·692	29·562	11°	52°	59°	75°	63°	42°	75	88	K	7	K	5	N	·26	NW	·26			3°
26	29·472	29·120	5·5	42°	54°	57°	56°	35°	92	93	K	10	N	10	NW		S	·52	·02		3·5
27	29·333	29·454	5·5	42°	45	52°	49°	35°	85	86	K	10	K	10	SW	·26	SW		2·		10°
28	29·766	29·765	5·5	42°	46°	65°	53°	35°	85	86	K	10	KN	6	SE	·26	SW	·26	·20		6°
29	30·176	30·212	5·5	43°	47°	65°	52°	32°	85	87	KN	10	KN	6	SW		S		·03		6°
30	30·222	30·298	4°	39°	50°	87°	55°	32°	85	85	K	6	K	8	SW	·26	S	·26	·01		3°
31	30·266	30·242	5·5	42°	49°	70°	52°	33°	85	86	K	5	N	10	NW	·52	S	·26		·65	4°
	Mean Press. 29·785		Mean 7·20	M'n. Tem. 48·36		Mean. 71·50	Mean 56·64	Mean 36·20	Mean 82		Mean for Month. 7				Mean Force ·62 lb.				Tl. 4·96	Tl. ·80	Tl. 153·5
	Greatest do. 30·298		Max. 14·0			Max. 90·0	Max. 65·0	Max. 45·0			Prev. Character, K				Greatest Force 5·21 lb.						Mean 5·0
	Least do. 29·120		Min. 4·0			Min. 52·0	Min. 49·0	Min. 29·0							Least Force. 9 Prevailing Direction NW						

The Meteorological form brought into use at the beginning of 1876 differs in some respects from the former one. It has been adopted with the view of assimilating the Hobart Town records more closely with those of stations in Europe, America, etc., in order to co-operate in a system of International Meteorology. Readings are added from the centigrade thermometer, that being the instrument generally used on the continent of Europe.

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

The direction of the wind is registered from currents at a height of 92 feet above sea level, and its force in lbs. per square foot.

The relative quantity of rain that fell under the different winds is registered each morning at 7·30 a.m.

The 35 years' standard tables are used for obtaining the difference from average.

FRANCIS ABBOTT, F.R.A.S., etc.

Printed at the "Mercury" Steam Press Office, Hobart Town, for the Royal Society of Tasmania.

Time of leafing and flowering of a few standard plants in the Botanic Gardens, Hobart Town, during the month of July, 1878.

16th.—Arbutus unedo commencing to flower.
20th.—Garrya Elliptica ditto.
25th.—Cape mulberry commencing to leaf.
30th.—Common almond commencing to flower.
31st.—Yellow crocus in full flower.

METEOROLOGICAL.

Results of observations taken at New Norfolk for July, 1878, in accordance with new forms, at 7·30 a.m. and 4·30 p.m.:—

Barometer.—Mean of two daily readings, corrected and reduced, 29·913 inches.
Thermometer.—Mean of two ditto, 43·84 deg.
,, Mean of max. and min. in shade, 44·95 deg.
Dew Point.—Mean of two ditto, 39·48 deg.
Elastic Force of Vapour.—Mean of two ditto, ·243.
Humidity of Air.—Mean of two ditto, ·84.
Solar Intensity.—Mean of max. temperature, 98·93 deg.
Terrestrial Radiation.—Mean of min temperature, 30·32 deg.
Daily Range of Temperature.—Mean 15·38 deg.
Rainfall —1·94 inches, in excess of evaporation ·54 inches.
Evaporation.—1·40 inches.
Clouds.—Mean amount of two daily registers, 8·30.
Ozone.—Mean amount of two daily registers, 7·72.

W. E. Shoobridge, Bushy Park.

METEOROLOGY FOR AUGUST, 1878.

PRIVATE OBSERVATORY, HOBART TOWN.

Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.
(Registered for the Royal Society of Tasmania.)

Day of Month.	Bar. corrected for temperature instrumental error, and to mean sea level.		Thermometers (Reading.)			Thermometers (Self-Registering.)			Relative Humidity. Per cent		Clouds.				Wind.				Rain in Inches	Spon. Evap.	Ozone. Chrom. Scale.
	7·30 a.m.	4·30 p.m.	Centigrade, 7·30 a.m.	Fahrenheit, 7·30 a.m.	Fahrenheit, 4·30 p.m.	Highest in Sun, 4·30 p.m.	Highest in Shade, 4·30 p.m.	Lowest on Grass, 7·30 a.m.	7·30 a.m.	4·30 p.m.	7·30 a.m. Character.	7·30 a.m. Amount.	4·30 p.m. Character.	4·30 p.m. Amount.	7·30 a.m. Direction from.	7·30 a.m. Force in lbs. per square foot.	4·30 p.m. Direction from.	4·30 p.m. Force in lbs. per square foot.	7·30 a.m.	7·30 a.m.	7·30 a.m.
1	30·019	30·036	5·	41·	50·	62·	53·	35·	85	80	K	10	K	5	NW	·52	NE	·0	·01		9·
2	29·949	29·987	8·	47·	51·	85·	57·	38·	79	80	K	10	K	9	NW	0	S	·52			8·
3	29·848	29·820	10·	54·	53·	65·	57·	39·	93	80	N	10	KN	10	SE	·52	S	·52	·03		7·
4	28·918	29·832	6·5	43·	52·	89·	57·	37·	94	71	K	10	K	3	SW	0	S	·0	·10		9·
5	28·967	29·904	5·5	42·	43·	73·	54·	36·	92	85	K	8	KN	10	NW	0	S	·26			4·
6	29·978	29·892	5·	41·	50·	83·	52·	35·	92	80	K	4	K	7	SW	0	NW	·0	·04		8·
7	29·459	29·550	7·	45·	54·	89·	60·	36·	93	74	K	10	KN	10	NW	0	W	·26	·03		6·
8	29·618	29·392	5·5	42·	55·	57·	56·	34·	85	75	K	10	K	10	NW	·52	NW	·0			3·5
9	28·941	29·120	9·	48·	55·	62·	60·	38·	79	87	K	10	KN	10	N	·26	SE	·52	·27		10·
10	29·364	29·283	5·5	42·	54·	62·	60·	33·	92	65	K	10	K	10	N	0	NW	5·21	·11		4·
11	29·205	29·139	9·	48·	53·	90·	58·	37·	80	80	K	5	KN	10	NW	·52	NW	·52	·45		9·
12	29·157	29·149	7·5	46·	46·	65·	53·	36·	93	93	K	10	KN	10	NW	·52	NW	2·60	·05		4·
13	29·391	29·406	8·5	47·	45·	65·	48·	37·	79	93	K	6	KN	10	NW	·26	N	·0	·25		8·
14	29·761	29·864	9·	49·	55·	80·	57·	38·	80	65	K	5	K	6	N	·52	NW	·52	·30		10·
15	29·350	29·388	10·	55·	50·	88·	56·	38·	93	88	K	10	K	9	SW	·52	NW	·52	·15		10·
16	29·493	29·441	10·	50·	50·	89·	55·	38·	64	74	K	2	K	4	NW	2·60	SW	·26	·30		8·
17	29·914	29·882	10·	55·	52·	88·	57·	37·	81	74	K	8	K	8	SW	·26	S	·0	·03		8·
18	29·693	29·511	11·	52·	57·	81·	60·	33·	74	70	K	8	K	9	N	2·60	N	2·60			4·
19	29·562	29·955	7·5	46·	47·	60·	57·	32·	79	67	K	10	KN	10	W	10·12	W	5·21	·35		7·
20	30·060	30·134	11·	52·	54·	89·	61·	36·	69	74	K	5	K	5	SW	2·60	W	2·60	·42		9·
21	30·050	30·015	12·	54·	59·	86·	69·	38·	57	56	K	2	K	6	NW	2·60	NW	2·60			5·
22	29·803	29·708	11·	52.	61·	95·	63·	40·	60	83	K	5	K	7	N	·52	NW	2·60			6·
23	29·681	29·575	9·	49·	60·	90·	53·	37·	80	71	K	10	K	7	NW	·26	N	·52			2·
24	29·748	29·764	12·	54·	58·	95·	62·	40·	80	58	K	6	K	6	NW	2·60	N	·52	·07		5·
25	29·937	29·915	14·	58·	59·	85·	52·	41·	54	62	K	4	K	7	N	·26	NW	·26			2·
26	29·930	29·744	15·	60·	68·	105·	73·	42.	55	50	K	4	K	2	NW	2·60	W	2·60			4·
27	29·942	29·811	12·5	55·	60	100·	68·	39·	49	58	K	6	K	6	NW	2·60	NW	·52			4·
28	29·625	29 604	7·	45·	42·	65·	58·	34·	100	79	N	10	N	10	NW	0	W	·26	·15		7·
29	29·819	29·942	8·	47·	48·	93·	56·	36·	55	93	K	4	KN	7	W	·52	S	·0	·35		10·
30	30·126	30·048	7·	45·	55·	90·	57·	34·	57	61	K	1	K	4	NW	·52	NW	·0	·01		6·
31	29·916	29·815	6·	43·	60·	94·	60·	32·	67	62	K	7	K	3	NW	0	NW	2·60			8·

Mean Press. 29·660	Mean 8·84	M'n. Tem. 51·00	Mean. 81·00	Mean 58·40	Mean 36·65	Mean 76	Mean for Month. 7·30		Mean Force 1·62 lb.			Tl. 3·47	Tl. 0	Tl. 202·5
Greatest do. 30·134	Max. 15.0		Max. 105·00	Max. 73·0	Max. 42·00		Prev. Character, K		Greatest Force 10·12 lb.					Mean 6·5
Least do. 29·941	Min. 5·0		Min. 62·00	Min. 48·00	Min. 32·00				Least Force. 0 Prevailing Direction NW					

The Meteorological form brought into use at the beginning of 1876 differs in some respects from the former one. It has been adopted with the view of assimilating the Hobart Town records more closely with those of stations in Europe, America, etc., in order to co-operate in a system of International Meteorology. Readings are added from the centigrade thermometer, that being the instrument generally used on the continent of Europe.

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

The direction of the wind is registered from currents at a height of 92 feet above sea level, and its force in lbs. per square foot.

The relative quantity of rain that fell under the different winds is registered each morning at 7·30 a.m.

The 35 years' standard tables are used for obtaining the difference from average.

FRANCIS ABBOTT, F.R.A.S., etc.

Results of observations taken at New Norfolk for August, 1878, in accordance with new forms, at 7·35 a.m., and 4·35 p.m.

Barometer.—Mean of 2 daily registers corrected and reduced, 29·832 inches.

Thermometer.—Mean of 2 do., 44·89 degrees.

Thermometer.—Mean of max. and min. in shade, 46·45 degrees.

Dew Point.—Mean position of, 2 do., 38·48 degrees.

Elastic Force of Vapour.—Mean of 2 do., ·241.

Humidity of Air.—Mean of 2 do., ·80.

Solar intensity, mean of maximum temperature, 106·04 deg.

Terrestial radiation, mean of minimum temperature, 31·05 degrees.

Rainfall, 3·89 inches: in excess of evaporation, 1·83 inches.

Rainfall.—Total, from commencement of year, 15·23 inches.

Evaporation, 2·06 inches.

Clouds.—Mean of 2 daily registers, 6·06.

Ozone.—Mean of 2 do., 7 25.

W. E. SHOOBRIDGE, Bushy Park.

Time of leafing, flowering, and fruiting of a few standard plants in the Botanic Gardens during August, 1878:—

12th. Common elder *(sambucus niger)* commencing to break.

13th. Horsechestnut ditto.

14th. Gooseberries ditto.

" Elm commencing to flower.

" Common poplar commencing to break.

28th. Apricots commencing to flower.

F. ABBOTT, JUN., Superintendent.

METEOROLOGY FOR SEPTEMBER, 1878.

PRIVATE OBSERVATORY, HOBART TOWN.

Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.
(Registered for the Royal Society of Tasmania.)

Day of Month.	Bar. corrected for temperature instrumental error, and to mean sea level.		Thermometers (Reading.)			Thermometers (Self-Registering.)			Relative Humidity. Per cent		Clouds. 7·30 a.m.		Clouds. 4·30 p.m.		Wind. 7·30 a.m.		Wind. 4·30 p.m.		Rain in Inches	Spon. Evap.	Ozone. Chrom. Scale.
	7·30 a.m.	4·30 p.m.	Centigrade, 7·30 a.m.	Fahrenheit, 7·30 a.m.	Fahrenheit, 4·30 p.m.	Highest in Sun, 4·30 p.m.	Highest in Shade, 4·30 p.m.	Lowest on Grass, 7·30 a.m.	7·30 a.m.	4·30 p.m.	Character.	Amount.	Character.	Amount.	Direction from.	Force in lbs. per square foot.	Direction from.	Force in lbs. per square foot.	7·30 a.m.	7·30 a.m.	7·30 a.m.
1	29·843	29·765	12·5	55·	59·	96·	63·	40·	66	66	K	7	K	6	NW	·52	SW	5·21			2·
2	29·820	29·719	12·5	55·	59·	95·	62·	39·	70	70	K	4	K	7	NW	·52	W	·52	·11		4·
3	29·492	29·386	10·	50·	52·	82·	60·	35·	86	74	K	10	KN	9	W	·26	W	2·60	·05		4·
4	29·875	29·965	7·	45·	54·	78·	61·	34·	67	65	K	7	K	7	NW	5·21	NW	·62	·36		9·
5	30·174	30·072	3·	38·	56·	88·	62·	32·	84	76	K	3	KS	4	NW	0	S	·26	·01		8·
6	30·104	29·917	7·5	46·	51·	95·	65·	36·	86	76	K	6	K	6	NW	·26	N	·26			7·
7	30·039	30·015	12·5	55·	52·	100·	66·	39·	66	63	K	4	K	5	NW	·26	SE	·26			8·
8	30·022	29·894	11·	61·	62·	107·	70·	39·	67	78	K	4	K	4	NW	·52	N	·52			2·5
9	29·871	29·801	17·	63·	66	105·	71·	40·	63	64	K	8	K	7	NE	·52	N	·26			6·
10	29·087	29·831	10·5	51·	53·	72·	64·	36·	93	93	N	10	N	10	E	0	SE	·0	·31		9·
11	29·941	29·899	7·5	46·	54·	87·	68·	33·	86	70	K	4	K	8	NW	0	S	·0	·02	·57	8·
12	29·803	29·657	9·5	49·	60·	75·	62·	35·	80	82	K	7	K	10	NW	·26	SE	·0	·01		8·
13	29·691	29·765	11·5	52.	57·	74·	59·	40·	59	71	K	5	K	6	N	·52	NW	·52			3·
14	29·693	29·474	12·	53·	57·	69·	59·	40.	79	76	K	10	K	10	NW	0	NW	·0			2·
15	29·399	29·359	10·	50·	61·	105·	64·	38·	74	72	K	7	K	3	NW	0	SE	·26			7·
16	29·798	29·874	10·5	51·	54·	72·	62·	38·	86	81	KN	10	K	9	SE	0	S	·0			8·
17	29·935	29·894	11·	52·	64·	106·	68·	40·	81	68	K	4	KS	3	NW	·52	S	·0	·01		10·
18	29·920	29·701	12·	54·	65·	105·	69·	41·	74	78	K	3	K	3	S	·26	S	·0			3·
19	29·586	29·626	11·5	53·	67·	92·	68·	41·	75	52	K	7	K	3	NW	·52	NW	·52	·04		7·
20	29·646	29·391	12·	55·	70·	109·	75·	41·	57	44	K	5	K	8	N	·26	N	5·21		·75	3·
21	29·393	29·345	11·	52·	51·	69·	57·	39·	86	88	K	7	KN	10	NW	2·60	W	2·60	·13		6·
22	29·746	29·659	9·	54·	59·	75·	66·	34·	63	83	KN	8	K	10	NW	2·60	N	2·60	·83		9·
23	29·281	29·105	15·	59·	52·	69·	54·	36·	76	88	KN	10	KN	10	NW	2·60	N	·52	·02		5·
24	29·165	29·145	10·	50·	55·	75·	60·	34·	68	75	K	8	K	9	NW	·52	NW	·26	·48		10·
25	29·087	29·093	11·	52·	51·	67·	57·	36·	81	93	K	7	K	10	NW	·26	SE	·0	·01		6·
26	29·196	29·272	11·	52·	56·	75·	61·	36·	70	75	K	5	K	10	NW	·26	N	·0	·40		9·
27	29·506	29·583	8·	47·	49·	72·	57·	33·	62	67	K	5	K	7	SW	2·60	SW	2·60	·03		6·
28	29·855	29·918	10·	50·	56·	80·	60·	36·	63	75	K	6	K	4	NW	2·60	N	·26	·01		6·
29	29·693	29·647	10·5	51·	59·	100·	62·	36·	86	61	K	10	K	4	NW	0	W	2·60			5·
30	29·693	29·748	10·	50·	57·	76·	60·	34·	86	70	K	7	K	7	NW	2·60	NW	2·60	·06	·65	6·

Mean Press. 29·810	Mean 10·22	Mean M'n. Tem. 54·82	Mean. 82·33	Mean 63·00	Mean 37·00	Mean 74	Mean for Month. 6·78	Mean Force 81 lb.	Tl. 2·89	Tl. 1·97	Tl. 186·5
Greatest do. 30·174	Max. 17.00		Max. 109·00	Max. 75·00	Max. 41·00		Prev. Character, K	Greatest Force 5·21 lb.			Mean 6·22
Least do. 29·087	Min. 3·00		Min. 67·00	Min. 54·00	Min. 32·00			Least Force. 0 Prevailing Direction NW			

The Meteorological form brought into use at the beginning of 1876 differs in some respects from the former one. It has been adopted with the view of assimilating the Hobart Town records more closely with those of stations in Europe, America, etc., in order to co-operate in a system of International Meteorology. Readings are added from the centigrade thermometer, that being the instrument generally used on the continent of Europe.

