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PAPERS AND PROCEEDINGS

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REPORT

OF THE

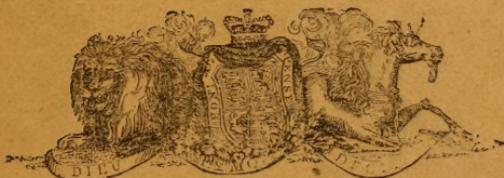
ROYAL SOCIETY

OF

TASMANIA,

FOR

1877.



TASMANIA :

PRINTED AT THE "MERCURY" STEAM PRESS OFFICE, HOBART TOWN.

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PAPERS AND PROCEEDINGS

REPORT

ROYAL SOCIETY

TRANSACTIONS

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.

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# ROYAL SOCIETY, 1877.

MARCH, 1877.

The monthly evening meeting of the Society was held on Tuesday, 13th March, James Barnard, Esq., 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., the Revd. John Gray, Messrs. R. R. Rex and William Belbin, M.H.A. Professor Ulrich, of Melbourne; and Alexander Wallis, Esq., Secretary to the Board of Agriculture, Victoria, were elected as corresponding members.

The HON. SECRETARY (Dr. Agnew) brought under notice the following returns :—

1. Number of Visitors to Museum during January, 1536; February, 1402.
2. Ditto to Gardens, January, 4279; February, 3939.
3. Plants received at Gardens during February 7th.
4. Time of leafing, etc., of a few standard plants in Botanic Gardens during February.
5. Presentations to Museum.
6. Books and periodicals purchased and presented.

America as usual has been the most liberal donor to the library, the present contribution comprising no less than ten quarto volumes—an "Atlas of Mining Industry"—Geological Explorations, with numerous pamphlets, and proceedings of various learned Societies.

#### *Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq., tables for January and February.
2. New Norfolk, from W. E. Shoobridge, Esq., ditto, ditto.
3. Port Arthur, from Dr. Coverdale, ditto, ditto.
4. Mount Nelson, tables for January and February; South Bruni Lighthouse, ditto; King's Island Lighthouse, ditto for October, November, and December, 1876, and January 1877. From the Marine Board.

The presentations to the Museum were as follows :—

1. From G. Bennett, Esq., M.D., F.L.S., F.Z.S.—A collection of Fossils, from Darling Downs, Queensland, viz.: Portion of Humerus, second vertebra (axis), and lower jaw of *Diprotodon Australis*. Tusks or Incisors of ditto. Portion of jaw of Kangaroo (*Procoptodon Goliath*, Owen). Molar teeth and portion of Jaw of *Diprotodon*. Jaws of different species of Kangaroo (*Macropus*.) (With note).
2. From Mrs. S. Parsons.—Models of a Rice boat, and Passenger boat, from Ceylon.
3. From Mr. Tabor, Huon Road.—Specimen of *Gordius* sp.
4. From Mr. E. Oldfield, Launceston.—An Egg, probably of a species of Petrel imbedded in hardened guano, from Bird Island.
5. From Mr. Josh. Gates.—Portion of human Skull from Kaipara, New Zealand.
6. From Mr. Thos. Dury.—One pound note of Faversham Bank, 1813.
7. From Mr. W. C. Blyth.—Three specimens of *Unio mortonicus* from Campbell Town.
8. From Mr. Graves.—Cast skin of Snake.
9. From Mr. Ferguson, Tinder-box Bay.—Skull of Seal (*Stenorhynchus leptonyx*).

10. From Capt. Dillner, brig Prairie.—Specimens of Copper Ore, Nickel, Limestone, Beche-de-Mer, etc. from New Caledonia. Shells from Browse, and other Islands. A living specimen of the Frilled Lizard (*Chlamydosaurus kingii*) from Port Darwin.
  11. From the Rev. James Thomas.—Six very beautiful specimens of Coral from the Friendly Islands.
  12. From Mr. W. J. Watchorn.—A Mexican Saddle, Bridle, Spurs, etc., etc.
  13. From R. C. Kermodé, Esq.—A named collection of English and Tasmanian Insects, and Eggs of Tasmanian Birds, mounted in a handsome cabinet. [The collection comprises 1339 specimens of Tasmanian, 205 of New South Wales, and 35 of English Insects; with 171 eggs].
  14. From J. K. Clark, Esq.—Three Pheasants, beautifully prepared and mounted in glass case.
  15. From Mr. T. Bates, Adelaide.—A silver Penny of James II., 1688.
  16. From H. M. Hull, Esq.—A Treasury Bill dated 1827, with autographs of Commissaries A. Moodie, G. Boyes, and G. Hull.
  17. From J. Scott, Esq., M.H.A.—Specimens of the small green Beetle which proved so destructive to vegetation in various districts of the colony during the early part of the summer.
  18. From J. E. Calder, Esq.—Similar specimens.
  19. From Mrs. Robert Gatenby, Isis River.—Seventeen silver and two copper Coins.
  20. From Mr. J. Whitehouse.—A large Mussel from the Derwent.
  21. From Mr. Eddington, Sorell.—Specimen of the sooty Crow-shrike (*Strepera fuliginosa*) of an unusually light colour.
  22. From Mr. Brent.—A Pelican (*Pelecanus conspicillatus*) shot at Glenorchy.
  23. From Mr. Weaver.—A spine-tailed Swift (*Chaturax caudacuta*).
  24. From Mrs. C. O. Parsons.—A specimen of one of the "Walking-stick Insects" (*Phasmidae*), probably *Acrophylla Chronus*, from Kurrijong, North Richmond, New South Wales. (See British Museum Cat. of Orthopterous Insects, p. 114, pl. 5 supplement.)
  25. From Mr. Armstrong, Christchurch, New Zealand.—A Human Skull, labelled "Head of Moa Hunter," with fragments of jade, etc., from Canterbury Plains, N.Z.
  26. From Mr. Collis.—Skin of an Australian Coot (*Fulica Australis*).—A Spanish Dollar found on Cape Barren Island, near supposed site of the wreck of the barque Britomart, about the year 1838.
  27. From Mr. John Gillon.—A collection of Cornelians from the Public Cemetery, Cornelian Bay.
  28. From Mrs. R. Pybus.—An ornamental Basket composed of shells collected at Bruni Island.
  29. From Professor R. Tate, Adelaide.—Specimens of *Belemnites senescens* and *Salenia tertiaria* from the middle tertiaries Aldinga, South Australia. Six specimens of South Australian Polyzoa, with a paper.
- [The special attention of the meeting was called to presentation No. 13, which was examined with the greatest interest by all present. The collection was made by the donor himself. When recently in England, Mr. Kermodé had the entire collection properly displayed, classified, and named by Janson, and thus for all time a trustworthy and authoritative standard of reference will be afforded to the entomologists of Tasmania [by means of this truly valuable and liberal donation.]

In reference to presentation No. 1, the following letter from the donor, Dr. G. Bennett, was read :—

"Sydney, Decr. 23rd, 1876.

"MY DEAR DR. AGNEW,—Mrs. C. Moore, visiting Hobart Town, has

kindly taken charge of a few fossils from Darling Downs, Queensland, which I present to the Royal Society if they are worthy of acceptance. (*Here follows a description of the fossils as detailed in the list of donations.*)

"In a letter from Professor Owen, dated Oct. 25th, 1876, he says his large and expensive work on the Australian fossils will soon be published, and adds, 'I have now got to p. 520, and plate 131!'

"Yours, etc., etc.,

"GEORGE BENNETT, M.D."

The SECRETARY informed the meeting that the microscope then on the table was presented to the Society by Mr. P. T. Smith prior to his departure for England. The instrument was a first-class one, by Ross, and was furnished with very many accessories, a vast number of mounted objects, etc. It was a very great acquisition for the Society, as its value (with its numerous appliances) could not be far short of £200. It had recently belonged to the late Dr. Valentine of Campbell Town.

The SECRETARY reported that the committee appointed at the late general meeting of the Society, for the purpose of urging upon Government the claims of the Public Gardens for an increase of the grant-in-aid, had waited on the Hon. the Colonial Secretary, and had expressed the views of the Society on the subject. In reply, the Colonial Secretary admitted he was fully convinced as to the claims of the Gardens to increased support, and expressed himself as being most desirous to do anything which might be in his power in the matter. As his colleagues, however, were not in town, he suggested that the committee should address to him a letter containing a full statement of the case. This he would submit without loss of time to the other members of Government for their consideration, and, although of course they had no power to give immediate effect to the views of the deputation, the subject would be brought by means of the estimates under the consideration of Parliament at its next meeting.

Subsequent to this interview the committee had agreed upon the following letter, which was accordingly forwarded to the Honorable the Colonial Secretary :—

"Royal Society of Tasmania,

"24th February, 1877.