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

The direction of the wind is registered from currents at a height of 92 feet above sea level, and its force in lbs. per square foot.

The relative quantity of rain that fell under the different winds is registered each morning at 7·30 a.m.

The 35 years' standard tables are used for obtaining the difference from average.

FRANCIS ABBOTT, F.R.A.S., etc.

Time of leafing, flowering, and fruiting of a few standard plants in the Royal Society's Gardens during the month of September, 1878:—

12th. *Quercus pedunculata* commencing to break.
14th. Horsechestnut commencing to flower.
16th. Grape Vines commencing to break.
18th. Moutan Peony commencing to flower.
22nd. Common Ash commencing to break.
24th. Common Sycamore commencing to break.
27th. *Robinia pseudo Acacia* commencing to break.

F. ABBOTT, JUN., Superintendent.

Results of observations taken at New Norfolk for September, 1878, in accordance with new forms, at 7·30 a.m., and 4·30 p.m.

Barometer.—Mean of 2 daily readings corrected and reduced, 29·796 inches.

Thermometer.—Mean of 2 do., 49·61 degrees.

Thermometer.—Mean of max. and min. in shade, 50·62 degrees.

Dew Point.—Mean position of, 2 do., 40·56 degrees.

Elastic Force of Vapour.—Mean of 2 do., ·253.

Humidity of Air.—Mean of 2 do., ·73.

Solar intensity, mean of maximum temperature, 119·44 deg.

Terrestial radiation, mean of minimum temperature, 33·33 degrees.

Rainfall, 3·16 inches: from beginning of year 18·39 inches; ditto to September, 1877, 15·47 inches; ditto in 1876, 14·81 inches; ditto in 1875, 15·83 inches; ditto in 1874, 14·91 inches.

Evaporation, 3·21; in excess of rainfall ·05.

Clouds.—Mean of 2 daily registers, 5·65.

Ozone.—Mean of 2 do., 6·93.

W. E SHOOBRIDGE, Bushy Park.

METEOROLOGY FOR OCTOBER, 1878.

PRIVATE OBSERVATORY, HOBART TOWN.

Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.
(Registered for the Royal Society of Tasmania.)

Day of Month.	Bar. corrected for temperature instrumental error, and to mean sea level.		Thermometers (Reading.)			Thermometers (Self-Registering.)			Relative Humidity. Per cent		Clouds.				Wind.				Rain in Inches	Spon. Evap.	Ozone. Chrom. Scale.
											7·30 a.m.		4·30 p.m.		7·30 a.m.		4·30 p.m.				
	7·30 a.m.	4·30 p.m.	Centigrade, 7·30 a.m.	Fahrenheit, 7·30 a.m.	Fahrenheit, 4·30 p.m.	Highest in Sun, 4·30 p.m.	Highest in Shade, 4·30 p.m.	Lowest on Grass, 7·30 a.m.	7·30 a.m.	4·30 p.m.	Character.	Amount.	Character.	Amount.	Direction from.	Force in lbs. per square foot.	Direction from.	Force in lbs. per square foot.	7·30 a.m.	7·30 a.m.	7·30 a.m.
1	29·852	29·651	11·	52.	60·	78·	70·	38·	69	67	K	10	K	9	NW	2·60	NW	5·21			3·
2	29·735	29·798	12·	54·	62·	85·	66·	39·	87	50	K	9	K	5	NW	2·60	N	2·60	·06		6·
3	29·928	29·745	15·5	60·	70·	107·	73·	40·	64	57	K	4	KS	5	N	·26	S	·0			3·
4	29·825	29·845	11·5	57·	58·	80·	72·	39·	81	66	K	7	KN	7	NW	·52	NW	5·20			5·
5	30·035	29·837	11·5	53·	66·	108·	68·	39·	64	52	K	10	K	4	N	·26	NW	·52			2·
6	29·696	29·398	11·	56·	69·	95·	71·	39·	61	88	K	10	K	8	N	·52	NW	5·21			6·
7	29·835	29·825	10·	50·	60·	95·	69·	37·	68	66	K	7	K	4	NW	·52	NW	·25			2·
8	29·626	29·362	12·	54·	62·	107·	65·	39·	60	59	K	6	KN	10	N	·52	NW	2·60			5·
9	29·483	29·220	9·	48·	57·	75·	63·	33·	67	61	K	10	K	8	NW	·52	N	·52	·01		2·
10	29·762	28·641	11·	52·	58·	86·	58·	36·	80	93	KN	10	N	10	N	0	SE	·0	·01	1·65	6·
11	29·152	29·281	8·	47·	52·	98·	58·	33·	79	64	K	10	K	3	W	0	SW	·52	·47		9·
12	29·384	29·675	9·	49·	56·	95·	58·	35·	93	65	K	9	K	4	NW	·52	NW	2·60	·02		5·
13	29·573	29·454	12·5	52·	63·	85·	66·	38·	86	63	K	8	K	4	NW	2·60	NW	5·21	·01		3·
14	29·427	29·168	14·0	58·	60·	75·	63·	41·	71	88	K	10	K	10	NW	·52	NW	·52	·19		8·
15	28·942	29·120	9·	49·	67·	70·	57·	34·	69	69	KN	9	KN	10	NW	·26	SW	10·42	·06		10·
16	29·656	29 721	7·5	46·	55·	79·	62·	32·	61	65	K	5	K	7	SW	2·60	W	2·60	·25		8·
17	29·393	29·517	11·5	57·	66	95·	61·	37·	66	70	K	9	KN	9	NW	·52	NW	2·60	·02		4·
18	29·842	29·865	11·5	53·	56·	90·	90·	39·	74	68	KN	7	K	6	NW	2·60	N	·52	·05		6·
19	29·892	29·913	11·5	53·	63·	95·	69·	39·	64	77	K	10	K	4	N	2·60	W	2·60	·04	·30	4·
20	29·920	29·804	13·	55·	64·	85·	70·	40·	82	72	K	5	K	10	NW	·52	S	·26	·01		5·
21	29·722	29·446	16·	61·	58·	101·	65·	42·	59	81	K	6	K	7	N	·26	SE	·26	·03		9·
22	29·937	29·942	11·5	57·	62·	85·	68·	39·	76	67	K	7	K	10	NW	·26	W	·52	·01		3·
23	29·625	29·501	17·5	64·	62·	109·	71·	41·	73	58	K	7	K	8	NW	2·60	W	5·21	·05		8·
24	29·515	29·520	8·0	45·	60·	85·	67·	35·	85	66	KN	5	KN	7	W	·52	S	2·60	·15		7·
25	29·552	29·675	9 0	49·	52·	79·	62·	36·	73	74	K	8	K	7	NW	·52	NW	·52	·09		7·5
26	29·998	30·087	9·5	49·	49·	69·	57·	36·	74	74	KN	10	K	7	SW	·52	SE	2·60	·03		6·
27	30·154	30·075	10·5	51·	59·	86·	65·	37·	55	66	O	0	K	6	NW	·26	S	·52	·01		6·
28	29·848	29·657	9·	48·	60·	85·	62·	35.	86	76	K	10	K	10	N	·52	NW	·26	·01		8·
29	29·542	29·581	16·5	62·	66·	112·	75·	37·	63	73	K	3	K	3	NW	2·60	W	·26	·05		9·
30	29·470	29·314	13·5	57·	67·	109·	79·	34·	81	68	K	10	K	7	NW	·26	NW	·52			5·
31	29·932	30·005	13·	56·	56·	80.	68·	35·	61	70	K	3	K	4	W	2·60	S	·52	·03	1·00	3·
	Mean Press. 29·628		Mean 11·50		M'n. Tem. 56·60	Mean. 90·00		Mean 66·71	Mean 37·23		Mean 70										
	Greatest do. 30·154		Max. 17.50			Max. 112·00		Max. 90·00	Max. 42·00												
	Least do. 28·641		Min. 8·00			Min. 69·00		Min. 57·00	Min. 32·00												

Mean for Month. 7·20	Mean Force 1·51 lb.	Tl. 1·56	Tl. 2·95	Tl. 173·0
Prev. Character, K	Greatest Force 10·42 lb.			Mean 5·00
	Least Force. 0			
	Prevailing Direction NW			

The Meteorological form brought into use at the beginning of 1876 differs in some respects from the former one. It has been adopted with the view of assimilating the Hobart Town records more closely with those of stations in Europe, America, etc., in order to co-operate in a system of International Meteorology. Readings are added from the centigrade thermometer, that being the instrument generally used on the continent of Europe.

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

The direction of the wind is registered from currents at a height of 92 feet above sea level, and its force in lbs. per square foot.

The relative quantity of rain that fell under the different winds is registered each morning at 7·30 a.m.

The 35 years' standard tables are used for obtaining the difference from average.

FRANCIS ABBOTT, F.R.A.S., etc.

Time of leafing, flowering, and fruiting of a few standard plants in the Royal Society's Gardens during the month of October, 1878 :—

8th. *Carpinus betulus* commencing to break.
18th. *Ailanthus glandulosus* commencing to break.
20th. *Tilia Europœa* commencing to break.
23rd. Black Mulberry commencing to break.
25th. Common Elm Seeds commencing to fall.
28th. *Melia azederach* commencing to break.

F. ABBOTT, JUN., Superintendent.

METEOROLOGICAL.

Results of observations taken at New Norfolk for October, 1878, in accordance with new forms, at 7·30 a.m. and 4·30 p.m.:—

Barometer.—Mean of two daily readings, corrected and reduced, 29·742 inches.

Thermometer.—Mean of two ditto, 52·20 deg.

" Mean of max. and min. in shade, 53·93 deg.

Dew Point.—Mean position of two ditto, 42.92 deg.

Elastic Force of Vapour.—Mean of two ditto, ·277.

Humidity of Air.—Mean of two ditto, ·72.

Solar Intensity.—Mean of max. temperature, 120·09 deg.

Terrestrial Radiation.—Mean of min. temperature, 36·29 deg.

Rainfall —2·82 inches. Total since commencement of year, 21·21 inches; to same time in 1877, 18·22 inches; in 1876, 16·97 inches; in 1875, 19·03 inches; and in 1874, 16·29 inches.

Evaporation.—3·44 inches, in excess of rainfall, ·62 inches.

Clouds.—Mean of two daily registers, 5·56.

Ozone.—Mean of two ditto, 7·29 of scale 0—10.

W. E. Shoobridge, Bushy Park.

METEOROLOGY FOR NOVEMBER, 1878.

PRIVATE OBSERVATORY, HOBART TOWN.

Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.

(Registered for the Royal Society of Tasmania.)

Day of Month.	Bar. corrected for temperature instrumental error, and reduced to mean sea level.		Thermometers (Reading.)			Thermometers (Self-Registering.)			Relative Humidity. Per cent		Clouds.				Wind.				Rain in Inches	Spon. Evap.	Ozone. Chrom. Scale.
											7·30 a.m.		4·30 p.m.		7·30 a.m.		4·30 p.m.				
	7·30 a.m.	4·30 p.m.	Centigrade, 7·30 a.m.	Fahrenheit, 7·30 a.m.	Fahrenheit, 4·30 p.m.	Highest in Sun, 4·30 p.m.	Highest in Shade, 4·30 p.m.	Lowest on Grass, 7·30 a.m.	7·30 a.m.	4·30 p.m.	Character.	Amount.	Character.	Amount.	Direction from.	Force in lbs. per square foot.	Direction from.	Force in lbs. per square foot.	7·30 a.m.	7·30 a.m.	7·30 a.m.
1	30·291	30·207	10·5	51·	63·	102·	66·	38·	80	82	K	4	K	5	N	·26	S	·52	·01		7·
2	30·107	29·725	14·	52·	56·	68·	49·	37·	93	87	KN	10	KN	10	S	·26	S	·26	·02		9·
3	29·721	29·441	17·	63·	69·	116·	78·	44·	68	78	K	7	K	10	SE	0	SE	·26	·20		9·
4	29·366	29·376	19·	66·	67·	114·	75·	45·	78	68	K	5	K	6	NW	2·60	S	2·60	·02		9·
5	29·292	29·467	16·	58·	58·	97·	68·	37·	76	76	K	6	K	8	N	·52	W	·52	·01		9·
6	29·928	29·966	13·	56·	60·	75·	65·	36·	93	66	K	5	K	8	W	·52	NW	2·60	·04		7·
7	29·945	29·740	14·	58·	71·	96·	78·	36·	81	68	K	10	KS	7	NW	·52	NW	2·60			3·5
8	29·462	29·460	15·	60·	54·	78·	58·	37·	54	80	K	10	K	10	NW	5·21	NW	5·21			4·
9	29·222	29·205	17·	63·	60·	110·	65·	39·	82	66	K	7	KN	10	NW	2·60	W	5·21	·35		10·
10	29·341	29·540	10·	50·	58·	105·	55·	33·	86	81	KN	10	KN	7	NW	2·60	NW	2·60	·42	·55	7·
11	29·793	29·737	12·5	55·	68·	113·	72·	36·	87	68	K	3	K	4	NW	·52	W	·52	·25		7·
12	29·730	29·435	15·	60·	76·	120·	78·	39·	62	52	K	7	K	7	NW	·52	NW	·0			3·
13	29·652	29·821	18·	65·	70·	120·	78·	41·	52	49	K	5	K	3	N	2·60	NW	2·60			2·
14	29·625	29·400	15·	60·	79·	127·	83·	38·	58	52	K	7	K	3	NW	2·60	NW	5·21			5·
15	30·082	30·052	12·	54·	66·	102·	78·	36·	64	55	K	7	K	5	NW	0	NW	2·60		1·25	5·
16	29·925	29·891	15·	60·	63·	103·	70·	39·	82	52	K	7	K	4	N	2·60	SW	2·60			3·
17	29·462	29·325	19·	62·	57·	75·	67·	42·	52	94	K	9	K	10	W	5·21	W	2.60			6·
18	29·548	29·614	10·	50·	60·	118·	70·	40·	58	61	K	7	K	7	NW	·52	NW	·52	·60		9·
19	29·192	29·522	12·	52·	57·	75·	62·	41·	81	87	KN	8	K	4	SW	10·42	NW	2·60	·20		8·
20	29·738	29·653	11·5	53·	54·	70·	60·	41·	69	75	K	2	K	7	S	·52	S	·52	·02		2·
21	29·628	29·633	11·	52·	54·	65·	58·	40·	74	81	K	10	KN	10	N	0	N	·0			6·
22	29·740	29·654	10·	50·	62.	121·	70·	39·	80	56	K	2	K	6	N	0	SE	·52	·18		7·
23	29·561	29·567	13·	56·	61·	90·	64·	41·	87	75	K	4	KS	4	NW	2·60	NW	5·21	·06		8·
24	29·693	29·659	14·	57·	61·	84·	66·	41·	81	62	K	9	K	8	W	5·21	NW	·52	·01		3·5
25	29·188	29·118	10·5	51·	47·	68·	62·	39·	89	80	KN	10	N	10	NW	·52	NW	5.21	·01		3·
26	29·343	29·422	12·	54·	55·	70·	61·	40·	70	93	K	6	K	8	W	5.21	SW	2·60	·30		7·
27	29·593	29·822	11·	51·	60·	79·	63·	38·	80	58	K	7	K	5	SW	·52	SW	2·60	·15		6·
28	30·136	30·073	14·5	57·	65·	95·	63·	40·	73	66	K	4	K	3	NE	0	S	·52	·01		5·
29	29·974	29·844	16·	61·	69·	95·	74·	41·	82	68	K	7	K	7	N	·52	SW	·52			3·
30	30·129	30·060	12·	56·	65·	115·	70·	37·	75	68	K	10	K	2	SE	0	S	·26		1·50	8·
	Mean Press. 29·664		Mean 13·55	M'n. Tem. 59·38		Mean. 95·53		Mean 67·70	Mean 32·00		Mean ·72										
	Greatest do. 30·291		Max. 19·00			Max. 127·00		Max. 83·00	Max. 45·00												
	Least do. 29·118		Min. 10·00			Min. 65·00		Min. 49·00	Min. 33·00												

Mean for Month. 6·72	Mean Force 1·92 lb.	Tl. 2·86	Tl. 3·30	Tl. 181·0
Prev. Character, K	Greatest Force 10·42 lb.			Mean 6·00
	Least Force. 0			
	Prevailing Direction NW			

The Meteorological form brought into use at the beginning of 1876 differs in some respects from the former one. It has been adopted with the view of assimilating the Hobart Town records more closely with those of stations in Europe, America, etc., in order to co-operate in a system of International Meteorology. Readings are added from the centigrade thermometer, that being the instrument generally used on the continent of Europe.

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

The direction of the wind is registered from currents at a height of 92 feet above sea level, and its force in lbs. per square foot.

The relative quantity of rain that fell under the different winds is registered each morning at 7·30 a.m.

The 35 years' standard tables are used for obtaining the difference from average.

FRANCIS ABBOTT, F.R.A.S., etc.

Time of leafing, flowering, and fruiting of a few standard plants in the Royal Society's Gardens during the month of November, 1878:—

18th. First Strawberry gathered.
20th. First May Duke Cherry gathered.
25th. Black Mulberry in blossom.
28th. First Red Antwerp Raspberry gathered.
31st. *Bougainvillœa spectabilis* commencing flower.

F. ABBOTT, JUN., Superintendent.

Results of observations taken at New Norfolk November, 1878, in accordance with new forms, at 7·30 a.m. and 4·30 p.m.:—

Barometer.—Mean of two daily readings, corrected and reduced, 29·824 inches.

Thermometer.—Mean of two ditto, 55·61 deg.

" Mean of max. and min. in shade, 56·05 deg.

Dew Point.—Mean position of two ditto, 44·80 deg.

Humidity of Air.—Mean of two ditto, ·68.

Elastic Force of Vapour.—Mean of two ditto, ·298.

Solar Intensity.—Mean of max. temperature, 118·46 deg.

" for 1877, 130·58 deg.

Terrestrial Radiation.—Mean of min. temperature, 40·26 deg.

" for 1877, 35·83 deg.

Rainfall.—3·66 inches. From beginning of year, 24·87 inches; to same time last year, 21·14 inches; in 1876, 21·49 inches; in 1875, 22·64 inches; and in 1874, 21·64 inches.

Evaporation.—4·23 inches, in excess of rainfall, ·57 inches.

Clouds.—Mean of two daily registers, 5·88. Scale 0—10.

Ozone.—Mean of two ditto, 7·01. Scale 0—10.

E. W. SHOOBRIDGE, Bushy Park.

METEOROLOGY FOR DECEMBER, 1878.

PRIVATE OBSERVATORY, HOBART TOWN.

Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.

(Registered for the Royal Society of Tasmania.)

Day of Month.	Bar. corrected for temperature instrumental error, and reduced to mean sea level. 7·30 a.m.	Bar. corrected for temperature instrumental error, and reduced to mean sea level. 4·30 p.m.	Thermometers (Reading.) Centigrade, 7·30 a.m.	Thermometers (Reading.) Fahrenheit, 7·30 a.m.	Thermometers (Reading.) Fahrenheit, 4·30 p.m.	Thermometers (Self-Registering.) Highest in Sun, 4·30 p.m.	Thermometers (Self-Registering.) Highest in Shade, 4·30 p.m.	Thermometers (Self-Registering.) Lowest on Grass, 7·30 a.m.	Relative Humidity. Per cent 7·30 a.m.	Relative Humidity. Per cent 4·30 p.m.	Clouds. 7·30 a.m. Character.	Clouds. 7·30 a.m. Amount.	Clouds. 4·30 p.m. Character.	Clouds. 4·30 p.m. Amount.	Wind. 7·30 a.m. Direction from.	Wind. 7·30 a.m. Force in lbs. per square foot.	Wind. 4·30 p.m. Direction from.	Wind. 4·30 p.m. Force in lbs. per square foot.	Rain in Inches 7·30 a.m.	Spon. Evap. 7·30 a.m.	Ozone. Chrom. Scale. 7·30 a.m.
1	30·076	30·060	13°	56°	65°	115°	70°	40°	70	67	K	10	K	1	SE	0	SE	·52				2·5
2	29·837	29·728	12°	54°	71°	110°	73°	40°	70	82	K	7	K	6	NE	0	SE	·52				6·
3	29·522	29·452	16°	61°	60°	112°	70°	41°	63	62	K	10	K	7	NW	·26	NW	2·60				7·
4	29·403	29·618	9°	49°	60°	110°	65°	37°	86	58	KN	10	K	7	W	·52	SW	2·60	·29			8·
5	29·772	29·802	13°	56°	65°	105°	67°	39°	65	51	K	8	K	4	SW	2·60	SW	2·60	·02			3·
6	29·988	29·965	11°	52°	54°	79°	65°	38°	69	61	K	9	KN	10	SE	2·60	SE	2·60				2·5
7	29·882	29·809	12°	54°	65°	115°	68°	40°	81	63	K	10	KS	6	N	0	SE	2·60				3·
8	29·668	29·680	18°	65°	70°	120°	75°	42°	73	73	K	8	K	7	SE	0	SE	·26	·05	1·0		7·
9	29·552	29·616	20°	68°	70°	110°	75°	43°	69	78	K	7	K	7	NW	5·21	NW	2·60				5·
10	29·815	29·891	16·5	62°	70°	109°	74°	40°	51	73	K	5	K	6	NW	2·60	NW	·0				3·
11	29·861	29·905	15°	59.	63°	94°	72°	37°	62	67	K	10	KN	10	W	2·60	S	·52				3·
12	30·015	30·032	15°	60°	62.	90°	65°	37°	76	76	K	8	K	6	E	0	SW	·52	·02			2·
13	30·013	29·894	16·5	62°	71°	120°	80°	38°	68	69	K	7	K	3	NW	0	SE	·26				6·5
14	29·912	29·617	20°	68°	91°	120°	93°	40°	73	35	K	9	K	7	NW	·26	NE	2·60				5·
15	29·648	29·594	20°	68°	72°	110°	90°	45°	68	61	KN	10	K	2	SE	·52	SE	·26		1·5		2·
16	29·259	30·254	20·5	67°	60°		78°	36°	83	88	K	5	KN	10	NW	2·60	NW	2·60				10·
17	29·181	29·317	13°	55°	62°	119°	74°	34°	66	67	K	6	K	6	W	·52	NW	2·60	·76			10·
18	29·583	29·714	12°	54°	61°	95°	67°	34°	74	62	K	10	K	7	NW	2·60	SE	2·60	·04			4·
19	30·082	30·046	12°	54°	65°	95°	63°	34°	70	63	K	10	K	7	NW	·26	NW	·52	·02			4·
20	29·929	29·559	14°	58°	63°	79°	67°	36°	87	72	K	10	K	10	NW	·26	NW	·0				3·5
21	29·630	29·654	14°	58°	68°	95°	71°	36°	71	56	K	8	K	10	N	2·60	W	·26	·06			7·
22	29·522	29·854	15°	60°	66°	96°	72°	39°	58	69	K	10	K	9	W	2·60	W	2·60	·01			3·
23	29·339	29·330	12°	56°	58°	98°	68°	36°	65	66	K	9	K	6	NW	2·60	W	2·60	·01			3·
24	29·505	29·406	10·5	55°	65°	105°	67°	34°	65	51	K	7	K	10	NW	·26	NW	·52	·07	·73		5·
25	29·222	29·171	14°	58°	59°	80°	64°	38°	58	61	K	6	K	10	W	2·60	NW	2·60	·05			5·
26	29·553	29·517	12°	54°	61°	89°	64°	36°	70	63	K	10	K	7	N	2·60	W	·26	·45			8·
27	29·486	29·218	12·5	55°	58°	98°	68°	36°	70	70	K	6	K	5	NW	·52	W	2·60				3·
28	29·541	29·526	10·5	51°	59	72°	62°	35°	74	61	K	7	K	6	W	·52	SW	·52	·06			4·
29	29·578	29·675	10·5	51°	55°	82°	60°	32°	80	70	K	7	K	7	W	0	NW	·52	·01			2·
30	29·776	30·757	11·5	53°	66°	106°	69°	34°	74	59	K	7	K	4	W	·52	S	2·60	·08			4·
31	29·875	29·894	16°	61°	71°	115°	76°	36°	67	60	K	7	KS	7	NW	·52	S	·52		·18		3·
	Mean Press. 29·673		Mean 14·10	M'n. Tem. 61·37		Mean. 101·17	Mean 70·90	Mean 37·32	Mean ·67													
	Greatest do. 30·082		Max. 20·50			Max. 120·00	Max. 93·00	Max. 43·00														
	Least do. 29·171		Min. 9·00			Min. 72·00	Min. 60·00	Min. 32·00														

Mean for Month. 7·35	Mean Force 1·34 lb.			Tl. 2·00	Tl. 3·46	Tl. 141·0
Prev. Character, K	Greatest Force 5·21 lb.					Mean 4.67
	Least Force. 0	Prevailing Direction NW, W, and SE				

The Meteorological form brought into use at the beginning of 1876 differs in some respects from the former one. It has been adopted with the view of assimilating the Hobart Town records more closely with those of stations in Europe, America, etc., in order to co-operate in a system of International Meteorology. Readings are added from the centigrade thermometer, that being the instrument generally used on the continent of Europe.

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

The direction of the wind is registered from currents at a height of 92 feet above sea level, and its force in lbs. per square foot.

The relative quantity of rain that fell under the different winds is registered each morning at 7·30 a.m.

The 35 years' standard tables are used for obtaining the difference from average.

FRANCIS ABBOTT, F.R.A.S., etc.

Time of leafing, flowering, and fruiting of a few standard plants in the Botanic Gardens during the month of December, 1878:—

15th. First bunch Red Currants ripe.
18th. Common Privet commencing to flower.
21st. First bunch Black Cnrrants ripe.
24th. *Melia Azederach* commencing to flower.
27th. Doyenne d'Eté Pear commencing to ripen.
30th. Juneating Apple commencing to ripen.

F. ABBOTT, JUN., Superintendent.

Results of observations taken at New Norfolk December, 1878, in accordance with new forms, at 7·30 a.m. and 4·30 p.m.:—

Barometer.—Mean of two daily readings, corrected and reduced, 29·780 inches.

Thermometer.—Mean of two ditto, 58·40 deg.

" Mean of max. and min. in shade, 57·83 deg.

Dew Point.—Mean position of two ditto, 47·88 deg.

Elastic Force of Vapour.—Mean of two ditto, ·333.

Humidity of Air.—Mean of two ditto, ·68.

Solar Intensity.—Mean of max. temperature, 126·16 deg.

Terrestrial Radiation.—Mean of min. temperature, 41·00 deg.

Rainfall.—2·96 inches. Total for the year, 27·83 inches; total for 1877, 22·63 inches; ditto for 1876, 23·54 inches; ditto for 1875, 28·17 inches; ditto for 1876, 23·04 inches.

Evaporation.—5·45 inches, in excess of rainfall, 2·49 inches.

Clouds.—Mean of two daily registers, 5·32.

Ozone.—Mean of two ditto, 6·99.

E. W. SHOOBRIDGE, Bushy Park.

RESULTS of METEOROLOGICAL OBSERVATIONS taken at HOBART TOWN during the Year 1878.

PRIVATE OBSERVATORY.

Latitude, 42° 52′ 13″ S. Height above sea level, 67 feet. Longitude 9h. 49m. 29·2s. E.

Months.	Barometer.	Thermometers (Reading.)		Thermometers (Self-registering.)			Relative humidity per cent.	Clouds (Scale, 0·10).		Wind (lbs. per square foot.)			Rain in Inches.	Spontaneous evaporation.	Ozone.
	Mean of two daily readings.	Centigrade Mean of two daily readings.	Fahrenheit Mean of two daily readings.	Mean of highest in Sun.	Mean of highest in Shade.	Mean of lowest on Grass.	Mean of two daily observations.	Mean amount for month.	Prevailing Character.	Prevailing Direction.	Mean force for Month.	Maximum force.	Total Amount.	Total amount.	Chromatic Scale, Mean.
January	29·997	13·84	63·07	105·50	75·58	38·60	·69	5·10	K	S.E., S., N.W.	1·12	10·42	·25	5·49	3·80
February	30·036	13·71	62·64	101·14	77 00	38·45	·75	6·73	K	N.W., N., S.	·67	5·21	4·51	3·20	4·30
March	29·752	12·71	60 83	104·41	74·10	42·37	·72	6·50	K	N.W.	·75	5·21	·51	3·49	3·80
April	29·857	10·40	55·90	85·53	67·63	36·00	·80	6 47	K	N.W.	·38	2·60	1·07	95	5·10
May	29·938	7·35	48·83	80·10	58·78	35·00	·78	6·80	K & KN	N.W.	1·52	20·83	1·72	2·20	5·42
June	29·854	4·03	43·85	73·60	53·33	33·10	·85	5·70	K	N.W.	·30	2·60	3·96	1·45	6·35
July	29·785	7·20	43·86	71·50	56·64	36·20	·82	7 00	K	N.W.	·62	5·21	4·96	·80	5·00
August	29·660	8·84	51·00	81·00	58·40	36 65	·76	7·30	K	N.W., N.W.,	1·62	10·12	3·47	0·	6·53
September	29·810	10·22	54·82	82·33	63·00	37·00	·74	6·78	K	N.W.	·81	5·21	2·89	1·97	6·22
October	29·628	11·50	54·69	90·00	66·71	37·23	·70	7·20	K	N.W.	1·51	10·42	1·56	2·95	5·60
November	29·664	13·55	59·53	95·53	67·70	39·00	·72	6·72	K	N.W.	1 92	10·42	2·86	3·30	6·00
December	29·673	14·10	61·37	101·17	70·90	37·39	·67	7·35	K	N.W., W.	1·34	5·21	2·00	2·46	4·67
Sum	357·654	127·45	660·30	1076·81	789·77	446·99	900	79·65			12·56	93·46	29·96	28·26	62·79
Mean for Year	29·804	10·62	55·02	89·73	65·81	37·25	·75	6·64	K	N.W.	1·50	7·79	2·50	2·35	5·23

At Hobart Town the Observations are taken twice daily, viz., at 7·30 a.m., and 4·30 p.m.

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

The direction of the wind is registered from currents at a height of 92 feet above sea level, and its force in lbs. per square foot.

The relative quantity of rain that fell under the different winds is registered each morning at 7·30 a.m.

FRANCIS ABBOTT, Observer.

MONTHLY MEANS OF OBSERVATIONS TAKEN AT NEW NORFOLK, 1878.

Latitude 42° 46′ 48″ South. Longitude 147° 5″ East.