"SIR,—Agreeably to your request to the committee which was appointed at a general meeting of this Society, to wait on you in order to advocate the claims of the Public Gardens to increased assistance from Government, I beg, on behalf of the committee, to submit the following statement, which may be considered supplementary to former communications addressed to Government on the 20th May, 1875; 8th September, 1875; and 5th April, 1876 :—

"The grant-in-aid is now only £400, and if we add to this £120 as the extreme money value of the prison labour, the total assistance from Government will not exceed £520 per annum, but may be less. Thirty-seven years ago the assistance rendered by Government was equal to £1,200 at the present time; although at the former period the Gardens were little more than half their present size, they contained probably little more than one-tenth of the number of plants now in cultivation, and labour and provisions, as calculated by Mr. Abbott, were about one-third of their present value. The labour afforded by the prison gang, too, is not satisfactory in character, as the men are naturally idle and indifferent, and, from ignorance of the work, they cannot be employed in any operations requiring skill or care; and their supervision also requires the attention of one of the few skilled gardeners, whose loss is consequently severely felt elsewhere.

"It is to be recollected that the Government grant only supplies labour to the value of £250, as the very inadequate salary of the superintendent absorbs the remainder, and is must therefore be self-evident that, for such

a sum, at the present rate of wages, not one-third part of the ground could be properly cultivated. Were £300 a year added, the Gardens might be kept in a tolerably creditable condition, yet even this would be a mere fraction in comparison with the sums granted for similar purposes in the neighbouring colonies. In Victoria, for Gardens about twice as large as ours, £7,220 were voted for the year 1876-7. In New South Wales the Gardens received £4,469; in South Australia, £6,700; and in Queensland, £2,485.

“Very recently the free labourers in the Gardens forwarded a respectful petition for a small increase to their pay, which is only four shillings per day, without rations! This very fair petition could not be complied with for want of funds, and although the men, from long habit and interest in their work, have remained much longer than could have been expected, it is now known they will not continue to do so, and it would be quite impossible to replace them. The urgency, therefore, for an increased grant is most pressing.

“It has been said if an increased grant were given to these Gardens that similar assistance would be asked for other places. But this objection has no real weight, as no colony could fairly be expected to support duplicate National Institutions. Even a wealthy nation like England does not support more than one British Museum, one Royal Observatory, or one great Botanical Garden (Kew). It must, indeed, be evident that, in an economic and educational point of view, it must be more to our advantage to have one well appointed and scientifically conducted Garden, than to fritter away our means on several, all of which would necessarily be inferior in quality, discreditable to the colony, and valueless for educational purposes.

“It may be added that in making this application for a grant of £700 a year to these National Gardens the Royal Society is acting solely on behalf of the public. It is not, perhaps, generally understood that the Society receives nothing whatever from Government, and has never asked anything for itself. It is in fact self-supporting, and at its own expense issues its publications; maintains its continually increasing library; and keeps up friendly relations with kindred institutions in various parts of the world. On many occasions it has even afforded considerable pecuniary assistance to both Gardens and Museum. As to the grants to the Museum and Gardens the Society acts strictly as an agent for Government, by receiving and distributing them in a correct and careful manner.

“I have the honour, etc., etc.,

“J. W. AGNEW, M.D.,

“Hon. Sec.

“The Hon. the Colonial Secretary.”

The feeling of the meeting, as expressed by several of the members, appeared to be that the Committee had done all that was possible in the matter for which it was appointed, and that the future of the Gardens must rest in the hands of the Ministry and of Parliament.

The Rev. W. W. SPICER mentioned that during the interview with the Hon. the Colonial Secretary he had recommended the interchange of certain books between the Public, the Parliamentary, and the Royal Society's Libraries. Each library, in fact, contained some works which would find a more fitting place on the shelves of another, and the interchange would be a benefit to all. The Colonial Secretary had entertained the idea favorably, and he (the speaker) felt certain that good would result were it acted on.

It was agreed that the Librarians of the several libraries should be requested to compare their catalogues, and determine if satisfactory interchanges might be made, it being understood that no such exchanges could be effected without the sanction of Parliament.

The SECRETARY laid on the table two copies of the *Santa Barbara*

(California) *Weekly Press*, with many cuttings from American papers on the subject of Angora wool, together with a sample of the wool itself. [The sample, which can be seen at the Museum, is a pure white, with a beautiful silky lustre, and  $16\frac{1}{2}$  inches in length.] The following letter was read :—

“*Santa Barbara Press*,  
“Santa Barbara, Cal., U.S.,  
“14th January, 1877.

“To the Hon. Secretary, Royal Society of Tasmania.

“DEAR SIR,—I have read in the *Bulletin* of our National Association of Wool Manufacturers, interesting extracts from the proceedings of your Society relative to the culture of the Angora Goat in Tasmania, and have re-published portions of the same, which I will mail to you in the *Press*.

“I write to ask you to favour me with a complete printed copy of your proceedings containing the able paper of Mr. John Swan, M.H.A., on this topic, together with any other facts in your possession relative to the introduction, culture, and breeding of the Angora in your country. It is an object of great interest to me and to California, and I wish the facts for preservation and dissemination. In return for the courtesy I will be glad to mail to your address some publications on this industry in this country, which I hope will be found of interest. I will of course pay, besides, any charges there may be on the papers you may send, when the same shall have been ascertained.

“I have written Mr. Swan, in your care, to the same effect.

“I am, etc., etc.,  
“H. G. OTIS,  
“Editor.”

The SECRETARY read a paper “On some South Australian Polyzoa,” by F. W. Hutton, Esq., F.G.S., Director of the Museum, Dunedin; and in connection with it the following note from Professor R. Tate, of Adelaide, was also read :—

“4 Buxton-street, Adelaide,  
“17th Novr., 1876.

“DEAR SIR,—Herewith I send you M.S. ‘On some South Australian Polyzoa’ by my correspondent Mr. F. Hutton, as a communication to the Royal Society of Tasmania; also specimens of the new species therein described.

“I beg to communicate that I have discovered species of *Belemnites* and *Salenia* in the Middle Tertiaries (? Miocene) of South Australia; they were obtained by myself in the sea cliffs of Aldinga Bay, about 26 miles south from here, and are associated with the characteristic fossils of the Murray and Mount Gambier beds. The technical descriptions of the new species have been communicated to the Geological Society of London, and the species named *Belemnites senescens* and *Salenia tertiaria*.

“Hitherto the genus *Belemnites* has been represented in Tertiary strata only by one species, from the Eocene of Germany.

“The present species of *Salenia* is the first recorded from Cainozoic strata, and it happily fills the gap which was made by the discovery of the genus in a living state during the voyage of the Challenger. I send you examples of the new species.

“Truly yours,  
“RALPH TATE.

“Dr. Agnew, Secretary Royal Society of Tasmania.”

A “Census, with brief description of the Marine Shells of Tasmania and the adjacent Islands,” by the Rev. J. E. Tenison-Woods, F.L.S., F.G.S., F.R.G.S., Corresponding Member of the Royal Societies of New South Wales and Tasmania, etc., etc., was laid on the table.

The Rev. W. W. SPICER after commenting on the great value to all

future Tasmanian entomologists of the large cabinet presented by Mr. R. Kermode, proposed a special vote of thanks to the donor. A similar vote was also due to Mr. P. T. Smith for the Microscope, a presentation for which any Society would feel indebted, and he had much pleasure in including in his motion Dr. G. Bennett, the learned naturalist of Sydney, for his most interesting presentation. The motion having been carried, the thanks of the meeting were accorded to the authors of papers and to the donors of presentations, when the proceedings terminated.

## APRIL, 1877.

The monthly meeting of the society was held on Tuesday, the 10th April. The Right Reverend the Lord Bishop of Tasmania in the chair. An unusually large number of Fellows attended, and the Rev. George Brown, Wesleyan Missionary to New Britain and New Ireland (lately returned from those islands), was present as a visitor.

Alfred Dobson, Esq., was elected a Fellow, and F. W. Hutton, Esq., Director of the Otago Museum, Dunedin, New Zealand, as a Corresponding Member of the Society.

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

1. Number of visitors to Museum, total 1592.
2. Ditto ditto to Gardens, total 4495.
3. Plants and seeds received at Gardens. From Messrs. Huber and Co., Hyeres, France, two packets of seeds. From M. Aug. van Geert, Ghent, 112 plants, comprising Rhododendrons, Magnolias, Lilies, Peonies, Clematis, etc. From Baron Ferd. von Mueller, seeds of *Festuca dives*.
4. Time of leafing, flowering, and fruiting of a few standard plants in the Botanic Gardens during March.
5. Books and Periodicals received.

*Meteorological Returns—*

1. Hobart Town, from F. Abbott, Esq.—Table for March.
2. New Norfolk, from W. E. Shoobridge, Esq.—Ditto.
3. From the Marine Board—Mount Nelson, table for March; Goose Island, tables for January and February.
4. Port Arthur, from Dr. Coverdale—Table for March.
5. Melbourne, from R. J. L. Ellery, Esq.—Printed records for August and September, 1876.

The presentations to the Museum were as follows :—

1. From W. K. Dixon, Esq., Ouse—A Spine-tailed Swift (*Chaetura caudacuta*), and an Emu Wren (*Stipiturus malachurus*).
2. From Captain W. Fisher—A Sawfish (*Pristiophorus cirratus*).
3. From Dr. Coverdale—Four hair balls from the paunch of a calf six weeks old. Concretions from paunch of a sheep.
4. From Owen Meredith, Esq.—Specimens of Stream Tin from Mount Heemskirk, Western Tasmania, found on land taken up and intended to be worked by the Emu Bay and Pieman's River Prospecting Company.
5. From Mr. C. Sandberg, per Mr. O. H. Hedberg—Stream Tin from the "All Nations" Co.'s mine, Main Creek, Thomas' Plains, Ringarooma.
6. From Master A. Maddock—Two insects (*Cyria imperialis*) from Mount Nelson.
7. From Mr. J. Lucas, Huon—A specimen of the Golden-bellied Beaver Rat (*Hydromys chrysogaster*). An Opossum Mouse (*Dromicia gliriformis*).
8. From Mrs. Maun, Senr., Clarence Plains—A curiously malformed Egg of domestic fowl.
9. From Mr. J. W. H. Clark—Two freshwater mussels (*Unio mor-tonicus*) from the Elizabeth River, Campbell Town.
10. From the Rev. James Thomas—A Basket made by the natives of Tonga. Two crab shells, ten specimens of Echinodermata, two species of Coral attached to a piece of rock, two specimens of *Lithodomus*, and seeds of *Abrus precatorius* from the Friendly Islands.

11. (Name of donor not sent). Specimens of Crayfish "found some two or three feet beneath the surface of the ground, chiefly in moist places at roots of trees, and from about 100 to 500 feet above running water, on North-west Coast of Tasmania,"
12. From Mr. O. H. Hedberg—A Crayfish, from the Hobart Town rivulet, Fern-tree Valley.
13. From Mr. Spencer—Sample of Coal from Jerusalem.
14. From Miss Knight—A Fish (*Capros australis*) caught at Sandy Bay.
15. From Mr. Harbroe—A Fish (*Scorpaena sp.*) caught at Risdon.
16. From Mr. S. Dove—Specimen of dendrites on Sandstone, from Knocklofty.
17. From F. W. Hutton, Esq., Director of Otago Museum, Dunedin—An Arctic Fox (*Vulpes lagopus*) from Iceland. A King Bird of Paradise (*Cicinnurus regius*) from New Guinea.
18. From Lieutenant Langdon, R.N.—Two Notes (5 piasters and 25 centimes) of National Bank of Hayti.
19. From Master Hull—Specimens of a paper-like substance from the reservoir at Cascades.
20. From the Rev. G. Brown—A collection of Ornaments made by natives of New Britain and New Ireland, viz. :—Shell and tortoiseshell armlets, a nose ornament, a large neck ditto, shell money, a small basket, and a kind of Jew's-harp, from New Britain. (This instrument is remarkable from being constructed exactly on the principle of the common Jew's-harp—that is, two external arms with a small vibrating tongue between them. When touched by Mr. Brown the sound produced was almost identical with that of the Jew's-harp). Two neck ornaments, one head ditto, a rattle and a string of shell money, from New Ireland. A shell armlet, from the Solomon Islands. Also twelve prepared bird skins from Duke of York Island, New Britain, and Fiji. Specimens of Chalk from New Ireland.

The Rev. W. W. SPICER read some notes, and a communication from Baron Ferd. von Mueller, on the curious confervoid substance from the Cascades reservoir. (Presentation No. 19.)

The Rev. G. BROWN, C.M.Z.S., having been introduced by the Secretary, was kind enough, agreeably to request, to favor the meeting with some very interesting observations descriptive of the various islands he had recently visited, with remarks on the inhabitants, their language, manners, and customs. The islands referred to were New Britain, New Ireland, and the Duke of York Group. A description, in the Proceedings of the Linnean Society of New South Wales, of many objects of Natural History collected in these islands was noticed and extracts from it read. As to the ethnology of the people, it was evident they were true Papuans. This was proved by colour, their thick curly matted hair, the grammatical construction of the language, and also by some of their manners and customs. Illustrative of some of these remarks, the speaker instanced the different construction of the words "my face," "your face," "his face," in the Samoan, Fijian, and Duke of York languages, showing the similarity of grammatical construction in the latter two, and its difference from the Samoan and other Malayo-Polynesian dialects. It was suggested that the peculiarly sacred relation sustained by the sister and sister's children to the brother's children (called by the name of Tamaha in Tonga, Tamafafine or Tama-Sa in Samoa, and Vasu in Fiji) would be found to be one of the distinguishing marks of connection between the Malayo-Polynesian races; whilst the custom of dividing all the people into two classes, called respectively "Pickalaba" and "Maramara" in the Duke of York dialect would probably be found to

indicate a Papuan origin, or previous connection of races in all the islands in which the custom exists. Each class had its own particular share of the land and of the cocoa-nut trees. Members of either were not permitted to intermarry, the rule being that the male of one class must marry a female of the other; and it was curious that in the event of death all property and children passed to the mother's class. Mr. Brown then exhibited some specimens of true chalk from New Ireland. These were interesting, because no chalk is found on the islands, but blocks of it are said to be thrown up occasionally on the shores by earthquakes and tidal waves. It was a very remarkable circumstance that the natives though accustomed to nothing but nudity, carved out of these blocks, or masses, figures clothed in a fashion somewhat similar to that of the Elizabethan age and suggestive, therefore, of a probable visit by Spanish explorers at that period. The tribe that carved these figures was an inland one.

Some remarks were then made on the geographical distribution of the Fauna, more especially as regards the Marsupials found on New Britain and New Ireland. The Cuscus was found in abundance on New Ireland, the most distant island from New Guinea, but was *not* found on New Britain. The Wallaby, which is described and named by Mr. Ramsay in the Proceedings already referred to, was found on New Ireland alone, but it was possible it might exist on New Britain, though no specimens were obtained from that locality. The only Marsupial found on New Britain was a small Flying Squirrel. A new *Perameles* (Bandicoot) was found on the Duke of York Island.

The curious custom of "Duk Duk" was explained. For this the natives gathered together in a large ring, within which two chiefs accompanied by a native fantastically dressed to represent a Cassowary took their stand. Suddenly from the bush another native, dressed like a Cassowary, would break into the ring, and, brandishing a spear, rush in a menacing manner towards the chiefs. After threatening them for some time, he would suddenly stop, and stooping down, present his back to them. Then one of the chiefs or their companion would take a strong cane and strike him a very severe blow (occasionally twice) with it across the shoulders. Having received the blow, the man would leave the circle and others would take his place and go through the same ceremony.

Another peculiar rite was that in which the elders of the tribe took the youths before they were admitted to manhood into the bush where they fed them for some weeks solely on shark's flesh, turtle, and pork. On their return to the tribe they never afterwards, during their entire life tasted any one of these articles of food.

Mr. BROWN then alluded to certain strange reports which had reached him of a race of men possessed of tails who were said to live in the interior of New Britain. These reports were almost incredible, yet they came from so many sources, and were so explicit in their descriptions, that at last he (Mr. Brown) organised a party and started for the locality where the tails were said to flourish. Most unfortunately soon after starting one of the party, a sailor, got access to a bottle of gin and thus was the cause of an accident of such a serious character, that the party had to return to the ship with the wounded man, and circumstances then prevented a renewal of the expedition.

Mr. M. ALLPORT, after moving a vote of thanks to the Rev. W. W. Spicer, and to the donors of presentations, proposed that a special vote should be accorded to the Rev. G. Brown for his highly interesting and instructive address.

The BISHOP OF TASMANIA said it was scarcely necessary for him to put this vote to the meeting as he was sure it would be carried by

acclamation. For himself he would say he had never spent a more pleasant evening at any of their meetings than he had just done in listening to the admirable address by the Rev. G. Brown. He was very glad to hear that Mr. Brown did not intend to sever his relations with the Society as he proposed on his return to the scene of his labours to favour us if possible with further information and specimens, all of which the Society would well know how to appreciate.

The vote having been carried Mr. BROWN returned thanks, when the proceeding terminated.

## MAY, 1877.

The monthly evening meeting of the Society was held on Monday, the 7th May. His Excellency the Governor in the chair.

The following gentlemen, who had previously been nominated by the Council, were ballotted for and declared duly elected as Fellows of the Society, viz:—

1. John Perkins, Esq., Mayor of Hobart Town.
  2. Frederick John Simson, Esq., of Brighton.
- And the Rev. George Brown, C.M.Z.S., of the Wesleyan Mission to New Britain, as a corresponding member.