Months.	Barometer.	Thermometer.					Humidity of Air.			Condensation.		Evaporation.	Ozone	Clouds.	Winds.	
	At sea level Temperature 32°.	Mean Temperature of two Daily Registers	Mean Temperature of max. & min. in shade	Mean Diurnal Range	Mean Solar Intensity.	Mean Terrestrial Radiation.	Dew Point, Mean position.	Humidity of Air per 100.	Elastic Force of Vapor per 1000.	Rain in Inches.	No. of Days on which Rain fell.	Spontaneous Evaporation in Inches.	Mean Daily Amount.	Mean Daily Amount.	Prevailing Direction.	Force in lbs. per sq. foot.
		°	°	°	°	°	°					Scale	Scale 0—10			
January.....	30·102	64·72	63·96	30·32	137·67	41·35	50·20	·60	·364	·21	3	9·49	7·21	5·01	SE.NW	
February	30·064	63·78	64·35	25·67	130·50	45 46	53·78	·71	·413	8·70	10	5·59	7·11	5·55	SE.W	
March	30·024	59·08	60·05	25·73	131·00	40·19	49·50	·71	·354	·77	5	4·85	7·44	6·00	NW	
April	30·034	54·86	56·22	21·55	118·82	38·01	49·00	·80	·346	1·15	10	5·34	7·35	6·08	W	
May	30·062	46·66	47·66	16·48	100·67	32·45	40·33	·77	·250	1·87	12	2·24	7·50	6·19	W	
June	29·951	40·87	41·62	14·34	94·24	28·07	37·36	·89	·222	1·70	12	·91	7·44	6·88	NW·SW	
July	29·913	43·84	44·95	15·38	98·03	30·32	39·48	·84	·243	1·94	16	1·40	7·72	6·69	NW	
August	29·832	44·89	46·45	18·32	106·48	31·06	38·48	·80	·241	3·89	14	2·06	7·25	6·06	W.NW	
September....	29·796	49.61	50·62	21·79	119·44	33·33	40·56	·73	·253	3·16	17	3·21	6·93	5·65	NW	
October	29·742	52·20	53·93	20·64	120·09	36·29	42·92	·72	·277	2·82	17	3·44	7·29	5·56	NW	
November....	29·824	55·61	56·05	19·56	118·46	40·2	44·80	·68	·298	3·66	16	4·23	7·01	5·88	W	
December....	29·780	58·40	57·83	21·58	126·16	41·00	47·88	·68	·333	2·96	16	5·45	6 90	5·32	NW.SE	
Sums	359·124	634·52	643·69	251·26	1402·46	437·79	534·29	8·03	3·594	*27·83	150	48·21	87·15	70·87		
Mean for 1878.	29·927	52·87	53·64	20·93	116 88	36·48	44·52	·74	·282	2·32	12·50	4·01	7·26	5·90	NW	
Mean for 1877.	30·005	52·71	52·98	22.03	118·35	36·02	44·37	·75	·297	1·88	11·66	4·28	7·91	5·71	W.SE	60·64
Mean for 1876.	29·887	52·92	54·18	21·61	116·37	37·12	45·22	·76	·308	1·96	11.41	4·10	6·81	5·49	W	67·15
Mean for 1875.	29·863	54·62	53·65	21·33	116·84	37·69	45·99	·75	·320	2·34	14·41	4·03	7·31	5·56	W.SE	73·56
Mean for 1874.	29·912	54·90	54·33	18·47	115·50	40·67	49·31	·83	362	1·92	11·30	3·55	7·77	5 95	W.SE	83·80

Total Rainfall for 1877, 22·63in.; for 1876, 23·54in. ; for 1875, 28·17in. ; for 1874, 23·04in.

W. E. SHOOBRIDGE.

METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH JAN., 1878, INCLUSIVE.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers*		*Relative Humidity.*	*Wind.*		*Cloud.*		*Rain in 24 hours.*	*Weather.*
		Fahrenheit.	*Centigrade.*		*Direction from*	*Force in lbs. per square foot.*	*Amount.*	*Character.*		
				%					*In.*	
1	30·000	60·0	15·5	88	S	·26	10·0	N	·17	Cloudy, sky covered
2	30·260	53·0	14·5	82	SE	·26	·0	·0		Starlight
3	30·365	61·5	16·5	88	S	·52	10·0	N		Cloud, sky covered
4	30·270	53·5	12·0	71	SE	·52	·0	·0		Starlight
5	30·115	60·0	15·5	71	SW	·25	10·0	N		Cloud, sky covered
6	30·240	60·0	15·5	82	SE	·52	·0	·0		Starlight
7	30·085	61·0	16·0	77	SE	·52	5·5	K	.0	Stars faint
8	30·000	63·0	17·5	88	SE	·26	4·0	K		Stars and cloud
9	29·660	72·5	22·5	73	SE	·26	2·5	K		Sky cloudy
10	29·920	64·0	18·0	88	SE	·26	10.0	K		Cloud, sky covered
11	30·100	60·0	15·5	77	SE	·52	·0	.0	·05	Moon and starlight
12	30·025	61·5	16·5	88	S	·25	5.5	K		Cloud and stars
13	29·920	66·0	18·5	78	SE	·52	4·5	K		Moon, star, and cloud
14	29·645	69·0	20·5	69	NW	5·21	5·5	K		Wind strong
15	29·765	63·0	12·0	60	W	2·60	7·0	K		Wind and squal

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

FROM THE 16TH TO THE 31ST JAN., 1878, INCLUSIVE.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers*		*Relative Humidity.*	*Wind.*		*Cloud.*		*Rain in 24 hours.*	*Weather.*
		Fahrenheit.	*Centigrade.*		*Direction from*	*Force in lbs. per square foot.*	*Amount.*	*Character.*		
				%					*In.*	
16	29·955	53·0	11·5	63	SW	2·60	7·0	K	·01	Moon, star, and cloud
17	29·745	62·5	17·0	82	·0	·0	10·0	KN		Cloudy, sky covered
18	29·645	64·0	18·0	72	SW	2·60	5.0	K		Moon and cloud
19	29·655	59·0	15·0	77	W	52·0	10·0	K		Large massive clouds
20	30·220	53·5	12·0	81	SE	·52	10·0	KN		Cloud, sky covered
21	30·269	59·0	15·0	82	SE	·52	10.0	K	·02	Cloud, sky covered
22	30·045	61·0	16·0	88	SW	·52	9·0	K		Sky cloudy
23	30·240	58·0	14·5	82	SE	·52	4·0	K		Star and cloud sky
24	30·350	59·5	15·5	82	S	·52	10·0	KN		Cloud, sky covered
25	30·160	61·5	16·5	82	S	·52	5·0	K		Cloud and stars
26	29·960	65·0	18·5	83	SE	·26	10·0	KN		Very dark
27	30·020	62·0	17·0	71	S	·52	10·0	KN		Very dark
28	30·265	58·5	14·5	71	S	·52	4·5	K		Stars faint
29	30·120	61·5	16·5	82	SW	·26	4·0	K		Faint starlight
30	29·920	72·0	22·0	88	NW	·52	5·0	K		Star and cloud
31	29·860	72·5	22·5	83	SE	·0	7·0	K		Stars in the zenith

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH FEB., 1878, INCLUSIVE.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers*		*Relative Humidity.*	*Wind.*		*Cloud.*		*Rain in 24 hours.*	*Weather.*
		Fahrenheit.	*Centigrade.*		*Direction from*	*Force in lbs. per square foot.*	*Amount.*	*Character.*		
				%					*In.*	
1	29·895	70·5	21·5	88	SE	·0	10·0	N		Very cloudy
2	30·164	62·5	17·5	72	S	·26	10·0	N	·36	Cloud, sky covered
3	30·040	65·0	18·5	88	N	·0	10·0	N	·03	Light rain
4	30·265	53·5	12·0	92	SE	·52	10.0	N	·63	Dark and cloudy
5	30·412	60·0	15·5	88	SE	·26	10·0	N	·22	Do. do.
6	30·285	59·5	15·5	61	S	·52	3·5	K		Starlight
7	30·249	60·5	16·0	72	SE	·52	10·0	KN		Cloud, sky covered
8	30·230	59·0	15·0	88	S	·52	5·0	K		Stars in the zenith
9	30·220	63·0	17·5	88	SE	·26	10·0	KN		Cloud, sky covered
10	29·825	72·5	22·5	94	·0	·0	10·0	N		Very dark
11	29·340	58·0	14·5	88	S	·52	9·5	K	1·0	Sky cloudy
12	30·025	62·5	17·0	94	S	·26	10·0	KN	37	Do. do.
13	29·920	62·5	17·0	88	S	·26	10·0	KN	01	Cloud and thunder rain
14	30·160	52·0	11·0	75	SW	2·60	3.5	K	·54	Moon, stars, and cloud
15	30·256	53·0	11·5	81	S	·52	·0	·0		Moon and Starlight

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

FROM THE 16TH TO THE 28TH FEB., 1878, INCLUSIVE.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers*		*Relative Humidity.*	*Wind.*		*Cloud.*		*Rain in 24 hours.*	*Weather.*
		Fahrenheit.	*Centigrade.*		*Direction from*	*Force in lbs. per square foot.*	*Amount.*	*Character.*		
				%					*In.*	
16	30·340	57·0	14·0	82	SE	·52	·0	·0	·0	Moonlight
17	30·125	64·0	18·0	94	E	·26	7·0	K	·0	Moon and cloud
18	29·730	77·0	24·5	89	NE	·26	10·0	K	·0	Sultry
19	29·745	62·5	16·5	94	NW	·52	7·5	K	·85	Cloudy
20	29·915	64·0	18·0	96	NW	·52	10.0	K	·04	Cloudy
21	29·820	61·0	16·5	83	NW	·26	5·0	KS	·0	Moon and stars
22	29·480	76·0	29·0	79	NW	·26	10·0	N	·0	Cloud, sky covered
23	29·510	58·0	14·5	73	NW	2·60	4·0	K	·45	Windy
24	29·980	59·0	15·0	83	NW	·52	5·0	K	·0	Sky hazy
25	30·210	60·0	15·0	78	NW	·0	6·0	K	0	Cloud and stars
26	30·225	65·0	18·5	83	·0	·0	10·0	N	·0	Cloud, sky covered
27	30·123	65·5	18·5	83	S	·26	3.0	K	0	Starlight
28	30·128	70·0	21·0	58	S	·25	10·0	KN	·0	First clouds, then stars

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH MARCH, 1878, INCLUSIVE.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers*		*Relative Humidity.*	*Wind.*		*Cloud.*		*Rain in 24 hours.*	*Weather.*
		Fahrenheit.	*Centigrade.*		*Direction from*	*Force in lbs. per square foot.*	*Amount.*	*Character.*		
									In.	
1	30·020	74·0	23·0	78	SE	·26	4·0	K	·0	Stars in the zenith
2	29·725	79·0	26·0	66	NW	·26	10·0	K	·0	Cloud, sky covered
3	30·125	72·0	22·0	78	SE	·52	10·0	KN	·0	Cloud and rain
4	29·940	74·5	23·5	84	SE	·26	10·0	K	·6	Ditto sky covered
5	30·120	64·0	17·5	71	W	·52	·0	·0	·0	Starlight
6	30·140	63·0	19·5	82	SE	·26	5·0	K	·0	Stars faint
7	29·920	69·5	20·5	94	NW	·52	7·0	KN	·0	Few stars only
8	29·620	70·0	21·0	73	W	2·60	10·0	N	·0	Cloud, sky covered
9	29·920	67·0	19·5	82	NW	2·60	7·5	K	·0	Stars few and faint
10	29·940	70·0	21·0	73	NW	·52	4·5	K	·0	Stars and cloudy
11	29·720	71·5	21·5	83	E	·0	10.0	K	·0	Calm and cloudy
12	29·920	72·5	22·5	69	NW	·52	4·0	K	·0	Few stars only
13	29·720	74·0	23·0	78	NW	·52	7·5	K	·0	Cloudy, few stars
14	29·820	71·0	21·5	73	S	·52	9·0	K	·0	Cloudy
15	29·950	67·0	19·0	77	SE	·52	10·0	K	·0	Cloudy, sky covered

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

FROM THE 16TH TO THE 31ST MARCH, 1878, INCLUSIVE.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers*		*Relative Humidity.*	*Wind.*		*Cloud.*		*Rain in 24 hours.*	*Weather.*
		Fahrenheit.	*Centigrade.*		*Direction from*	*Force in lbs. per square foot.*	*Amount.*	*Character.*		
				p.c.					In.	
16	29·920	63·0	19·0	72	NW	2·60	3·0	K	0	Squally, rain
17	30·222	64·0	18·0	76	S	·52	·0	0	·02	Moon and starlight
18	30·040	65·0	18·5	77	NW	·52	5·0	K	·0	Moonlight
19	30·020	67·0	19·5	77	W	·26	7·0	K	·0	Moonlight
20	29·920	63·0	20·0	88	NW	2·60	10·0	K	·0	Wind and cloud
21	30·220	67·5	19·5	82	S	·52	7·5	K	0	Moonlight
22	30·220	66·0	19·0	82	S	·52	3·0	K	0	Moon and haze
23	29·945	72·0	22·0	88	NW	·26	5·0	K	0	Few faint stars
24	29·945	71·0	21·5	68	N	·52	6·0	K	0	Few stars, sky hazy
25	29·945	70·0	21·0	78	NW	·26	4·5	K	0	Stars round the zenith
26	29·320	74·0	23·5	83	N	·26	10·0	N	·0	Cloud, sky covered
27	29·440	69·0	20·5	78	NW	·26	.0	·0	·08	Starlight
28	29·970	70·5	21·5	78	SW	·26	·0	·0	·0	Starlight
29	29·740	72·0	22·0	78	S	·26	·5	K	·0	Stars in the zenith
30	29·720	68·0	20·0	88	S	·26	10·0	KN	·30	Cloud, sky covered
31	29·820	67·0	19 5	88	SW	·26	10·0	N	·0	Rain, calm, cloud

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH APRIL, 1878, INCLUSIVE.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers*		*Relative Humidity.*	*Wind.*		*Cloud.*		*Rain in 24 hours.*	*Weather.*
		Fahrenheit.	*Centigrade.*		*Direction from*	*Force in lbs. per square foot.*	*Amount.*	*Character.*		
				p.c					In.	
1	29·820	66·0	19·5	81	NW	2.60	7·0	KN	·60	Fine after rain
2	30·140	64·0	18·0	82	NW	·0	7·0	K	·01	Fine
3	29·625	65·0	18·5	86	NW	·52	3·5	K		Squally
4	29·490	63·5	17·0	93	NW	·26	7·0	K		Cloudy
5	29·900	61·0	16·0	93	NW	·26	.0	0		Clear & calm
6	30·210	62·0	16·5	87	S	·0	9·0	K		Sultry
7	29·870	62·0	16·5	82	SE	·26	10·0	K		Calm and cloudy
8	29·990	64·5	18·0	82	S	·26	·0	0	·08	Fine
9	29·870	66·0	19·5	82	SE	·52	5·5	K		Sultry
10	29·940	63·0	16·5	81	S	·0	5·0	K		Ditto
11	29·730	64·0	18·0	86	SE	·26	10·0	KN	.04	Light rain
12	29·980	69·0	20·5	80	W	·26	·0	0	·05	Fine & clear
13	30·000	67·0	19·0	83	NW	·0	3·5	K		Ditto
14	30·120	69·0	20·5	79	NW	·26	·0	0		Ditto
15	30·410	68·0	19·5	87	W	·52	2·0	K		Ditto

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

From the 16th to the 30th April, 1878, inclusive.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers* Fahrenheit.	Centigrade.	*Relative Humidity.*	*Wind.* Direction from	Force in lbs. per square foot.	*Cloud.* Amount.	Character.	*Rain in 24 hours.*	*Weather.*
				p.c					In.	
16	30·040	68·0	20·0	83	NW	·52	·0	·0	·0	Moonlight
17	30·020	70·0	21·0	78	SE	·26	6·0	K	·0	Do. do.
18	30·020	68·0	20·0	94	S	·0	10·0	K	·0	Calm and cloudy
19	29·940	69·5	20·5	89	SE	·26	10·0	KN	11	Sky hazy
20	29·920	68·0	20·0	88	SE	·26	10·0	N	·0	Sky hazy
21	29·620	68·5	20·0	88	NE	·52	10·0	KN	·01	Cloud, sky covered
22	29·420	66·0	19·0	93	NW	2·60	5·0	K	·0	Star and cloud
23	29·720	64·0	18·0	88	NW	2·60	4·0	K	·0	Do. do.
24	29·440	66·0	19·0	83	NE	·0	3·5	K	·01	Stars and haze
25	29·500	68·0	20·0	83	NW	·26	4·0	K	·01	Do. and cloud
26	29·445	68·0	20·0	83	N	·26	8·0	KN	·01	Cloudy
27	29·503	55·0	12·5	94	S	·26	7·5	K	·0	Sky hazy
28	29·380	62·0	17·0	83	NW	·26	10·0	N	·06	Light rain
29	29·320	60·0	12·0	88	SE	·52	5·0	K	·30	Showery
30	29·920	60·0	11·5	94	NW	·52	10·0	KN	·0	Cloud, sky covered

Francis Abbott, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH MAY, 1878.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers*		*Relative Humidity.*	*Wind.*		*Cloud.*		*Rain in 24 hours.*	*Weather.*
		Fahrenheit.	*Centigrade.*		*Direction from*	*Force in lbs. per square foot.*	*Amount.*	*Character.*		
				p.c					*In.*	
1	29·704	63·0	14·0	77	NW	2·60	4·0	K	·01	Stars in the zenith
2	29·500	65·0	14·5	82	NW	5·21	4·0	K	·01	Do. do.
3	29·820	63 0	13·5	88	W	·52	17·0	KN	·0	Do. do.
4	29·920	62·0	13·0	82	NW	2·60	6·0	N	·0	Wind, star, and cloud
5	30·280	62·5	13·5	83	NW	·25	5·5	K	·01	Stars in the zenith
6	30·135	63·0	14·0	88	NW	·52	7·0	K	·0	Do. and wind
7	29 840	66·0	15·0	94	NW	·52	10·0	N	·0	Sky cloud covered
8	29·895	65·0	15·0	94	NW	2·60	10·0	N	·0	Dark cloud
9	29·460	62·0	13·0	94	NW	20.83	hazy sq'ly		·03	Great storm
10	29·620	58·5	11·5	62	NW	·52	4·0	K	·01	Strong wind
11	29·675	52·5	11·5	81	W	2·60	10·0	K	.02	Squally
12	29·488	53·0	11·5	76	SE	·0	10·0	K	·03	Storm in night
13	29·528	50·0	10·0	60	NW	5·21	10·0	N	·17	Stormy
14	29·525	50 0	10·5	98	W	·52	10·0	KN	02	Steady rain
15	30·190	50·0	10·5	86	NW	·52	7·0	K	·98	Snow and rain