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

1. Number of visitors to Museum during April, total 1582.
2. Ditto to Gardens, ditto, ditto, 4198.
3. Seeds received at Gardens.
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 April.
2. New Norfolk, from W. E. Shoobridge, Esq.—ditto.
3. Port Arthur, from Dr. Coverdale—ditto.
4. From the Marine Board—Tables from Mount Nelson and South Brunni for April; Kent's Group for December 1876, January to March, 1877; and Goose Island for March.
5. From Mr. Roblin—Abstracts and results of observations registered at the lighthouses and other coast stations in Tasmania during 1876.
6. Adelaide, from C. Todd, Esq.—Printed tables, monthly, from January to October, 1876.

The presentations to the Museum were as follows:—

1. From Mr. John Brazier, Sydney—A beautiful specimen of an Echinoderm (*Lobophora truncata*), from New Caledonia, dredged by the donor from a depth of eight fathoms. (With a note.)
2. From Mr. R. A. Murray—Specimen of rock with native silver, from the Hampshire Hills silver mine. (Van Diemen's Land Company.)
3. From Mr. Edward Nicholas, jun., Meadsfield—Specimen of silicious rock from between Lake Echo and the Serpentine.
4. From Mr. Arthur K. Johnston, Cleveland Bay—"A sample of fibre beaten from the bark of a tree, and used by the natives of the Louisiades Islands for making fishing lines and ropes for their canoes."
5. From Mr. W. Piguénit—Flower and seed of (*Banksia serrata*) from the North Coast of Tasmania.
6. From Mr. John Allison—A Bronze Cuckoo (*Lamprococcyx basalis*.)
7. From Mr. Penny, Queen's Asylum—A Pheasant, killed at New Town.
8. From Mr. Wilson, Bellerive—Crystals of Gypsum, from Riverina.
9. From Mr. J. E. Baynton—An internal cast of a fossil univalve shell, from Patea, New Zealand.
10. From Mr. James Wilson, Ashgrove, Oatlands. A White Hawk (*Leucospiza novæ hollandiæ*.)
11. From Mr. R. Terry, New Norfolk. Section of a large fungus from a Peppermint Tree (*Eucalyptus amygdalina*).

12. From John Swan, Esq. Specimens of copper ore from the Duck River, Tasmania.

In reference to the monthly returns from the Gardens of "the time of leafing, flowering, and fruiting of a few standard plants," His EXCELLENCY remarked it would be interesting to notice if change of climate, or soil, or other circumstances modified the habits of certain English trees. From his own observation at the grounds about Government House he could state that some trees which, in England, came into leaf before others, here acted in an exactly reverse manner.

Discussion ensued, in which the Rev. W. W. Spicer, Sir Francis Smith, Mr. Justice Dobson, Mr. Swan, Mr. Allport, and Mr. Abbott took part; and on the whole, it appeared probable that varieties in exposure or position might influence different trees variously as to their leafing, etc. Mr. Abbott, however, engaged to obtain further and more precise information on the subject, and bring it before a future meeting.

The Rev. W. W. SPICER read a paper on "Aliens," or plants which have been introduced into the colony and naturalised. Illustrative of the paper a collection of plants was laid on the table, embracing all those referred to in the text. These, amounting to 140 specimens, were collected, mounted and named by Mr. Spicer, and very liberally presented by him to the Museum.

HIS EXCELLENCY informed the meeting he had written to England for a supply of cuttings of the new fodder plant, the Prickly Comfrey. It was probable this climate would suit it exactly, but that of England appeared to be too cold, as it did not seed there, and therefore cuttings were sent for. Its cultivation would be tried on the grounds at Government House, and, if successful, seeds or cuttings would be distributed throughout the colony. It appeared to be well suited to a deep sandy soil as the roots were found to go as far as nine feet in depth. It was of a vigorous nature, and in one district of England had been grown for fourteen years consecutively without any appreciable loss of strength or vitality. It had been known to produce the astonishing result of one hundred tons to the acre. Its own leaves were good manure for it. It was said to be the very best soft food for horses. It was very good for cattle, and supposed to be a preventative to the diseases to which they are liable, and also well adapted for dairy food, as it produced no unpleasant effect on the milk.

Colonel CRAWFORD saw the plant in cultivation at the Royal Agricultural College at Cirencester in England many years ago, but it did not seem at that time to be much thought of.

HIS EXCELLENCY thought that any discrepancies of this kind might be explained by the fact that there were two species of the Comfrey.

Colonel CRAWFORD, in connection with the President's remarks as to the probability that this climate would be more suitable to the Comfrey than the English, observed that the difference of the climates was very clearly marked by the growth of the blackberry and the sweetbriar on the Northern side of the island, as it far surpassed anything of the kind he had ever seen in England. The Blackberry grew into huge hedges, so high and dense that boys climbed up to the tops by ladders, and then went along the surface by laying down palings to walk upon. Large quantities were made into jam and sent to Queensland, where it was said to be good for bowel complaints. He thought large quantities of the small twigs of the Sweetbriar could be very profitably sent home to persons engaged in the manufacture of scents.

HIS EXCELLENCY had also been struck by the enormous hedges of the Sweetbriar in the Ringarooma district.

Mr. SWAN observed it was a curious circumstance as to the Blackberry that he had never seen birds feed upon it.

Mr. SPICER did not think either the Blackberry or Raspberry was eaten by birds in England, although the Strawberry was.

Mr. Justice DOBSON had great pleasure in proposing that a special vote of thanks should be given to Mr. Spicer for the paper which had just been read, and to which he and all present, he was sure, had listened with extreme interest. The Museum, too, could not but be much indebted to the learned author of the paper for the very liberal donation of the large collection of plants which accompanied and illustrated it.

The vote having passed, and thanks having been accorded to the other donors of presentations, the President left the chair.

## JUNE, 1877.

The monthly evening meeting of the Society was held on Tuesday, 12th June. The Right Revd. the Bishop of Tasmania in the chair.

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

1. Number of visitors to the Museum, 1,100.
2. Ditto to Gardens, 3,371.
3. Seeds received at Gardens—From Mr. Piesse, 14 packets of Flower seeds. From His Excellency the Governor, seeds of the Mesquit, or Screw Bean (*Prosopis pubescens*). From Mr. J. Dawson, 16 packets seeds from Fiji. From Messrs. Huber, France, seeds of *Jacaranda mimosafolia*. From H. M. Hull, Esq., Secretary to the Philadelphia Exhibition Commissioners, 25 packets seeds.
4. Plants supplied for public places :—For planting grounds at Hospital and Public Buildings, Launceston, 176 plants, and collection of bulbs. For grounds of St. Mark's Church, Kangaroo Point, 100 plants. For the Public Recreation Ground, New Norfolk, 100 plants. For the Hobart Town Cemetery, 180 plants.
5. Time of leafing, flowering, and fruiting of a few standard plants in the Botanic Gardens during May.
6. Books and Periodicals received.
7. Presentations to Museum.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott Esq.—Table for May.
2. New Norfolk, from W. E. Shoobridge Esq.—Ditto.
3. Mount Nelson, table for May; Swan Island, ditto for April.—From the Marine Board.
4. Melbourne, from R. J. L. Ellery, Esq.—Printed tables for October 1876.
5. Adelaide, from C. Todd Esq.—Ditto ditto for November and December, 1876.

The presentations to the Museum were as follows :—

1. From E. D. Swan, Esq.—36 North and 15 South American Birds ; prepared, mounted, and named.
2. From Wm. Pitt, Esq.—Three tertiary fossils, viz., two specimens of a species of Oyster, and a Crab, from Brighton, West Coast of New Zealand.
3. From Mr. R. F. Archer.—Six samples of Tin Ore, from Mount Bischoff.
4. From Mr. F. Wise.—Specimens of Copper Pyrites, from Mount Maurice.
5. From the Rev. R. E. Dear.—Portions of a block (English Elm), and a spar (Celery-topped Pine), from the Priscilla, completely riddled by the Teredo during 11 months' submersion near Huon Island.
6. From Mr. W. E. Shoobridge.—Specimen of Sulphate of Magnesia, from caves near New Norfolk.
7. From Mr. R. M. Johnston.—A Pouched Lamprey (*Geotria Allporti*).
8. From Dr. E. L. Crowther.—An Australian Bittern (*Botaurus poiciloptilus*.) A Water Snake (*Pelampus bicolor*).
9. From H. M. Hull, Esq., Secretary to the Philadelphia Exhibition Commissioners.—Seven samples of American Wool, and seven ditto of Cinchona and other barks,
10. From Mr. J. Bidencope.—Stereotype mould and portion of casting as used in printing the *Sydney Morning Herald* newspaper.

11. From Mr. G. W. Rex.—A Potato, pierced in two directions by the underground stems of the Couch Grass (*Triticum repens*).

The following additions to the Library were reported:—

1. From the Hon. the Colonial Secretary.—Two pamphlets—“The Progress and Resources of New South Wales,” by C. Robinson, Esq.; and “Tobacco: its Culture and the Curing of its Leaf,” by Aug. Morris, Esq.
2. From H. M. Hull, Esq.—Three pamphlets, viz.,—“Contributions to the Flora of Iowa,”  
“Regulations of the Wisconsin State Agricultural Society,”  
and “Prizes for Arboriculture offered by the Trustees of the Massachusetts Society for Promoting Agriculture.”
3. From H. C. Russell, Esq.—“The Climate of New South Wales.”
4. From the Meteorological Office, London.—“Charts of Meteorological Data for nine 10° Squares of the Atlantic, with Remarks.”

In reference to a question which had been brought forward at a late meeting of the Society, namely, the alleged sanitary influence of the Blue Gum tree (*Eucalyptus globulus*), Dr. Agnew mentioned that certain experiments had been recently conducted at home by Mr. C. T. Kingzett, F.C.S., etc., which might possibly assist in throwing some light on the subject. In a lecture delivered before the Society of Arts in February last, Mr. Kingzett showed that the slow oxidation of certain turpentine, with which the essential oil of the Blue Gum is virtually identical in chemical composition, give rise to two very active sanitary products; one, the peroxide of hydrogen, well-known as a most potent disinfectant; the other camphoric acid, a powerful antiseptic. Now, as the free elimination of these agents was continually going on wherever the *Eucalyptus* was cultivated it was clear nothing could be more conducive to the destruction of malaria and the consequent preservation of health, and hence the recognised value of this tree in the malarial regions of the Campagna near Rome, and in the vicinity of the Douro in Spain. It was right to add, however, that during the discussion which followed the reading of Mr. Kingzett's paper, a learned writer on sanitary science, Dr. Thudichum, thought that the beneficial action which the *Eucalyptus* was supposed to exert, was more probably due to its sucking up the superabundant moisture of the ground and thus destroying malaria.

The Rev. W. W. SPICER suggested that the tree might act as a valuable sanitary agent in both ways.

Mr. F. ABBOTT, F.R.A.S., read a lengthened paper on “The Modern Progress of Astronomy.” Being necessarily a *resumé* the paper did not invite or call for discussion.

The Rev. W. W. SPICER, F.R.M.S., read a paper “On the occurrence of ‘Ergot’ on Rye-grass.”

Mr. W. E. BAYNTON, of Kingston, (who furnished the specimen referred to in the paper), in reply to a question stated that hitherto none of his cattle had suffered from eating the diseased rye-grass, but this was probably due to the fact that as yet only a very small patch of the grass had become affected.

Sir JAMES WILSON was sure every one present would agree with him in thinking that not only this Society, but many others to which we have sent our Meteorological Tables, were much indebted to Mr. Abbott for his unwearying attention, extending over a period of about 30 years, to meteorological observation. No other member, he thought, had done more for the Society, and he had therefore much pleasure in proposing that our best thanks were due to Mr. Abbott not only for the paper on “The Modern Progress of Astronomy,” which had just been read, but for all his past exertions in the cause of meteorology.

The CHAIRMAN in putting the motion observed it was happy for us, seeing that the Government had done so little for meteorology, that one of our members had been able to effect so much. The motion having passed, a "special vote of thanks" was accorded to Mr. E. D. Swan for his very valuable and acceptable donation; and, a vote of thanks having been also given to the Rev. W. W. Spicer, and the donors of the presentations, the proceedings terminated.

## JULY, 1877.

The monthly evening meeting of the Society was held on Tuesday, 10th July. His Excellency the Governor was in the chair.

Charles Henry Smith, Esq., Consular Agent for Italy at Launceston, who had previously been nominated by the Council, was balloted for and declared duly elected as a Fellow of the Society.

The Hon. Secretary, Dr. AGNEW, laid on the table the following returns for the past month, viz.,

1. Number of Visitors to Museum, 1,486.
2. Ditto to gardens, 3,158.
3. Plants received at gardens.—From Mr. Wm. Lamdner, Melbourne, seeds of Valonia Oak (*Quercus Ægilops*). From Baron F. von Mueller, Melbourne, three packets seeds.
4. Plants and seeds sent from Gardens :—To the Department of Agriculture, Washington, United States, 100 packets of seeds. For grounds of Cemetery, Cornelian Bay, 40 plants. For grounds of Launceston Hospital, 150 plants. For Horton College, Ross, 100 plants. For grounds of St. David's Cathedral, two plants. For grounds of Sandy Bay Cemetery, 50 plants.
5. Times of leafing, flowering, and fruiting of a few standard plants in the Botanic Gardens during June.
6. Books and Periodicals received.
7. Presentations to Museum.

*Meteorological Tables.*—

1. Hobart Town, from Mr. F. Abbott.—Table for June.
2. New Norfolk, from Mr. W. E. Shoobridge.—Ditto.
3. Mount Nelson, table for June; Swan Island, ditto for May; Goose Island, ditto for April and May; South Bruni, ditto for May and June; Kent's Group, for April.—From the Marine Board.
4. A series of the American simultaneous meteorological observations, forwarded from the chief signal office, Washington, U.S. [In these the "simultaneous" observations taken at Hobart Town by Mr. F. Abbott appear, in the "British Series," for the first time; the Melbourne Observatory furnishing the only other record for these colonies.]

The presentations to the Museum were as follows :—

1. From Master Dunstan.—A specimen of the "More-pork" (*Podargus Cuvieri*), from Kangaroo Point.
2. From Mr. Hissey.—Two specimens of young of Native Devil (*Sarcophilus ursinus*) from the pouch.
3. From Mr. J. Brown.—Specimens of iron ore, etc., from Glaziers' Bay.
4. From Lieut. F. G. C. Langdon, R.N.—22 polished specimens of Fossil Wood from Jamaica. [These beautiful specimens were examined with great interest, the minute structure of the former woody tissues being brought out with peculiar distinctness.]

HIS EXCELLENCY, after referring to a former communication he had made to the Society as to the value of a new article of fodder—the pods of the *Prosopis pubescens*, or Screw Bean—laid on the table some further information on the subject by an employé at the Cinchona Plantation, Jamaica. From this it appeared that, on one occasion, when a horse had eaten a pound of the pods he was found dead on the morning of the third day afterwards, the impression being that the death was due to some poisonous property in the bean. It was, therefore, evident that as a fodder the bean should be very cautiously tried. And caution was the more necessary as it was well known in Jamaica that the pods of another species of the same genus—*Prosopis juliflora*—though "a valuable fodder," was apt, especially after rain, to produce intestinal disturbances, and in some cases death. As far as the seed which had been distributed by him was concerned, no harm

could possibly have been done, as it had quite failed (as far as he was aware) to germinate, vitality having apparently been destroyed by weevil.

The Hon. SECRETARY read a paper "On the Hobart Town Storage Reservoir," by T. Stephens, Esq., F.G.S.

The Rev. W. W. SPICER, M.A., F.R.M.S., read a paper "On Plants as Insect Destroyers."

The BISHOP OF TASMANIA, after some complimentary observations on the very practical remarks of Mr. Stephens, and the very instructive paper by the Rev. W. W. Spicer, proposed a special vote of thanks to both writers. This, with the usual vote of thanks to donors of presentations, having passed, His Excellency left the chair.

## AUGUST, 1877.

The monthly meeting of the Society was held on Tuesday, 14th August; JAMES BARNARD, Esq., in the chair.

H. BENJAFIELD, Esq., M.B., who had previously been nominated by the Council, was balloted for and declared duly elected as a Fellow of the Society.

The HON. SECRETARY (Dr. AGNEW) brought forward the following returns for the past month, viz. :—

1. Number of visitors to Museum, 1685.
2. Ditto ditto to Gardens, 4502.
3. Plants and Seeds sent from Gardens :—To Baron von Mueller, Melbourne, 100 papers seeds. To Mr. W. Bull, London, 10 papers seeds. [To Botanic Gardens, Calcutta, 28 papers seeds. To Royal Horticultural Gardens, London, 10 ditto. To the Royal Gardens, Kew, 106 ditto. To Messrs. Vilmorin, Andrieux, & Cie., Paris, 14 ditto. To Ch. Huber & Cie., Hyeres, France, 14 ditto. To Mr. C. F. Creswell, Melbourne, one box plants and seeds. To Mr. J. Jones, Melbourne, 50 papers seeds.
4. Plants supplied for decoration of public places :—For public school grounds, Sorell, 18 plants. For Church grounds, St. Mary's, 30 plants. For Church grounds, Spring Bay, 25 plants. To the Municipality of Deloraine, 100 plants.
5. Time of leafing, &c., of a few standard plants in the Botanic Gardens during July.
6. Books and Periodicals received.
7. Presentation to Museum.