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

From the 16th to the 31st May, 1878.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp., Index Error and to Mean Sea Level.*	*Thermometers*		*Relative Humidity.*	*Wind.*		*Cloud.*		*Rain in 24 hours.*	*Weather.*
		Fahrenheit.	*Centigrade.*		*Direction from*	*Force in lbs. per square foot.*	*Amount.*	*Character.*		
				p c					In.	
16	30·060	52·0	11·0	80	NW	·25	·0	·0	·03	Moon and starlight
17	30·195	60·0	12·0	94	S	·26	·10	K	·03	Steady rain
18	30·220	58·0	11·5	71	NW	·52	·3	K	·03	Moon and starlight
19	30·226	57·5	11·0	81	SE	·0	.0	·0	·0	Clear moon and star
20	30·140	57·0	11·0	93	N	·0	·0	·0	·0	Do. do.
21	30·075	57·0	11·0	88	NW	·52	1·0	K	·0	Sky cloudy
22	30·345	57·0	11·0	93	NW	·0	·10	N	·14	Light rain
23	30·020	58·0	11·5	93	S	·0	·10	N	·5	Calm and cloudy
24	29·920	57·0	11·0	94	SE	·26	·6	K	·02	Stars in the zenith
25	29·985	55·0	10·0	87	S	·52	·5	K	·0	Stars round the zenith
26	30·125	55·0	10·0	86	NE	·25	·4	K	·0	White frost
27	30·120	56·0	11·0	87	NE	·52	·6	K	·0	Frosty and hazy
28	29·920	55·0	10·0	86	NW	·26	·7	K	·0	Do. do.
29	29·720	55 0	10·0	86	S	·52	·6	K	·0	Dark clouds
30	29·660	50·0	12·0	87	N	·52	·10	K	0	Sky cloudy
31	29·740	58·0	11·5	87	S	·0	·10	KN	·0	Cloud sky covered

Francis Abbott, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

From the 1st to the 15th June, 1878, Inclusive.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	Barometer corrected for Temp. Index Error and to Mean Sea Level.	Thermometers		Relative Humidity.	Wind.		Cloud.		Rain in 24 hours.	Weather.
		Fahrenheit.	Centigrade.		Direction from	Force in lbs. per square foot.	Amount.	Character.		
				p c					In.	
1	30·120	55·0	10·0	93	S	2.60	·10	KN	·10	Sky cloud covered
2	30·180	56·0	10·5	86	W	·0	.0	K	·0	Starlight
3	30·125	51·0	11·0	93	S	·26	·10	N	·0	Cloud sky covered
4	30·185	54·0	9·5	74	N	·26	·6	K	·0	Stars in the zenith
5	29·725	52·0	8·5	86	NW	·26	·7	K	·0	Sky hazy
6	29·630	53·0	9·0	86	NW	·52	·4	K	·0	Moon & starlight
7	29·620	52·0	8·5	93	NW	·52	·10	K	·0	Cloud sky covered
8	29·585	42·0	5·0	84	NW	·26	·7	K	·0	Moon star and cloud
9	29·640	52·0	9·5	86	NW	·0	·10	K	·0	Cloud sky covered
10	29·620	52·0	8·5	74	N	·25	·0	0	·0	Moon and starlight
11	29·210	53·0	10·0	86	NW	·52	·5	KN	·9	Sky hazy from rain
12	29·120	51·0	8·5	86	N	·52	·5	K	·0	Moonlight
13	29·550	52·0	9·0	87	SW	5 21	·10	N	·73	Squally wind & rain
14	29·850	53·0	9·0	87	S	2·60	10	N	·10	Rain and hail
15	29·980	53·9	9·5	87	NW	·52	·0	0	·0	Moon and starlight

Francis Abbott, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

FROM THE 16TH TO THE 30TH JUNE, 1878, INCLUSIVE.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers*		*Relative Humidity.*	*Wind.*		*Cloud.*		*Rain in 24 hours.*	*Weather.*
		Fahrenheit.	*Centigrade.*		*Direction from*	*Force in lbs. per square foot.*	*Amount.*	*Character.*		
				p.c					In.	
16	29·920	51·0	8·5	93	NW	·26	·10	K	·10	Cloud sky covered
17	29·720	54·0	9·5	87	NW	·26	·8	N		Moon and cloud
18	29·540	52·0	9·5	93	S	·26	·10	KN	·80	Steady rain
19	29·860	54·0	9·5	100	S	·52	·10	N	1.30	Wind & rain
20	30·120	55·0	10·0	93	S	·26	7·0	K	·25	Hazy & rain
21	30·225	52·0	9·0	93	S	·26	·10	KN	·12	Much cloud and rain
22	30·220	51·0	8·5	86	SW	·26	·10	KN		Cloud sky covered
23	30·120	50·0	8·5	86	N	·26	·6	K	·02	Frosty
24	30·11	40·0	6·0	80	SW	·26	·7	KN		Sharp frost
25	30·020	38·0	2·5	80	SW	·52	·5	K		Stars in zenith
26	30·020	44·0	5·5	77	NW	·26	·4	K		Frosty
27	29·680	52·0	9·5	80	NW	·0	·10	N		Calm and cloudy
28	29·530	45·0	7·0	86	N	·25	·7	K	·6	Cloud in horizon
29	29·710	52·0	11·0	86	NW	·52	·10	K		Very cloudy
30	29·440	56·0	8·5	87	NW	·52	7 0	K		Stars few & faint

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH JULY, 1878, 10·30 P.M.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp., Index Error and to Mean Sea Level.*	*Thermometers.* Fahrenheit.	Centigrade.	*Relative Humidity.*	*Wind.* Direction from	Force in lbs. per square foot.	*Cloud.* Amount.	Character.	*Rain in 24 hours.*	*Weather.*
				p.c					In.	
1	29·440	54·0	9·0	93	N	·0	·10	K	·10	Sky cloudy
2	29·820	56·0	10·5	94	S	.0	·5	KN	·6	Showery
3	30·040	54·0	9·5	87	S	2·60	·7	K	·37	Cloud and stars
4	29·610	52·0	11·0	80	NW	·52	·10	KN	·10	Dark and rainy
5	29·740	50·0	10·0	86	NW	·26	·7	K	·0	Star & cloud
6	29·810	55·0	10·0	88	N	·52	·9	KN	·01	Small rain
7	29·940	54·0	9·5	86	NW	·52	·9	K	·0	Sky cloudy
8	29·940	55·0	10·0	81	NW	·52	·5	K	·0	Star & cloud
9	29·725	55·0	9·5	88	NW	5·21	·6	K	·0	Moon & star
10	29·875	55·0	10·0	87	SW	·52	·7	KN	·19	Sky hazy
11	30·145	52·0	9·0	86	SW	·52	·4	K	·0	Moonlight
12	30·215	50·0	8·0	93	NW	·26	·4	K	0·1	Moonlight
13	29·920	55·0	10·0	83	SW	·52	·7	K	·0	Moonlight
14	29·820	56·0	10·5	86	SE	·0	·10	K	·6	Calm and cloudy
15	29·920	52·0	9·5	80	NW	·25	·0	·0	·0	Moon & star

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

FROM THE 16TH TO THE 31ST JULY, 1878, 10·30 P.M.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers.* Fahrenheit.	Centigrade.	*Relative Humidity.*	*Wind.* Direction from	Force in lbs. per square foot.	*Cloud.* Amount.	Character.	*Rain in 24 hours.*	*Weather.*
				p.c					*In.*	
16	29·720	46·0	7·5	86	NW	·26	·10	K	·0	Cloud covered
17	29·770	55·0	10·0	93	NW	·0	·0	·0	·0	Clear moonlight
18	29·520	55·0	10·0	100	W	.0	·10	KN	·8	Cloudy covered
19	29·393	51·0	10·5	86	W	·0	·10	K	·15	Small rain
20	29·450	57·0	11·0	80	NW	·52	·8	N	·01	Cloudy
21	29·520	56·0	10·5	93	NW	·26	·10	N	·4	Do. and rain
22	29·713	45·0	7·0	79	NW	·26	·7	K	·1	Sky cloudy
23	29·730	57·0	11·0	81	N	·26	·9	KN	·0	Cloudy
24	29·520	62·0	13·0	82	NW	·52	·4	K	·3	Stars round zenith
25	29·520	63·0	13·5	82	NW	·26	·3	K	·02	Starlight
26	29·120	55·0	11·0	93	S	·52	·10	N	2in.	Rain all day
27	29·425	55·0	10·0	93	SW	·26	·10	N	·20	Steady rain
28	30·940	45·0	6·0	86	SW	·26	·7	K	·3	Stars in zenith
29	30·145	47·0	7·0	86	S	·52	·6	K	·01	Stars faint
30	30·240	53·0	9·0	86	S	·26	·7	KN	·0	Stars in zenith
31	30·120	55·0	10	81	S	·25	·4	K	·01	Starlight

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

From August 1 to August 15, 1878.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers.* Fahrenheit.	Centigrade.	*Relative Humidity.*	*Wind.* Direction from	Force in lbs. per square foot.	*Cloud.* Amount.	Character.	*Rain in 24 hours.*	*Weather.*
				p.c					*In.*	
1	29·925	55·0	10·0	86	NE	·26	·7	K	·0	Stars faint
2	29·745	52·0	9·0	94	S	·52	·7	K	·3	Stars in milky way
3	28·948	63·0	6·5	93	S	·26	10	KN	·10	Raining
4	29·740	51·0	8·5	80	S	·0	·0	·0	·0	Moon and starlight
5	29·940	50·0	8·0	93	S	·26	10	KN	·4	Cloud, sky covered
6	29·735	50·0	8·0	93	NW	.0	10	K	·6	Sky cloudy
7	29·710	52·0	8·5	87	NW	·52	·0	·0	·0	Moon, star, and cloud
8	29·220	55·0	10·0	100	NW	·0	10	KN	·27	Calm and rainy
9	29·320	55·0	10·0	93	SW	·26	·7	KN	·0	Cloud and rain
10	29·145	55·0	10·0	87	NW	·52	.0	KN	·0	Moon and stars
11	29·025	54·0	9·5	93	NW	·52	10	K	·45	Smart shower
12	29·230	51·0	8·5	79	NW	2·60	·6	K	·25	Moonlight
13	29·620	45·0	5·0	86	NW	·26	10	KN	·30	Sky hazy
14	29·530	53·0	9·5	87	NW	·52	10	KN	·15	Thick and hazy
15	29·220	57·0	11·0	87	NW	·26	·7	KN	·5	Cloud, rain, and star

Francis Abbott, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

FROM AUGUST 16 TO AUGUST 31, 1878.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp., Index Error and to Mean Sea Level.*	*Thermometers.* Fahrenheit.	Centigrade.	*Relative Humidity.*	*Wind.* Direction from	Force in lbs. per square foot.	*Cloud.* Amount.	Character.	*Rain in 24 hours.*	*Weather.*
				p.c					In.	
16	29·626	55°	10°	81	SW	·26	10	KN	.30	Sky cloudy
17	29·820	53°	9·5	75	NW	2·60	·7	K		Large heavy cumulus
18	29·420	57°	11·5	76	NW	·21	·9	KN	·02	Massive clouds
19	29·960	52°	9°	81	W	·52	10	KN	·35	Windabated
20	30·120	53°	9·5	57	W	·52	·5	K	·45	Black, stars faint
21	29·949	59.	12°	76	NW	·52	·6	K		Stars in the Zenith
22	29·725	60°	12·5	82	NW	·26	10	K		Cloud, sky covered
23	29·610	60°	12·5	82	N	·26	10	N	·7	Cloud and rain
24	29·740	61°	13°	82	NW	·0	·9	KN		Calm and cloudy
25	29·945	62°	13·5	82	NW	·52	.7	K		Stars faint
26	29·940	62°	13·5	53	W	·26	·3	K		Starlight
27	29·930	60.	12·5	88	NW	·26	10	N	·15	Cloud, sky covered
28	29·620	58°	11·5	81	W	·26	10	N	·35	Cloud, sky covered
29	30·020	55°	10°	87	NW	·52		O	·1	Starlight
30	30·020	57°	11°	81	NW	·52		O		Starlight
31	29·840	58°	11·5	62	NW	·52	10	KN		Cloud, sky Cloudy

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

FROM SEPTEMBER 1 TO SEPTEMBER 15, 1878.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42 32′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers.*		*Relative Humidity.*	*Wind.*		*Cloud.*		*Rain in 24 hours.*	*Weather.*
		Fahrenheit.	*Centigrade.*		*Direction from*	*Force in lbs. per square foot.*	*Amount.*	*Character.*		
				p.c					*In.*	
1	29·820	60·0	12·5	76	SW	·52	6	K	·11	Rain abated
2	29·625	61·0	13·0	76	W	·26	6	K	·5	Moon, star and cloud
3	29·520	55·0	10·0	83	NW	5·21	10	KN	·36	Rain and haze
4	30·025	56·0	10·5	87	W	·26	3	K	·01	Moon and starlight
5	30·045	55·0	10·0	81	SW	·26	7·5	KS	·0	Sky hazy
6	30·020	57.0	11·0	88	NW	·26	10·0	K	·0	Cloud, sky covered
7	29·945	57·0	11·0	55·6	SE	·0	10·0	KN	·0	Cloud, sky covered
8	29·840	62·0	17·0	82	N	·0	10	K	·0	Cloud, sky covered
9	29·730	62·5	17·0	78	N	·0	10	K	·0	Calm and cloudy
10	29·920	48·0	9·0	82	SE	·0	7	K	·31	Moonlight
11	29·820	47·0	8·5	82	S	·0	10	K	·02	Cloudy moon
12	29·625	54·0	12·0	83	NW	·26	8	K	·1	Moonlight
13	29·745	53·0	12·0	77	NW	·26	10	K	·0	Cloud, sky covered
14	29·340	51·0	10·5	88	NW	·0	7	K	·0	Moon, star and cloud
15	29·465	52·0	11·0	72	NW	·26	7	KN	·0	Stars to the south

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

FROM SEPTEMBER 16 TO SEPTEMBER 30, 1878.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers.*		*Relative Humidity.*	*Wind.*		*Cloud.*		*Rain in 24 hours.*	*Weather.*
		Fahrenheit.	*Centigrade.*		*Direction from*	*Force in lbs. per square foot.*	*Amount.*	*Character.*		
				p.c					*In.*	
16	29·073	50·0	10·0	82	S	·26	7	K		Clear to south
17	29·920	53·0	11·5	88	S	·26	4	K	·01	Starlight, brilliant
18	29·620	54·0	12·5	73	S	·26	4	K		Starlight
19	29·630	51·0	10·5	82	NW	·26	5	K	·04	Stars in the Zenith
20	29·225	60·0	15·5	83	N	2·60	10	KN		Rain and wind strong
21	29·520	45.0	8·0	88	W	·26	10	KN	·13	Squally all day
22	29·445	54·5	12·5	88	N	·52	7	K	·83	Stars in the Zenith
23	29·120	48·0	9·0	88	N	·26	5	K	·02	Stars after rain
24	29·025	47·5	8·5	94	NW	·26	5	K	·48	Stars, overcast
25	29·125	45·0	7·0	83	SE	·25	10	KN	·01	Cloud, sky covered
26	29·220	50·0	10·0	82	NW	·25	10	KN	·40	Sky squally
27	29·725	42·0	5·5	75	SW	2·60	4	K	·03	Starlight
28	29·840	46·0	7·5	81	NW	·26	7	K	·01	Large K
29	29·725	48·0	8·5	82	NW	·52	0	·0		Starlight
30	29·840	51·0	11·0	76	NW	·52	10	KN	·06	Cloud, sky covered