*Meteorological Tables*—

1. Hobart Town, from F. Abbott, Esq.—Table for July.
2. New Norfolk, from W. E. Shoobridge, Esq.—Table for July.
3. Tamar Heads, from R. Henry, Esq., table for July.
4. From the Marine Board, tables from King's Island for February to June inclusive, Mount Nelson for July, and South Bruny for ditto.
5. Melbourne, from R. J. L. Ellery, Esq., printed tables for November, 1876.
6. Sydney, from H. C. Russell, Esq., ditto for 1876.
7. New Zealand, from Dr. Hector, meteorological report for 1875.

The presentations to the Museum were as follows :—

1. From F. B. Spicer, Campbell Town, a mountain duck (*Casarca tadornoides*).
2. From Mr. G. Ibbott, Lower Jerusalem, a Long-billed Cockatoo (*Licmetis tenuirostris*) shot near the Coal River. [This bird had evidently been in confinement.]
3. From Mr. L. Boyes, Gould's Country, a Nankeen Night Heron (*Nycticorax caldonicus*).
4. From Mr. Wm. Barnard, an Australian Golden Plover (*Charadrius orientalis*).

[Mr. J. SWAN observed he had never known these birds to be so numerous in Tasmania as during the present season. For one bird seen on former occasions, he must have seen fifty this year in the Lake District. He thought it probable that the great droughts in the interior of Australia had driven the birds southward to Tasmania in search of moisture.]

5. From Dr. Barnard, a sample of "tailings," said to contain 50 per cent. of copper, from the Kaiser Gold and Copper Mining Company, Lincoln, near Wellington, New South Wales.
6. From A. Simson, Esq. — Ten specimens of sponges and two of Echinodermata from Flinders Island.

7. From R. C. Kermodé, Esq.—190 specimens of modern European coins, with list.
8. From Master H. Jones—A Bronze Cuckoo (*Lamprococcyx plagosus*) from near Mount Nelson. [Mr. E. Swan remarked that this Cuckoo had appeared a month earlier than usual this year, as it was very rarely seen before September. Mr. J. Swan thought it might generally be looked for about the same time as the Swallow.]
9. From J. Swan, Esq.—A Black Magpie (*Strepera arguta*).

10. From Mr. W. Simpson—Two malformed eggs of common fowl. The SECRETARY called attention to the unusually long list of book presentations on the table from societies in various parts of the world, to wit, Great Britain, America, Italy, Germany, New Zealand, and the neighbouring colonies.

The SECRETARY informed the meeting that His Excellency the President was unavoidably absent in consequence of another engagement.

Owing to the inclemency of the weather, the attendance of members was smaller than usual. After some observations as to certain of the presentations, the usual vote of thanks was accorded to the donors, and the meeting terminated.

## SEPTEMBER, 1877.

The monthly evening meeting of the Society was held on Tuesday, 11th September, His Excellency the Governor in the chair.

The following gentlemen, who had been previously nominated by the Council, were balloted for and declared duly elected as corresponding Members of the Society, viz.: Professor F. McCoy, F.G.S., Melbourne University; R. L. J. Ellery, Esq., F.R.S., F.R.A.S., Government Astronomer, Victoria; and Mons. J. N. Verschaffelt, Ghent, Belgium. E. J. Crouch, Esq., of Hobart Town, and — Woodgate, Esq., of Launceston, were also elected Fellows of the Society.

The HON. SECRETARY (Dr. Agnew) brought under notice the usual returns for the past month, viz.:-

1. Number of visitors to Museum, 1727.
2. Ditto ditto to Gardens, 5894.
3. Plants received at Gardens.—From the Sydney Botanic Gardens, plants of the North American *Nymphaea lutea* and *N. odorata*. From Mr. G. Brunning, Melbourne, 41 plants and 23 varieties of fruit scions. From Messrs. Shepherd and Co., Sydney, 21 fruit trees.
4. Plants, etc., sent from Gardens.—To Messrs. Shepherd and Co., Sydney, one case plants and seeds. To Mr. G. Brunning, Melbourne, one ditto. For decoration of Public School grounds, Otlands, 55 plants.
5. Time of leafing, flowering, and fruiting of a few standard plants in the Botanic Gardens during August.
6. Books and Periodicals received.
7. Presentations to Museum.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq. Table for August.
2. Mount Nelson, from the Marine Board. Ditto.
3. Melbourne, from the Government Observer. Printed tables for December, 1876, and Results of Observations for 1875.
4. From the Chief Signal Office, Washington, U.S. Bulletins of International Observations from 13th to 22nd October, 1876.

The presentations to the Museum were as follows :-

1. From E. D. Swan, Esq. Nine specimens of Unio from Lakes Champlain and Ontario. One specimen of "Clam" shell from America. Land shells from Alexandria.
2. From Mr. J. R. Rollins, Longley. A fine specimen of silicified wood from the Sandfly Rivulet.
3. From R. C. Kermodé, Esq. A Tartar hat, from the Crimea. A pair of Tartar lady's shoes. A pair of child's ditto.—A pair wooden shoes (sabots), from Copenhagen. A Norwegian peasant's cap.
4. From the Rev. W. W. Spicer. Forty-seven species of plants collected by Mr. E. N. Spong.
5. From Mr. R. R. Rex. A jar containing specimens of the leaves and fruit of the nutmeg tree, from Penang. Two plates of "Baleen," from the whale lately found near East Bay Neck.
6. From Mr. P. Tanner. A sample of Coal from the Greta mines, New South Wales.
7. From Mr. Soby, Hobart Town. A Half-Farthing, William IV. A small Swedish Silver Coin (10 ore), 1864. A small Chilian Silver Coin.

Referring to the whale recently cast ashore at East Bay Neck, the SECRETARY reported that it had been purchased for the Museum by means chiefly of an appeal to the Fellows of the Society, which had been very generally responded to. A considerable sum would be necessary for setting up the skeleton, but as the purchase did not exhaust the sum already

received the extra amount required would be small. The whale was of the variety called "sulphur bottom," and about sixty-five feet in length.

In the absence of the author, the SECRETARY read the concluding portion of "Notes on the Hobart Town Reservoir," by T. Stephens, Esq., F.G.S.

The Rev. W. W. SPICER, M.A., F.R.M.S., read a paper entitled "Notes on the Flora of Tasmania." The author gave a most graphic and masterly sketch of the distribution of the flora throughout the island, with descriptions of many of its peculiar forms, and of their effect on the scenery, contrasting them with the vegetation at home and elsewhere. The paper throughout betrayed a perfect and practical acquaintance with all the known flora of Tasmania, and was listened to with the greatest interest and attention.

In reference to a subject which was brought forward at a late meeting of the society, to wit, the difference in the time of the leafing of trees here and in England, His Excellency mentioned he had recently noticed in the Gardens at Government House that the Oak came into leaf earlier than the Sycamore, whilst the reverse was the case in England. This he thought was very remarkable, but more extended observations were desirable. His Excellency also presented a parcel of the pods of *prosopis juliflora* obtained from the Royal Gardens, Kew. On the parcel being opened it was found that almost every pod had been attacked by a sort of weevil, the vitality of the seed being probably destroyed in consequence. (By the advice of the Superintendent of the Public Gardens these pods have been steeped in water in order to destroy the insect, and with a hope that is some the power of germination may not be lost.)

The proceedings terminated with a vote of thanks to the donors of presentations, and a special vote to Mr. Spicer for his most interesting paper on the "Flora of Tasmania."

After the meeting, Mr. Lewald, who has had experience in chemical analysis under the "Adulteration of Food Commission," in England, showed, by means of the Society's microscope, how, by polarised light, various animal and vegetable fats may be distinguished from each other; and how, therefore, in the case of mixture of any of these substances for the purpose of fraud, the adulteration may be detected. The substances subjected to the polariscope were sperm oil, paraffin, beef fat, mutton fat, and cocoa butter.

## ON SOME SOUTH AUSTRALIAN POLYZOA.

BY F. W. HUTTON, ESQ., F.G.S., DIRECTOR OF THE  
OTAGO MUSEUM, DUNEDIN.

[*Read 13th March, 1877.*]

The following is a list of some of the polyzoa collected at odd times by Professor Ralph Tate, Hon. Mem. Roy. Soc., Tasmania, on the shores of St. Vincent's Gulf. The great interest of several of the new species here described promises an ample reward to any one who will make a systematic search for them.

CABEREA RUDIS. *Busk, Cat. Mar. Polyz. Brit. Mus. Cat., I., p. 33.*

The South Australian specimen differs from the description of Mr. Busk's, in having the setæ long and serrated; if this be constant it might perhaps be used as a specific character. The type specimens are from Bass' Straits.

MEMBRANIPORA LACROIXI. *Savigny; Busk. loc. cit., p. 60.*

MEMBRANIPORA (?) CINCTA. *Spec. nov.*

Zoarium encasing stems of algæ. Cells quadrangular arranged transversely in rings; lamina punctured; orifice sub-orbicular, with a rounded, generally brownish, tubercle on each side; a broad flattened incurving process at the lower angle of each cell.

A most remarkable form, which from the exact regularity in the disposition of the cells, ought perhaps to be made the type of a new genus.

LEPRALIA CANDIDA. *MacGillivray, Trans. Phil. Inst., Victoria, IV., p. 98.*

LEPRALIA ELEGANS. *MacGillivray, loc. cit., p. 166.*

LEPRALIA TATEI. *Spec. nov.*

Cells irregular, subvertical smooth, strengthened by radiating ridges of which there are always three in front, including between them two large oval vacuities; orifice sub-orbicular with a long projecting rostrum below; a small raised cylindrical avicularium occasionally on one or both sides of the mouth.

A very distinct form belonging to the same group as *L. candida*.

LEPRALIA SPICEA. *Spec. nov.*

Cells cylindrical, sub-erect, areolated; walls thin, hyaline orifice orbicular; lower lip produced into a long acuminate

rostrum, bearing two or three small spines on either side; large oval avicularia scattered over the zoarium; remarkable for the spines on the lower lip.

LEPRALIA BACCATA. *Spec. nov.*

Cells small, quincuncial, immersed, divided by a raised line; surface coarsely granulated; orifice oval, transverse, with a smooth shining mammillary projection below; ov-ecia reniform, transverse, coarsely granulated; no avicularia; color purple; encrusting stems of algæ.

LEPRALIA POCULA. *Spec. nov.*

Cells pyriform, sub-erect, smooth, obscurely corrugated transversely, arranged in transverse, slightly oblique rows; opaque; orifice large, orbicular flattened below, generally with one or two small immersed avicularia (?) on the sides of each cell; encrusting stems of algæ.

CELLEPORA AGGLUTINANS. *Hutton, Cat. Marine Moll. of New Zealand, p. 99.*

CELLEPORA EDAX. *Busk, Trans. Micro. Soc., n.s., I., p. 54.*

The South Australian specimens differ somewhat in habit from the British type, but not sufficiently to make a specific difference.

CELLEPORA TUBIGERA. *Busk. (?) Crag. Polyzoa, p. 64.*

Several specimens of two varieties of *cellepora* are in the collection, the cells of which resemble those of *C. tubigera*, but are widely different in habit. Both encrust the stems of algæ. In one (var.  $\delta$ ) the zoarium is angled, the angles running more or less longitudinally. In the other (var.  $\beta$ ) the zoarium is also angled, but the angles form rather close spirals round the encrusting stem. Many intermediate forms occur, and it is evident that both belong to one species, but whether it should be considered as *C. tubigera* is doubtful.

ESCHARA CONTORTA. *Busk. (?)*

The type is from South Africa.

ESCHARA (?) HUTTONI TATE.\* *Spec. nov.*

Zoarium encrusting stems of algæ, but branching out into erect lobes; color, rose to yellow; cells immersed, ovate, coarsely punctured; orifice rounded, with a sinuosity below, and generally a small denticle on each side; an ascending cylindrical, tubular process supporting an avicularium, on

\* [This species was named *E. tatei* by the author, but as the name is pre-occupied for a tertiary S. Australian form described by the Rev. J. E. Tenison-Woods, Proc. Roy. Soc., N.S.W., 1876, I have taken the liberty of dedicating it to Mr. Hutton.—R. TATE.]

either side of the mouth ; ovæcia globular, coarsely punctured.

This remarkable form connects *Eschara* with *Lepralia*, its general aspect is like the former, but its encrusting zoarium shows an affinity to *Lepralia* or *Cellepora*.

RETIHORNERA FOLIACEA. *MacGillivray, loc. cit.*

RETEPORA CELLULOSA. *Busk., Cat. Mar. Polyz., Brit. Mus. Cat. II., p. 93.*

RETEPORA PHENICA. *Busk.*

The type specimens are from Bass' Strait.

VINCULARI MAORICA. *Stoliczka, Voy. Novara, Palæontology, p. 153.*

Hitherto only known as a fossil in the Miocene rocks near Auckland, New Zealand.

IDMONEA RADIANS. *Lamarck (Retepora), Hist. d. an. S. Vert., 2nd ed., p. 279.*

PUSTULIPORA PORCELLANICA. *Hutton, loc. cit., p. 102.*

TUBULIPORA FLABELLARIS, *Johnston, Brit., Zooph., p. 274.*

This species has not been found in the Southern Hemisphere before.

DISCOPORELLA NOVÆ-ZEALANDIÆ. *Busk., Cat. Marine Polyzoa, in Brit. Mus. Cat., III., p. 32.*

DISCOPORELLA FIMBRIATÆ. *Busk., loc. cit., p. 32.*

Also found in South America and Tasmania.

## CENSUS; WITH BRIEF DESCRIPTIONS OF THE MARINE SHELLS OF TASMANIA AND THE ADJACENT ISLANDS.

BY THE REV. J. E. TENISON-WOODS, F.L.S., F.G.S., F.R.G.S.,  
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[*Read 13th March, 1877.*]

NOTE.—All the measurements are given in French millimetres, and the greatest measurement in each direction is always meant. The letters N., S., E., and W. will be used to denote, the north, south, east, and west coasts of the island respectively; B. St., Bass' Straits; S.E.A., South-east Australia, as far as Port Jackson inclusive; E.A., the whole of the East Australian coast; S.A., the whole of the South Australian coast as far as Spencer's Gulf; W.A., Western Australia, as far as Swan River; V. will mean Victoria from Cape Howe to Portland Bay.

### CLASS CEPHALAPODA.

ARGONAUTA ORYZATA. *Meush. Mus. Gev.* 252, 133. This well-known shell, the "Paper Nautilus" of collectors is rarely found in Tasmania. Two species are found in E.A., not uncommon in S.A.

SPIRULA LEVIS. *Gray, Cat. Moll. Brit. Mus. Pt. 1, p. 116.* S.A., E.A., and W.A., rather uncommon.

SEPIA. Two species at least, not determined, and others of Octopus, Cistopus, Onychoteuthis, etc.

### CLASS GASTEROPODA.

MUREX TRIFORMIS. *Reeve, Icon. pl. 13, fig. 53.* Somewhat common but generally worn and imperfect specimens only. The shell seems as if its growth were stunted by its southern habitat, while in South Australia the varices expand into beautiful and delicate frills.

MUREX ZONATUS. *Tenison-Woods.*

MUREX ANGASI. *Crosse, Jour. de Conch.* 1863, p. 86, pl. 1, fig. 2. Two small specimens of this rare shell have been shown to me from the W. Coast. It has three varices which are canaliculately hooked at the upper part. There are three tubercles between each varix on the upper part of the whorl. One is strongly inclined to regard this as allied to *M. acanthopterus*, *M. pinniger*, *M. phyllopterus*, and *M. fulcatus*. Common in the dredge at Long Bay. W. F. Petterd.

TYPHIS ARCUATUS. *Hinds, Voy. Sulphur, vide Descr. Novæ. spec. ab. aue. Reg. Soc. Tas. Proc., 1876.*

TROPHON UMBILICATUS. *Tenison-Woods.* In this and all succeeding references to the author's name, the species will be found described in the Society's Proceedings for 1875 and 1876, and the names in this list are printed thus for the purpose of labelling collections.

TROPHON PETTERDI. *Crosse Jour. Conch., 1864, pl. 5, fig. 20.* Abundant. A yellowish white or brown cancellated shell. Long. 21, lat. 11. Whorls 6. Generally distributed.

TROPHON BRAZIERI. *Tenison-Woods.*

TROPHON ASSISI. *Tenison-Woods.*

TROPHON GOLDSTEINI. *Tenison-Woods.*

TROPHON MARLE. *Tenison-Woods.*

TROPHON HANLEYI. *Angas, Zool. Proc., 1867, p. 110.* This New South Wales shell is said to occur in Tasmania, but I have seen no specimen.

TROPHON AUSTRALIS. *Tenison-Woods.*

FUSUS DILATATA. *Quoy. and Gaim., Voy. de l'Astrolabe.* North Coast. W. F. Petterd.

FUSUS PYRULATUS. *Reeve. Icon., pl. 13, fig. 50.* Described as Tasmanian, but unknown to collectors here. S.A.

FUSUS NOVE-HOLLANDIÆ. *Reeve. Icon. pl. 18, fig. 70.* A very long channelled spindle shell with distant liræ and nodose ribs. Common. Long. 117, lat. 37; whorls 9. That size rare, generally smaller. In Australia it attains 175 mill. in length. S.A.