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

FROM OCTOBER 1 TO OCTOBER 15, 1878.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers.*		*Relative Humidity.*	*Wind.*		*Cloud.*		*Rain in 24 hours.*	*Weather.*
		Fahrenheit.	*Centigrade.*		*Direction from*	*Force in lbs. per square foot.*	*Amount.*	*Character.*		
				p.c					*In.*	
1	29·650	52·0	11·0	82	NW	2·60	5	K		Moon and starlight
2	29·920	55·0	13·0	77	N	·0	2	K	·06	Do. do.
3	29·430	57·0	11·5	73	S	·52	10	K		Lightning
4	29·840	51·0	11·0	76	NW	·52	10	KN		Cloud, sky covered
5	29·975	56·0	13·5	77	NW	·25	7	K		Sky hazy
6	29·435	59.0	15·0	78	NW	2·60	7	K		Moon, cloud and wind
7	29·825	52·0	11·0	88	NW	·25	0	·0		Moon and starlight
8	29·465	49·0	9·5	74	NW	·26	6	K		Do. do.
9	29·000	54·0	12·5	82	N	·52	10	K	·01	Sky cloudy
10	28·440	50·0	10·0	82	SE	·52	10	KN	·01	Sky hazy
11	29·340	45·0	7·0	81	NW	·52	7	K	·47	Cloud and haze
12	29·680	50·0	10·0	81	NW	·52	7	K	·02	Moonlight
13	29·420	55·0	13·0	82	N	·0	8	KN	·01	Moon, cloud thunder
14	28·942	49·0	9·0	64	NW	·26	9	KN	·19	Much rain
15	29·420	44·0	6·5	81	SW	2·60	10	KN	·06	Squally all day

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

FROM OCTOBER 16 TO OCTOBER 31, 1878.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42 32′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers.*		*Relative Humidity.*	*Wind.*		*Cloud.*		*Rain in 24 hours.*	*Weather.*
		Fahrenheit.	*Centigrade.*		*Direction from*	*Force in lbs. per square foot.*	*Amount.*	*Character.*		
				p.c					*In.*	
16	29·720	51·0	16·5	81	W	·52	10	KN	·25	Cloud, sky covered
17	29·640	50·0	10·0	76	NW	·52	5	K	·02	Starlight
18	29·965	50·0	10·0	77	N	·52	7	K	·05	Faint Starlight
19	29·920	55·0	13·0	82	NW	·52	5	K	·04	Do. do.
20	29·640	57·0	13·5	78	N	·0	10	N	·01	Cloud, sky covered
21	29·878	53·0	12·0	82	NW	·26	4	K	·03	Starlight
22	29·720	51·0	16·0	88	NW	·26	10	N	·01	Cloud, sky covered
23	29·520	52·0	11·0	77	W	·26	0	·0	·05	Starlight
24	29·620	48·0	9·0	82	SW	·52	0	·0	·15	Faint Starlight
25	29·765	46·0	8·0	75	SW	·26	0	·0	·09	Starlight
26	30·120	42·0	5·5	87	SE	·52	0	·0	·03	Faint Starlight
27	29·940	40·0	9·0	76	S	·52	5	K	·01	Do. do.
28	29·470	57·0	14·0	88	NW	·26	9	KN	·01	Sky cloudy
29	29·620	55·0	13·0	83	SW	·26	0	·0	·05	Starlight
30	29·525	55·0	13·0	73	NW	·52	5	K		Moon, Star, and clond
31	30·125	54·0	12·5	77	S	·52	10	KN	·03	Cloudy, sky covered

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

From November 1 to 15, 1878.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42 52′ 13″ S. **Long. 9h. 49m. 29·2s. E.**

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers.*		*Relative Humidity.*	*Wind.*		*Cloud.*		*Rain in 24 hours.*	*Weather.*
		Fahrenheit.	*Centigrade.*		*Direction from*	*Force in lbs. per square foot.*	*Amount.*	*Character.*		
				p.c					*In.*	
1	30·207	54·0	12·0	77	S	·52	6	K	·01	Sky very hazy.
2	29·510	56·0	13·0	88	·0	·0	10	K	·02	Calm and cloudy.
3	29·440	61·0	16·0	88	W	·26	10	KN	·20	Cloud, sky covered
4	29·225	60·0	15·5	68	·0	·0	7	K	·02	Calm and moonlight
5	29·467	52·0	11·0	77	W	·52	7	K	·01	Stars, moon and cloud
6	29·954	57·0	14·0	77	NW	·52	7	K	·04	Large heavy clouds.
7	29·620	60·0	15·0	54	NW	5·21	7	K		Wind, and hazy.
8	29·317	48	9·0	72	NW	·521	10	KN		Wind and rain.
9	29·520	46·0	8·0	71	W	2·60	7	K	·35	Windy, haze and rainy
10	29·720	47·0	8·0	71	NW	·52	7	K	·42	Moon and cloud
11	29·721	59·0	15·0	77	W	·0	7	K	·25	Calm and moonlight
12	29·410	70·0	21·0	73	W	·52	10	KN		Cloud, sky covered
13	29·875	61·0	16·0	68	W	·52	0	·0		Starlight
14	29·875	61·0	16·0	68	W	·52	0	.0		Starlight
15	29·725	57·0	14·0	73	W	5·21	0	·0		Starlight, brilliant.

Francis Abbott, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

METEOROLOGICAL OBSERVATIONS.

From November 15 to 30th, 1878.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	Barometer corrected for Temp. Index Error and to Mean Sea Level.	Thermometers. Fahrenheit.	Thermometers. Centigrade.	Thermometers. Relative Humidity.	Wind. Direction from	Wind. Force in lbs. per square foot.	Cloud. Amount.	Cloud. Character.	Rain in 24 hours.	Weather.
				p. c					In.	
16	29·940	57·0	14·0	78	NW	·26	10	KN		Cloud, sky covered
17	29·740	59·0	15·0	83	SW	·26	0	·0		Starlight
18	29·440	47·0	8·0	82	W	2·60	*	K	·60	Stars, cloud alternate
19	29·420	55·0	12·5	88	NW	·52	10	KN	·20	Clouds and stars
20	29·618	51·0	10·5	72	W	·52	4	K	·02	Starlight
21	29·565	57·0	12·0	88	S	·26	10	KN		Cloud, sky covered
22	29·620	55·0	13·0	82	·0	·0	10	K	·18	Calm and cloudy.
23	29·520	55·0	13·0	82	NW	2·60	4	K	06	Starlight
24	29·620	54·0	12·0	58	NW	10·42	5	K	·01	Clouds and stars
25	29·620	56·0	13·5	73	NW	·52	7	K	·01	Stars, hazy
26	29·030	51·0	10·5	81	NW	10·42	8	KN	30	Wind strong and squally
27	29·320	53·0	11·5	88	SW	·52	4	K	·15	Hazy starlight
28	29·945	51·0	10·5	88	SW	·52	4	K	·01	Starlight
29	30·025	54·0	12·0	88	S	·26	7	K		Few stars, faint
30	30·020	62·0	16·0	88	W	·26	10	K		Cloud sky covered

* Variable.

Francis Abbott, F.R.A.S., etc., Observer.

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METEOROLOGICAL OBSERVATIONS.

From December 1st to 15th, 1878.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers.* Fahrenheit.	Centigrade.	*Relative Humidity.*	*Wind.* Direction from	Force in lbs. per square foot.	*Cloud.* Amount.	Character.	*Rain in 24 hours.*	*Weather.*
				p c					In.	
1	30·020	58·0	14·5	83	S	·26	10	K	·0	Sky cloudy
2	29·620	59·0	15·0	83	SE	·26	0	·0	·0	Moon and starlight
3	29·412	50·0	10·0	88	NW	2·60	5·5	K	·0	Squal. moon, stars
4	29·,00	54·0	12·0	88	SW	·52	5	K	·20	Moon, stars, and cloud
5	29·920	55·0	13·0	72	SW	·52	7	K	·02	Moon and stars
6	29·920	54·0	12·0	88	S	·26	10	K	·0	Cloud covered sky
7	29·720	60·0	15·0	83	SE	·0	9	K	·0	Cloud, sky covered
8	29·620	65·0	18·0	83	SE	·26	7	MK	·05	Mottled K, sky covered
9	29·710	63·0	17·5	83	NW	·52	7	K	·0	Moonlight
10	29·920	61·0	17·0	83	NW	·0	5	K	·0	Moon, cl'uds and stars
11	29·945	61·0	16·0	73	W	·26	7	K	·0	Moon, cl'uds and stars
12	29·975	61·0	16·0	88	E	·26	4	KS	·02	Starlight
13	29·812	68·0	20·0	78	SE	·0	0	·0	·0	Starlight, brilliant
14	29·510	81·0	27·0	76	N	·26	4	K	·0	Hot wind, str'g S. light & lightning
15	29·359	61·0	20·5	83	KN	·26	4	K	·0	S. light

Francis Abbott, F.R.A.S., etc., Observer.

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METEOROLOGICAL OBSERVATIONS.

FROM DECEMBER 15TH TO 31ST, 1878.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

(Registered for the Royal Society, Tasmania.)

Day of Month.	*Barometer corrected for Temp. Index Error and to Mean Sea Level.*	*Thermometers.* Fahrenheit.	Centigrade.	*Relative Humidity.*	*Wind.* Direction from	Force in lbs. per square foot.	*Cloud.* Amount.	Character.	*Rain in 24 hours.*	*Weather.*
				p. c.					In.	
16	29·125	54·0	12·5	88	SE	·52	0	·0	·0	Starlight, brilliant
17	29·420	54·0	12·0	67	NW	·52	4	K	·76	Starlight
18	29·910	56·0	13·5	88	N	·52	5	K	·01	Starlight
19	30·020	60·0	15·5	63	SE	·26	7	K	·02	Stars in the zenith
20	29·320	62·0	17·0	88	NW	.26	4	K	·0	Starlight
21	29·610	61·5	16·5	94	NW	·52	10	K	·06	Cloud, sky covered
22	29·410	61·0	16·0	88	NW	·52	10	K	·01	Do. Do.
23	29·320	52·0	11·5	82	W	·52	0	·0	·01	Squally, starlight
24	29·210	59·0	15·0	94	W	·26	10	N	·07	Rain, sky covered
25	29·210	49·0	9·5	100	W	·52	10	N	·05	Set rain
26	29·510	58·0	14·5	88	W	·26	10	N	·45	Cloud, sky covered
27	29·345	47·0	9·0	88	W	·52	0	·0	·0	Starlight
28	29·445	55·0	12·5	94	W	·52	10	N	·06	Cloudy, sky covered
29	29·820	53·0	12·0	94	SW	·52	5	K	·01	Stars in the zenith
30	29·840	57·0	14·0	88	NW	·52	0	·0	·08	Stars, sky covered
31	29·920	65·0	18·5	88	S	·26	10	K	·0	Cloudy, sky covered

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

REPORT

OF THE

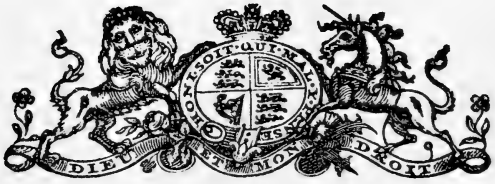
ROYAL SOCIETY

OF

TASMANIA

FOR THE YEAR

1878.



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1879.

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Walker, James Backhouse, Hobart Town.

Obituary.

Clarke, Rev. W. B., M.A., F.R.S., F.G.S., F.R.G.S., Member of the Geological Societies of France and Austria, Vice-President of the Royal Society of New South Wales, &c.—Died at Sydney, June 16th, 1878. The following notice appeared in the *Hobart Town Mercury* of the 22nd June, 1878.—"The Rev. William Branwhite Clarke, M.A., F.R S., F.G.S., the veteran geologist of New South Wales, died June 16, in his eighty-first year. Mr. Clarke's labours date back half a century. He was elected a Fellow of the Geological Society of London in 1826, and he had contributed several interesting essays on points of British geology before he commenced his arduous work amongst the coal-bearing strata of his adopted country. Influenced by the love of scientific investigation, and aided by a self-reliant and independent character, he surveyed those great depths of rock which brought the local names of Hawkesbury, Wianamatta, and Newcastle before the geological world as landmarks in an apparently anomalous series of strata. His survey, the result of years of patient labour, was so exact that, in spite of former unsparing criticism, it is now universally recognised as correct, and his deductions as to the relative value of marine and plant-bearing strata in estimating the ages of formations, though disbelieved in former years, have been proved to be consistent with facts since observed in South Africa, India, and North America. Mr. Clarke discovered that there were strata of marine limestones containing carboniferous *Spiriferi* and *Producti*, and that with these were intercalated beds of coal, which presented a mixture of forms of plants. He noticed that there was no break in this great series of deposits, and that *Sigillariæ*, calamites, and *Coniferæ* were associated with *Glossopteris* and other genera of ferns, which, had they been found in the typical area of England, would have denoted a Secondary horizon. Subsequent research by other observers in Queensland has produced corresponding results. Science, therefore, owes much to Mr. Clarke for the consistent and persistent manner in which he has upheld his opinions regarding the age of these Australian coal series. Labouring amongst the strata below the carboniferous, Mr. Clarke discovered the presence of Silurian rocks by the existence in them of characteristic trilobites and corals, and noticed the unconformity of the carboniferous with the underlying group; and even in those early days of his work he grasped the important idea that the geology of the typical area in Europe was not exactly comparable with that of Australia. From his

knowledge of the country and of the physical development of the Australian cordillera, Mr. Clarke was able to enlarge upon the relations of the sedimentary and intrusive rocks, and this led to his discovery of the auriferous quartzites and detrital accumulations of the mountains within 60 or 80 miles of Sydney. Subsequently the possibility of the great north and south range of New South Wales being highly auriferous was impressed upon him by comparing these mountains with the details of the Oural. Mr. Clarke's last work on the Sedimentary Formations of New South Wales appeared in 1875, and in it he had the satisfaction of repeating those acknowledged truths which he had elaborated 30 years since. In 1876 the Council of the Geological Society of London awarded him the Murchison medal and a purse of gold 'in recognition of his remarkable services in the investigation of the older rocks of New South Wales, services which have led to a correct knowledge of the succession of the formations in that great country, and which have been of great value to the community.'"

Allport, Morton, a Vice-President of the Society; F.L.S., F.Z.S., Fellow of the Royal Colonial Institute, Corresponding Member of the Anthropological Institute of Great Britain, Life Member of the Entomological and Malacological Societies, and Foreign Member of the Royal Linnean and Royal Botanic Societies of Belgium, Fellow of the Linnean Society of New South Wales.—Born at West Bromwich in Staffordshire, 1830, died September 10th, 1878. With his parents, he came to this Colony in 1831. From his earliest years he exhibited an ardent, it may be said hereditary, love of Natural History, which had the good fortune to be fostered and directed during his educational training by the Rev. T. J. Ewing, then one of our foremost Naturalists. From these early years the spare hours of his busy professional life (that of Solicitor) were incessantly devoted to the study of Nature, and being gifted with very keen powers of observation, a most retentive memory, and a physical frame equal to any exertion in exploring expeditions, the result was that his knowledge of the Natural History of Tasmania generally has never, by any one individual, been equalled, and will probably never be surpassed. For the introduction of our now acclimatised *Salmonidæ* the Colony is largely indebted to his untiring zeal and well-directed energy; and in past times, when doubts as to the success of the then novel experiment were largely entertained, he always felt and expressed the fullest confidence

as to the result, contributing many interesting papers on the subject to the Society's meetings. The Ichthyology of the Colony occupied a large share of his attention, and for many years past he was in the habit of sending, at his own cost, to the best authorities in England and elsewhere, for the purpose of being named and classified, specimens of every new fish which he could procure; and at the time of his death was busily engaged in making out a descriptive list of all our known species. The task, a very troublesome and difficult one, was unfortunately but little more than commenced, and its completion must now be left to the uncertain future. We are indebted to Mr. Allport for the introduction of the English perch; and many, not only in this but also in the neighbouring colonies, can testify to his great kindness and liberality in freely distributing supplies of the young of this and of other fish to various localities where they have now become acclimatised. Many of the old familiar plants of home were also introduced by him; of these the White Water Lily may perhaps be instanced as one in which he took particular interest, and with which his name will be long associated. When scientific visitors from abroad sought for information, Mr. Allport was the unfailing referee and authority on all questions relating to our Natural History; but it must also be said, his copious stores of information on these points were always most freely and gladly offered to any enquirer. To the subject of education—especially the higher education of both sexes—he devoted in later years a large amount of time and attention. In all the relations of social life his happy and genial disposition, and bright intelligence, secured him the friendship of all with whom he came in contact, and his untimely death has left a blank in our midst which will long remain unfilled. "*Multis ille bonis flebilis occidit.*"

MINUTES of the Annual General Meeting of the ROYAL SOCIETY OF TASMANIA, *held at the Museum, Macquarie-street, at Half-past Seven o'clock* P.M., *on Monday, the 27th January,* 1879: JAMES BARNARD, *Esq., in the Chair.*

THE advertisement by which the meeting had been convened having been read, the Chairman called upon the Secretary to read the Report.

The Report for 1878 was then read.

On the motion of Mr. Justin M'C. Browne, seconded by Mr. A. Webster, the report was adopted, and ordered to be printed for circulation amongst the Fellows.

The accounts for the year were laid on the table for the inspection of members.

Dr. Agnew reported that the retiring Members of the Council were the Ven. Archdeacon Davies, Right Rev. Bishop Bromby, Dr. Agnew, and Mr. Russell Young, and that no other nominations had been received.

Mr. E. D. Swan moved, and Mr. H. Scott seconded, that the four retiring Members of Council be re-elected. Agreed to.

On the motion of Mr. Stephens, seconded by Mr. Dodds, Messrs. H. Cook and F. Butler were re-elected Auditors of Annual Accounts.

Mr. John Chas. Macmichael, of George's Bay, was balloted for and declared duly elected a Fellow of the Society.

A vote of thanks to Dr. Agnew (Honorary Secretary), proposed by Mr. Stephens and seconded by Mr. Scott, was carried by acclamation.

Dr. Agnew returned thanks, and in doing so congratulated the Fellows on the present position and future prospects of the Society.

REPORT.

THE Session of 1878 was opened on the 12th March, with a paper entitled "Notes on the Platypus *(Ornithorhynchus anatinus)*," by Morton Allport, F.L.S., F.Z.S., &c., and the following papers were read at the meetings during the year :—"On some new Tasmanian Shells" (3rd series), by the Rev. J. E. Tenison Woods, F.L.S., F.G.S., &c. "On certain Tertiary and Post Tertiary Deposits on Flinders, Barren, Badger, and other Islands in Bass's Straits," by R. M. Johnston. "On the Distribution and Growth of Queensland Plants," by F. M. Bailey. "On Water Supply in Relation to Disease," by the Bishop of Tasmania. "Description of Specimens of Annelidæ, found in kelp, at Prosser's Bay," by Mrs. Meredith. "Notes on a visit to the Hot Springs near Southport, in 1877," by T. Stephens, M.A., F.G.S. "Notes on the Creeping Thistle *(Carduus arvensis)*," by F. Abbott, jun. "On some new Mollusca," by the Rev. J. E. Tenison Woods, F L.S., F.G.S., &c. "On the Land Shells of Tasmania," by W. F. Petterd.

We are again indebted to Mr. F. Abbott and to Mr. W. E. Shoobridge for conducting Meteorological Observations at Hobart Town and New Norfolk. Returns from the lighthouses have been regularly received from the Marine Board. The "Simultaneous Observations" are still taken by Mr. Abbott, and regularly forwarded to the Meteorological Department of the United States.

Four Fellows, and the same number of Corresponding Members were admitted. One Fellow and one Corresponding Member have been lost by death, and there have been two resignations.

COUNCIL.

Two vacancies have occurred in the Council, one by the retirement of the Rev. W. W. Spicer, who has left the colony, the other by the death of Mr. Morton Allport. These have been filled by the election of Messrs. John Swan and Russell Young.

The list of Retiring Members has been posted in the Library for the last three days, in accordance with No. 33 of the Rules of the Society.

Finance.

The income from all the sources was as follows:—Government grant-in-aid to Museum, £200; ditto to Gardens, £600; Subscriptions, £150; from Marine Board, £20; sale of Plants, &c., at Gardens, £98 17*s.* 2*d.*; this, with £30 12*s.* in the hands of the Superintendent of the Gardens, for weekly payment of men's wages, and arrears of subscriptions, £50, will give a total of £1149 9*s.* 2*d.* The expenditure and liabilities, as per balance sheet, amounted to £1212 1*s.* 5*d.*, leaving a balance to debit of £62 12*s.* 3*d.* It must, however, be specially noted that this sum would have been reduced to a mere fraction had all the annual subscriptions been duly paid. It is but fair to add that the expenditure for the year, without considering previous liabilities, has been kept within the income, as the following figures will show:—Total income for 1878, £1068 17*s.* 2*d.*; expenditure, £1052 12*s.* 7*d.*; balance towards meeting liabilities, £16 4*s.* 7*d.*

Gardens.

The new entrance, with suitable porter's lodge, has at last been completed. This work adds largely to the general appearance of the Gardens, and is found to be a very great convenience to the public. The estimated number of visitors, 58,784, is quite unprecedented, having more than doubled within the last eight years. The proof thus afforded of the increasing appreciation in which the Gardens are held is highly satisfactory.

The large amount of work in connection with the new entrance has for some time past absorbed all available labour, but now the Arboretum referred to in last year's report will at once be proceeded with, and when finished will, without doubt, form one of the most attractive features of the Gardens.

Many new plants have, as usual, been introduced, and a list of the donors is appended. Especial thanks are due to

Sir J. D. Hooker, of the Royal Gardens, Kew; Baron Ferd. Von Müeller, Melbourne; Jean N. Verschaffelt, Ghent, Belgium; the Department of Agriculture, Washington; and Mr. C. F. Creswell, Melbourne, for their liberal and valuable donations.

The usual gang of prison labour has been continued, and has rendered very great assistance in the formation of the new entrance, and in other rough work. Without this class of labour, indeed, it would be impossible, by means of the grant-in-aid alone, to maintain the Gardens in anything like a creditable condition, much less to undertake works of improvement or extension.

Museum.

Upwards of 600 species of Tasmanian shells have been arranged and named by Mr. Legrand, who has also most liberally contributed many required species from his private collection. The Society is also indebted to Mr. W. F. Petterd for several new land species described by himself; to the Rev. H. D. Atkinson for a number of new marine species described by the Rev. J. E. Tenison Woods; and Mr. R. M. Johnston for new fresh water species described by himself. Many specimens are still required, which Mr. Legrand has very kindly promised to supply as soon as he can procure them. When all are arranged the Museum will have, as it ought to have, by far the most complete collection of Tasmanian shells extant. The general work necessary for the preservation of the collection, which requires considerable time and attention, has been steadily carried on. The contents of several of the large cases in the lower room have been entirely rearranged and labelled, in accordance with a plan suggested by the Rev. W. W. Spicer previous to his departure from the colony.

Mr. E. D. Swan has rendered valuable assistance in mounting and labelling our collection of eggs of Tasmanian birds, to which he has added many specimens from his private cabinet.

The Museum, as the Fellows are aware, has been kept

open to the public for a few hours on Sunday afternoons. The success of the experiment has been quite as great as it was at its commencement towards the end of last year. Indeed for some months past the attendance on Sundays has been greater than the aggregate of that on all the other days of the week, and nothing could exceed the orderly conduct of the visitors.

The actual number of visitors on Sundays was 16,292; on week days 17,174; total 33,466; being an increase of 11,003 on last year.

STATEMENT of the Funds of the ROYAL SOCIETY OF TASMANIA *for the Year* 1878.

1878. Receipts.	£	s.	d.	£	s.	d.
Annual Subscriptions from 88 Members	132	0	0			
Ditto, arrears from former years...	18	0	0			
From the Marine Board for clerical assistance in completing and checking Meteorological Tables from Light-houses, &c.	20	0	0			
Total Royal Society		..		170	0	0
Museum.						
Grant in aid from Treasury		..		200	0	0
Botanic Gardens.						
Grant in aid from Treasury.....	600	0	0			
Proceeds of sale of Plants, Fruit, &c.	98	17	2			
Total Botanic Gardens....		..		698	17	2
Total Receipts from all sources ..		..		1068	17	2

Expenditure.	£	s.	d.	£	s.	d.
Jan. 18, 1878—Balance overdrawn at Commercial Bank, as per statement for 1877		..		147	12	2
Interest on overdrawn account, 30th June, £5 16*s.* 2*d.*; 31st December, £6 0*s.* 6*d.*		..		11	16	8
Royal Society.						
Meteorological Instruments	0	5	0			
Printing and Advertising.....	24	18	0			
Postage, Parcels, &c.	3	13	9			
Collector's Commission	7	11	6			
Messenger.....	0	5	0			
Library, Books, Stationery, &c.....	35	4	4			
Sundries, &c.	0	10	0			
Clerical assistance for completing Meteorological Tables	20	0	0			
Total Royal Society				92	7	7
Museum.						
Salary of Curator.....	125	0	0			
Wages of Attendant	52	0	0			
Premium of Insurance	6	7	6			
Purchase & preparation of Specimens	9	6	0			
Water Rate	5	13	4			
Fuel and Light	3	13	3			
Glass-topped Boxes for Shells, &c..	3	15	0			
Sundries and Petty Cash	5	11	6			
Ironmongery, Brushware, &c	9	13	2			
Fittings, Repairs, &c., including timber	24	2	5			

1879. Jan. 23. Balance overdrawn at Commercial Bank	..	143 4 3	
			£1212 1 5

NOTE.

Dr.		
To overdrawn balance at Bank	..	143 4 3
Cr.		
By Cash in hands of Superintendent of Gardens for payment of Wages	30 12 0	
Subscriptions due	50 0 0	
		80 12 0
Balance to Debit	..	£62 12 3

Museum Attendant, for Sunday duty	12 15 0		
Total Museum			257 17 2
Botanic Gardens.			
Salary of Superintendent	200 0 0		
Wages of Labourers	316 8 0		
Tools, &c.	7 18 6		
Freight and Carriage of Plants	23 3 0		
Stationery and Stamps	3 2 5		
Forage	12 1 10		
Horse hire	6 0 0		
Ironmongery	26 18 3		
Repair of Buildings, including timber	36 15 7		
Seeds, &c.	5 0 3		
Sundries	33 19 9		
Water Rate	3 3 4		
Flower Pots	12 14 4		
Cartage, &c.	5 2 0		
Fuel	9 12 3		
Total Botanic Gardens			701 19 6
Stamped Cheque-book	..		0 8 4
			£1212 1 5

Audited and found correct.

FRANCIS BUTLER.
HENRY COOK.

January 28, 1879.

BOOKS, &c. Purchased and Presented during 1878.

[Presentations marked thus*.]

*Aborigines, Australian, Language of. From Rev. P. M'Pherson, M.A.
*————————————, the Dyere Tribe of. From ditto.
*————————————, Vocabulaire des Dialectes. From ditto.
Agricultural Gazette, The, current numbers.
Arts, Journal of Society of, ditto.
Athenæum, The, ditto.
*Astronomical Observations, Edinburgh, 1870 to 1877, by C. Piazzi Smith, F.R.S., F.R.A.S., &c. From the author.
*Astronomical and Meteorological Observations, Washington, 1874. From United States Government
*Agriculture, Dept. of, United States, Annual Report, 1875. From U.S. Government.
*————————————, ditto, monthly ditto.
*American Academy of Natural Sciences, Proceedings of, vol. 4, 1876-7. From the Academy.
*———— Philosophical Society, Proceedings of, vol. 16, No. 99. From the Society.
*Academy of Natural Sciences, Philadelphia, Proceedings, 1877.
*Acta Horti Petropolitani, Tome 1, Fascic. 1. From the Imperial Botanic Gardens, St. Petersburg.

*Birds, Australian, tabular list of, by E. P. Ramsay, F.L.S. From the author.

Conchologia Iconica. Concluding parts.
*Conchology, Quarterly Journal of, vol. 1, parts 12 and 13. From the publisher.
*Charities, Public, Report of Board, Pennsylvania, 1876.
*Catalogues, British Museum :—
Birds, vol. 3.
British Hymenoptera, part 1.
———— Fossil Crustacea.
Illustrations of Typical Specimens of Lepidoptera Heterocera, part 1.
Fossil Reptilia of South Africa. From the trustees.
*Corals, On some extra-tropical, of Australia. By the Rev. J. E. Tenison Woods, F.G.S., F.R.G.S., &c. &c.
*Colonies, The, current numbers.
*Catalogue des Hesperides du Musée Royale d'Histoire Naturelle de Bruxelles, by M. P. Mabille. From the author.
*Canadian Journal, The, vol. 15, No. 5, April, 1877.

*Engineers and Shipbuilders, Institution of, transactions of, vol. 20. From the Institution.

Florist and Pomologist, The, current numbers.
Feathers, Stray, vol. 5, Nos. 5 and 6.
Federation, Imperial, 1878, by F. Young. From the author.
*Forest Tree Planting, and its influence on climate, by R. Schomburgh, Ph. D. From the author.
*Forestry, Report on, 1877, by Rev. J. Croumbie Brown, LL.D. From the Colonial Secretary.

* Forestry, Suggestions as to formation of a British School of, by the same. From the Colonial Secretary.

*———--, On Schools of, by the same. From ditto.
*———--, The School of, Carlsruhe. From ditto.
*———--, Opinions of Continental writers on location of a School of, by the same. From ditto.
*———---, The School of, in the Royal Wurtemburg Academy of Land and Forest Economy, by the same. From ditto.
*———---, The School of, at Evois, Finland, by the same. From ditto.
* Flora Australiensis, vol. 7, by G. Bentham, F.R.S. From Sir Robert Officer, Knt.

Gardeners' Chronicle, current numbers.
Geological Magazine, ditto.
* Geological and Geographical Survey of the Territories, United States of America, publications of 1872-4-5-6-7. From Dr. F. V. Hayden, Washington.
Grampian Society, Publications of, 4 vols., 1877. From the Hon. J. W. Agnew, M.D., M.L.C.
Geology, List of titles of scientific papers and reports on, by R. Etheridge, Jun., F.G.S. From the author.

Historical and Archæological Society of Ireland, Transactions, vol. 6, 1877. From Hon. J. W. Agnew, M.D.
——— Society, Royal, Transactions of, vols. 1 and 5. From the Society.
———, Genealogical. Memoirs of Scott and the Haliburtons, 1 vol. From the Society.

* Intestin, Gros, Memoires sur l'enterotomie du.
* Institute, Essex, Salem, Massachusetts, Bulletin of, vol. 8, Nos. 1-12. From the Institute.
*———, Royal Colonial, Proceedings, vol. 8. From the Institute.

Journal, Quarterly, of Science, current numbers.

* Life, The worth of. By the Lord Bishop of York. From the Leeds Literary and Philosophical Society.
* Lincei, Accademia R. dei, Publications of, for 1877-8. From the Academy.

* Meteorological Report, Canada, 1876-7. From Canadian Government.
*———, Kew, 1877. From the Royal Society, London.
*———, Observatory, New York.
*——— Department, India, Publications of; viz. :—Tables for Reducing Meteorl. Obsns. in India. By F. H. Blandford, Director.
Indian Meteorologists, Vade-Mecum. By the same.
Report on Meteorology of India, 1876. By the same.
Administrative Report, 1876-7. By the same.
Meteorological Memoirs, Indian, vol. 1, part 2. By the same. From the Department.
* Meteorological Office, London, Quarterly Weather Report, parts 1, 2, 3, 1875.
*——— Society, London, Quarterly Journal of, current numbers. From the Society.
*——— Observations, Hobart Town, Monthly Tables. From F. Abbott, F.R.A.S., F.R.M.S.

*Meteorological Observations, Mount Nelson, Goose Island, Swan Island, King's Island, Kent's Group, and South Bruni. From the Hobart Town Marine Board.
*———————————, Melbourne, Monthly Tables. From the Government Observatory.
*———————————, New Norfolk, Monthly Abstracts. From W. E. Shoobridge.
*———————————, New Zealand, Printed tables from various stations. From Dr. J. Hector, F.R.S., &c.
Magazine, Country Gentleman's, current numbers.
*Mining Surveyors and Registrars, Victoria, Reports of, 1877. From E. Couchman, Esq., Sec. for Mines, Victoria.
*Mines, Annual Report of Department of, New South Wales. From the Department.
*Mars, Observations on, and Orbits of Satellites of, 1879, by Prof. A. Hall, United States Navy. From U.S. Government.
*Mollusca, On some new Marine.

Natural History, Annals and Magazine of, current numbers.
Nature, current numbers.

*Plants, Catalogue of, in Botanic Gardens, Adelaide, by Dr. Schomburgh. From the author.
*——— and vegetable substances, Organic constituents of, by Dr. G. C. Wittstein. From Baron F. von. Müeller.
*Pennsylvania, Report of Board of Public Charities. From the Board.
*Palæontology, Notes on, by R. Etheridge, jun., F.G.S. From the author.
*——————— British, Contributions to, by R. Etheridge, jun., F.G.S., nine pamphlets. From the author.
*Phytography of Tasmania, Contributions to, No. 5, by Baron F. von Müeller, C.M.G., M.D., F.R.S., &c., &c., &c. From the author.
*Platypus *(Ornithorhynchus anatinus)*, Notes on the, by M. Allport, F.L.S., F.Z.S., &c., &c.
*Plants, Queensland, On the distribution and growth of, by F. M. Bailey. From the author.

Report of British Association, 1876.
*——— on Railways New South Wales, 1876. From Royal Society, N. S. Wales.

*Society, Royal, Proceedings of, current numbers.
*———, Linnean, of New South Wales, Papers read before. By E. P. Ramsay, F.L.S.
*———————, Proceedings of, vol. 2, parts 2, 3, and 4, vol. 3, part 1. From the society.
*———, Asiatic, of Japan, Transactions, vol. 5, parts 1 and 2, vol. 6, parts 1 and 2. From the society.
*———, Royal Astronomical, Monthly Notices, current numbers. From the society.
*———, Geological and Polytechnic of West Riding of Yorkshire, Proceedings, part 4, 1877. From the society.
*———, Royal, of New South Wales, Journal of, vol. II., 1877, and Rules, 1878. From the society.
*——— of Natural Sciences, Buffalo, Bulletin, vol. 3, part 4. From the society.
*———, Natural History, Boston, Memoirs of, vol. 2, part 4, No. 5; Proceedings of, vol. 18, parts 3 and 4. From the society.

*Society, Geological, Quarterly Journal of, vol. 33, parts 1 to 4, 1877. List of, 1877. From the society.
———, Linnean, Journal of, vol. 15, No. 88, vol. 16, Nos. 89 to 94; Botany, vol. 13, Nos. 67 to 71; Zoology, List for 1877.
———, Zoological, of London, Proceedings, part 4, 1876; parts 1 and 2, 1877.
———, Royal Geographical, Journal, vol. 46, 1876; Proceedings, vol. 21, Nos. 2 to 6; vol. 22, No. 1.
*———, Royal Asiatic, Journal, vol. 9, part 2, 1876–7. From the society.
*———, Royal, of Victoria, Transactions, vols. 13 and 14. From the society.
———, Zoological and Acclimatisation of Victoria, Proceedings, vol. 5, 1878. From the society.
*Société Entomologique de Belgique, Publications of, current numbers.
*Sedimentary Formations of New South Wales, Remarks on. By the Rev. W. B. Clarke, M.A., F.R.S., F.R.G.S., &c. From M. W. S. Clarke, Esq.
*Sthenurus, on a new species of. By Professor Owen, C.B., F.R.S., F.Z.S., &c.
*Springs, Hot, Southport, Notes on a visit to the. T. Stephens, M.A., F.G.S.
*Shells, Land, from Fitzroy Island, List of. By Jno. Brazier, C.M.Z.S. From the author.
*———, Fresh water, of Tasmania, Further Notes on. By Rev. J. E. Tenison Woods, F.G.S., F.R.G.S., F.L.S., &c. From the author.
*———, On some new Tasmanian. By the Rev. J. E. Tenison Woods, F.L.S., F.G.S., F.R.G.S., &c. From the author.
*———, On some Tasmanian Fresh water Univalves. By the same. From ditto.
*———, The Land, of Tasmania. By W. F. Petterd. From the author.

*Tasmania, Souvenir of a Tour through. By E. Richall Richardson. From the author.
*Transactions of New Zealand Institute, vol. 10, 1878. From Dr. James Hector, F.R.S., F.G.S., &c.
*Tertiary and Post-tertiary Deposits on Flinders and other Islands in Bass' Straits. By R. M. Johnston. From the author.
*Thistle, Creeping, The, Notes on. By F. Abbott, jun. From the author.

*Universe, The, and the coming Transits. By R. A. Proctor, B.A., 1874. From His Excellency the Governor.

*Victorian Year Book. By H. H. Hayter, Government Statist, Victoria. From the author.

*Wales, New South, History of. By Thomas H. Brain, 1846. From the Rev. P. M'Pherson, East Maitland.
*Water Supply in relation to Disease. By the Rt. Revd. Bishop Bromby, D.D.

LIST of Donors to the Museum during 1878.

(For particulars of Donations see Lists in Monthly Proceedings.)

Atkinson, Rev. H. D., Circular Head
Boon, Capt., barque *Southern Cross.*
Baynton, Mr. S. J., Kingston.
Baynton, Mr. E. J., ditto.
Baynton, Mr. J. E., ditto.
Beccari, Dr., Florence.
Beddome, C. E., Esq., Brown's River Road.
Bowden, Mr. F., Hobart Town.
Barlow, Mr. W., New Town.
Barnard, J., Esq., Hobart Town.
Bethune, J. C., Esq., Dunrobin.
Bird, Rev. Stafford, New Town.
Cox, Dr. J., Sydney.
Chambers, Mr. J., Branxholme.
Cracroft, Miss, London.
Dale, Mr. Thos., New Norfolk
Davidson, Mr. W. H., Bagdad.
Dawson, Mr., Hobart Town.
Exton, Mr. E., Oatlands.
Hector, Dr. James, F.R.S., &c., Director Geol. Survey, New Zealand, Wellington.
Hull, H. M., Esq., Hobart Town.
Hutton, Capt. F. W., Dunedin, New Zealand
Hill, Mr. P., Castle Forbes Bay.
Johnston, R. M., Esq., Launceston
Johnston, G. T., Esq., Hobart Town.
Johnson, Capt., barque *Sea Shell.*
Kellaway, Mr., Glenorchy.
Lamb, H., Esq., M.H A., Clarence Plains.
Latham, G. H., Esq., Hobart Town.
Lewald, D., Esq., ditto.
Lloyd, C. G. W., Esq., New Norfolk.
Murray, Mr. J. M., W. Australia.
Mitchell, J., Esq., M.H.A., Lisdillon.
Oldham, Mr. P., Hobart Town.
Petterd, Mr. W. F., Launceston.
Richards, Rev. G. B., Horton College, Ross.
Simson, A., Esq., Gould's Country.
Spicer, Rev. W. W.
Scott, James, Esq., M.H.A., Launceston.
Solomon, J., Esq., Hobart Town.
Spong, E. N., Esq., King's Island.
Turner, Mr. N.
Withrington, Mr. J., Brickfields.
White, Rev. J., Hobart Town.
Woods, Rev. J. E. Tenison, F.L.S., F.G.S., &c., Sydney.
Wright, T. S., Esq., Glenorchy.
Watson, Mrs.
Yeoland, Miss, Long Bay.

LIST OF CONTRIBUTIONS OF PLANTS AND SEEDS TO GARDENS DURING 1878.

January 7: From J. Ring, Superintendent Botanic Gardens, Calcutta—Seeds.

January 8: From Baron Ferd. Von Müeller—2 species palm seeds.

January 17: From the Melbourne Botanic Gardens—Case of ferns.

February 10: From Mr. E. Sparling, Forest Department, India—Cones of Cedrus Deodara.

February 18: From the Calcutta Botanic Gardens—Seeds Cedrus Deodara.

February 18: From the Department of Agriculture, Washington, United States—40 species seeds.

March 28: From Vilmorin, Audrieux, & Co., Paris—36 packets seeds.

March 28: From Baron Ferd. Von Müeller—12 packets American tree seeds.

March 30: From J. N. Verschaffelt, Ghent, Belgium—Case rhododendrons.

April 4: From the Royal Gardens, Kew, near London—Cases willow cuttings.

April 8: From Mr. James Dall, Nelson, New Zealand—7 species ferns.

April 8: From Jules Coch, Nurseryman, Ghent, Belgium—43 species tree seeds.

April 8: From J. Lidbetter, Esq., Bombay—8 species seeds Indian coniferæ.

April 24: From Mr. Wm. Bull, London—One case bulbs, 55 varieties.

April 24: From Mr. C. F. Creswell—One box imported herbaceous plants, 148 varieties.

April 27: From Capt. W. Willet—65 packages imported seeds.

April 27: From Doctor Hector—6 packets seeds.

April 28: From the Melbourne Botanic Gardens—9 species seeds.

May 10: From H. M. Hull, Esq.—9 species seeds (American).

May 17: From M. J. N. Verschaffelt, Ghent, Belgium—1 large case trees.

May 17: From the Royal Gardens, Kew—Collection seeds, 90 species.

June 8: From Mrs. Riddle—9 packets Natal seeds.

June 23: From Mr. G. Brunning, Melbourne—2 cases plants—75.

July 6: From Baron Ferd Von Müeller—450 packets seeds.

July 17: From Mr. J. F. Duthie, Superintendent Government Botanic Gardens, Saharunpore, N. W. P., India—Collection seeds.

July 17: From H. J. King, Superintendent Royal Botanic Gardens, Howrah, Calcutta—Cedrus Deodara seeds.

July 27: From Messrs. Shepherd & Co., Sydney—Case containing 60 plants

July 27: From Dr. Hector, Wellington—9 packets seeds.

Aug. 17: From Mr. S. Purchase, Sydney—1 case plants.

Sept. 14: From Mr. E. Innes—10 packets W. Australian seeds.

Oct. 12: From Ch. Huber, France—34 packets seeds.

Oct. 19: From F. M. Baily, Queensland—Packet Eucalpytus seeds.

Oct. 31: From Mr. E. B. Heyne, Adelaide—200 packets seeds.

Oct. 31: From Mr. J. Lidbetter—Clumps Cephalotus follicularis.

Nov. 15: From J. N. Verschaffelt, Ghent, Belgium—Case Dutch bulbs.

Nov. 22: From Mr. R. Guilfoyle, Botanic Gardens, Melbourne—6 packets seeds.

From Mr. Innes—Clumps of Cephalotus follicularis.

PLANTS AND SEEDS SENT FROM GARDENS, 1878.

Jan. 1 : To Royal Gardens, Kew, near London—1 case plants.
Jan. 15 : To M. J. N. Verschaffelt, Ghent, Belgium—2 large tree ferns.
Jan. 30 : To Mr. A. Van Geert, Ghent, Belgium—5 tree ferns.
May 9 : To Mr. J. Linden, Ghent, Belgium—4 tree ferns.
May 20 : To Mr. G Brunning, Melbourne—1 case of plants.
June 12 : Mr. C. F. Creswell, Melbourne—1 case plants.
July 31 : To Messrs. Shepherd & Co., Sydney—1 bundle plants ; seeds.
Nov. 25 : To Ch. Huber & Co., Paris—1 package gum seeds.
Nov. 25 : To Messrs. Vilmorin, Andrieux, & Co., Paris—1 package seeds.
Nov. 25 : To the Royal Gardens, Kew, London—1 package gum seeds.
Nov. 25 : To Mr. Wm. Bull, London—1 package gum seeds.

PLANTS SUPPLIED FOR PUBLIC PLACES.

Church of England, Bothwell—62 plants.
Cemetery, Cornelian Bay—50 plants.
St. Mary's Cathedral—50 plants.
Horton College, Ross—50 plants.
Railway Reserve, Domain—20 plants.
General Hospital, Hobart Town—106 plants.
Cascade Establishment, Hobart Town—40 trees.
Church of England, Hamilton—50 plants.

F. ABBOTT, JUN.

PLANTS INTRODUCED INTO THE ROYAL SOCIETY'S GARDENS DURING THE YEAR 1878.

Abies Kæmpferi
Acacia Nayporensis
Acer atropurpureum
Acer colchicum rubrum
Acer lævigata
Acer platanoides dissecta
Aconitum anthora
Aconitum ochroleucum
Adenophora stylosa
Agave cærulescens
Agave micrantha
Allium reticulatum
Anemia flexuosa
Andromeda Mariana
Andropogon annulatus
Androsace coronopifolia
Anthericum liliago
Arnica chamissoni typica
Asplenium ebeneum
Asplenium filix-fœmina
Aster Nova-Belgie
Astilbe rivularis
Astragulus hypoglottis
Astrantia major
Azalea mollis
Berberis interrima
Betula affinis
Betula atropurpurea pendula
Betula odorata
Betula populifolia
Bignonia Chamberleyi
Bignonia Cherieri
Bignonia excelsa
Bouvardia candidissima
Bouvardia flava
Bouvardia longiflora flammea
Bouvardia oriflamme
Bouvardia Preelandi
Brodæa volubile
Cæsalpinia alternifolia
Campanula aggregata
Campanula barbata
Companula glomerata pallida
Companula Grosseki
Companula punctata
Companula Warneri
Caragana jubata
Caragana pubescens
Cardamine pratensis
Canna Porteana
Carya alba
Carya microcarpa
Carya porcina
Carya tomentosa
Ceanothus Lobbianus
Centaurea ferox
Cerasus palustris
Cerasus serotina
Cersium heterophylla
Cheilanthes hirta
Clematis Buchannani
Clematis Wolgorica
Conoclinum sps.
Coprosma picturata
Cornus Siberica
Coronilla iberica
Coronilla lilacina
Corydalis nobilis
Cratægus cordata
Cryptopyrium Richardsoni
Cyathea Cunninghami
Cytisus purpureus pendula
Datura humilis plæno
Dianthus calocephalus
Dianthus fragrans
Dianthus ornatus
Dianthus superbus
Doryopteris palmata
Draba tridentata
Dracocephalum altiense
Erica autumnalis
Erica Bothwelliana
Erica Everyana superba
Erica hyemalis
Erica rubens
Erica tricolor major
Erica mammosa
Erica ventricosa magnifica
Erodium Manascari
Fraxinus potomophila
Galaxia graminea
Gentiana asclepiadea alba
Geranium macrorrhiza
Gladiolus dracocephalus
Globularia nudicaule
Glycyrrhiza glandulosa
Godetia Lady Albemarle
Grindelia hirsutata
Grindelia squarrosa
Gymnogramma lauchiana
Gymnogramma sulphurea
Gymnogramma tomentosa
Gypsophila acutifolia
Hemerocallis graminea
Halleria tetraptera
Hedychium splendens

Hedysarum humile
Helleborus antiquorum
Helleborus atrovirens
Helleborus Colchicus
Helleborus cupreus
Helimodendron argenteum
Hemionites cordifolia
Hemitelia Smithi
Hyacinthus amethystinus
Iberis corifolia
Ipomæa digitata
Ipomæa Hardyi
Iris Alberti
Iris iberica
Iris Kæmpferi
Iris lutescens
Iris pallida
Iris reticulata
Iris tuberosa
Jasminum humile
Juglans cineria
Linum alpinum
Linaria Morroccana
Lonicera hispida
Lonicera Tatarica alba
Lonicera Tatarica pulcherrima
Lomaria attenuata
Lophanthus rugosus
Lychnis Alpina
Lychnis Chalcedonica alba plæno
Lychnis Chalcedonica rubra plæno
Lysimachia Dahurica
Matricaria Golden Gem
Mazus pumilio
Mesembryanthemum album
Meum athemanticum
Michausela campanuloide
Monarda didyma
Monarda splendens
Myrtus bullata
Nyssa capitata
Œnothera Jamesi
Œnothera odorata
Orobus vernus
Orobus vernus albus
Papaver Alpinum
Papaver setosum
Pavia macrostachya
Phyteuma comosum
Phyteuma campanuloides
Piper excelsum
Podocarpus Donnianus
Podophyllum
Podophyllum peltatum
Polygonatum roseum
Polygonum divaricatum
Pulmonaria Virginica
Quercus imbricaria
Quercus palustris
Quercus phellos
Quercus tinctoria
Salix acuminata
Salix cinerea
Salix nigricans atrovireus
Salix purpurea
Salix regalis
Salix subscricea
Salvia Chionantha
Sanguinaria Canadensis
Saxifraga Andrewsi
Saxifraga geranioides
Sedum oppositifolium
Sedum populifolium
Silene Saponaria
Sisyrinchium convolutum
Solanum ciliatum
Spiræa aruncus
Spiræa chamædrifolia
Spiræa filipendula plæno
Spiræa ivifolia
Spiræa lævigata
Statice Limonium puberula
Tanacetum fruticulosum
Teucrium Botrys
Thalictrum foliosum
Trollius aconitifolius
Trollius giganteus
Ulmus plumosa
Urtica Cannabina
Urtica ferox
Viburnum nudum
Viola pedata
Woldstenia fragarioides
Wulfenia Carinthiaca
Zizyphus, sp.

Roses.

Abel Grand
Baron Charaud
Baron Hausman
Camille Bernardin
Catherine Guillot
Celine Noiret
Christine Nillson
Compt Rainbaud
Duke of Wellington
Francois Fontaine
Hippolyte Jamin
Lady Suffield
Madame Rival Verne
Magna Charta
President Thiers
Rev. B. M. Cann
Sir Garnet Wolsey
Vaillaret joyeuse

Colens.

Aurora	Howesoni
Chanticler	Rossina
Charmer	Ruby
Empress India	The Don
Fairy King	Woodhouse
Florence	

Herbaceous Iris.

Amabilis	Monsieur Eugene
Ariadne	Martaban
Faustine	Orpheus
Fenelon	Solomon
Madame Charneaux	

Apples.

Aromatic Carolina	Nickajack
Cannon Pearmain	San-touchee
Equinetely	Symmonds' winter
Lipscombe's large	Watson's Carolina
Maverack's sweet	Yates

Cherry.

Bigarreau d'Holland	Ronald's late Duke
Late Duke	Scarlet Bigarreau
Morello de Charneaux	

Peach.

Italian red	Shanghai
Italian yellow	Stump the world

Apricot.

Bush peche	Grosse peche
Elruge	Oullin's early peach

F. ABBOTT, JUN.

JAMES BARNARD,
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