FUSUS TASMANIENSIS. *Adams and Angas., Zool. Proc., 1863, p. 421.* Rare; N.W. Coast.

FUSUS LEGRANDI. *Tenison-Woods.* Rare.

FUSUS SPICERI. *Tenison-Woods.*

SIPHONALIA CLARKEI. *Tenison-Woods.*

SIPHONALIA CASTANEA. *Tenison-Woods.*

SIPHONALLA PULCHRA. *Tenison-Woods.*

SIPHONALIA TURRITA. *Tenison-Woods.*

SIPHONALIA FUSCOZONATA. *Ad. and Angas., Zool. Proc., 1865, p. 56.* A small white shell with blunt ribs and zones of brown spots. King's Island; not very common. Long.  $7\frac{1}{2}$ , lat. 3, but South Australian specimens double that size.

PLEUROTOMA (DRILLIA) COXI. *Angas. Zool. Proc., 1867, p. 113.* A turretted nodosely ribbed maculate shell. Long. 25, lat. 10. One specimen only, dredged by Rev. H. D. Atkinson at 7 fathoms. Long Bay, D'Entrecasteaux Channel.

PLEUROTOMA (DRILLIA ?) INCRUSTA. *Tenison-Woods.*

PLEUROTOMA (DRILLIA ?) PSEUDO-CARINATA. *Reeve. Icon. pl. 29, fig. 256.* An ovately pyramidal shell, somewhat indistinctly keeled, plicately ribbed (10 ribs on the body whorl) and transversely finely striate, brownish yellow. Long. 24, lat. 6. King's Island. Sometimes obscurely dotted brown at the top of the ribs.

PLEUROTOMA (DRILLIA ?) ATKINSONI. *Tenison-Woods.*

PLEUROTOMA (DRILLIA ?) MINUTA. *Tenison-Woods.*

PLEUROTOMA (DRILLIA ?) WELDIANA. *Tenison-Woods.*

PLEUROTOMA (DRILLIA) BERAUDIANA. *Cross. Jour. Conch., 1863, p. 88, pl. fig. 6.* S., rare. N.S.W. King's Island, Common. A turretted nodose livid species, about 15 mill. long.

PLEUROTOMA PHILIPINERI. *Tenison-Woods.*

PLEUROTOMA (CLATHURELLA) PHILOMENE. *Tenison-Woods.*

BELA MITRALIS. *Ad. and Angas., Zool. Proc., 1863, p. 420.* An ivory white shell with nacreous fine ribs which become obsolete on the last whorl; finely striate throughout; common. S.E.A. and S.A. Long. 17, lat. 7, whorls 6; sometimes faintly spotted reddish brown.

CYTHARA TASMANICA. *Tenison-Woods.*

DAPHNELLA TASMANICA. *Tenison-Woods.*

DAPHNELLA VARIX. *Tenison-Woods.*

MANGELIA ST. GALLE. *Tenison-Woods*; ditto, var. *Benedicte.*

MANGELIA DESALESI. *Tenison-Woods.*

MANGELIA ATKINSONI. *Tenison-Woods.*

MANGELIA MEREDITHIÆ. *Tenison-Woods.*

MANGELIA IMMACULATA. *Tenison-Woods.*

**MANGELIA LE-TOURNEUXIANA.** *Crosse, Jour. de Conch., 1865, p. 425, pl. 11, fig. 7.* A small attenuated shell of ten whorls, lirate and obscurely few ribbed, generally chocolate brown. Not common. S. and E., and S.E.A.

**TRITON CUTACEUS.** *Linné, Syst. Nat., 12 Edit., p. 1217.* A large ovate ventricose shell, girdled with sulci and wrinkled ribs of pink color not unlike human skin. A faint plait on the upper part of the columella. Ordinary specimens about a decimeter long. Lamarck gives the Atlantic as its habitat. All the species are so wide spread that I have no doubt of its extending to Australia. Recent deep sea dredging will probably cause some species of *Triton* to be abandoned, their habitat being the only reason for regarding them as distinct.

**TRITON SPENGLERI.** *Dillwyn, Descrip. Cat. Recent Shells, p. 2.* This appears to me only a variety of the above with a dilated mouth. The young shells are variegated and so finely marked that I believe they have been also mistaken for different species. Kiener thought, but probably incorrectly, that this was the character of *T. tranquebaricus*. S.E.A. and S.H.

**TRITON WATERHOUSEI.** *Ad. and Ang.* Much smaller than *T. cutaceus*, but difficult to characterize by any other feature.

**TRITON QUOYI.** *Reeve. Icon. pl. 19, fig. 93.* Common. A small whitish shell with 4 to 5 varices, acute spire, and finely decussated outer lip, toothed within. Long. 25, lat 13, whorls 7. Common in S.A.

**TRITON SUBDISTORTUS.** *Lamarck., Vol. 9, p. 638.* A larger and more ventricose shell than the preceding; ovately conical, sub-distorted, with fine irregularly noduled transverse ridges; whitish, mottled with brown. Long. 58, lat. 30, whorls 7. Common. E. and V.

**TRITONIDEA PETTERDI.** *Brazier, 1870.* One specimen only from Bridport, N.E. Coast, now in Melbourne Museum. W. F. Petterd.

**RANELLA LEUCOSTOMA.** *Lam., Vol. 9, p. 542. Triton leucostoma Quoy, Voy. Astrol., t. 3, 546, pl. 40, fig. 3.* An ovately conical shell, with varices scarcely regular enough for a *Ranella*; transversely striate and a row of tubercles on each whorl; scorched deep livid brown, the varices banded brown and white; mouth very white. Long. 72, lat. 43, whorls 6, decollated. Common. S.E.A., S.A.

**RANELLA VEXILLUM.** *Sowerby, Conch., Illust. Ranella, fig. 3.* A fusiformly ovate shell, depressed, with fine transverse and irregularly noduled ridges; brownish, regularly banded with reddish brown lines; outer lip minutely toothed. Long. 40, lat. 26, whorls 5. Common. Reeve gives another figure and habitat, and, therefore, I doubt if the Tasmanian one is *R. vexillum* of Sow.

**RANELLA EPITREMA.** *Tenison-Woods.*

**PISANIA RETICULATA.** *A. Adams, Zool. Proc. 1854, p. 138.* An oblong turretted shell, densely reticulated and of uniform purple brown color; upper whorls granulated; seldom more than one varix at the lip. Long. 30, lat. 12, whorls 7. Rather common; V. Said by Mr. Adams to occur in New Caledonia.

**PISANIA TASMANICA.** *Tenison-Woods.* Smaller than the preceding, and white with irregular varices. It seems, however, doubtful to me whether this is more than a variety.

**COMINELLA TENUISCOSTATA.** *Tenison-Woods.*

**COMINELLA ALVEOLATA.** *Kiener, Spec. Conch., Buccinum, fig. 13 (var. lineolata).* A handsomely striate nodose shell, chequered black and white; very variable; specimens from King's Island are banded green and brown, and have an appearance not unlike an *Ancillaria*. Common. S.A., S.E.A. Long. 30, lat. 15.

**COMINELLA LACTEA.** *Reeve, Icon., Buccinum, fig. 117.* This certainly appears to be no more than a greenish white variety of the last very variable shell, as also *C. quoyana*, A. Adams, *Zool. Proc.*, 1854, p. 313. It occurs in New Zealand.

**COMINELLA TASMANICA.** *Tenison-Woods.*

**COMINELLA COSTATA.** *Quoy. Voy. Astrol., Vol. 2, p. 417.* Very variable in color but generally of a reddish brown hue, spire acute and nodose; about the same dimensions as *C. alveolata*. B. Sts.; common. Rare on S. Coast.

**COMINELLA ANGASI.** *Crosse. Journ. de Conch., 1864, p. 275.* I cannot regard this as more than a dark variety of the preceding, as also *C. Adelaidensis* (*Crosse loc. cit.*) which, however, is not found in Tasmania.

**ADAMSIDIA TYPICA.** *Dunker, Zool. Pro., 1860, p. 421.* This generic name may have to be changed as it is pre-occupied by one of Prof. E. Forbes' genera of *Helianthoid anthozoa* with tubular retractile tentacles. Is the genus a good one? Mr. Angas says that the operculum is *purpuroid*. As we have a *Dunkeria* in conchology we cannot re-name it after the founder. I propose if the genus is to be maintained that it be called *Agnewia*, after the distinguished Secretary of the Society to which Tasmanian science is so largely indebted. A coarsely ribbed conspicuously lirate shell like a *Cominella*, but with a purpuroid operculum. The Tasmanian species are banded with purple or chestnut. Rare, N; in S.A., and S.E.A. Long. 32, lat. 17.

**NASSA FASCIATA.** *Lam. Vol. 10, p. 169.* Our largest Australian species, and probably the most common (except in Tasmania) in all extra tropical Australia. Very ornamental with ribs and granulation, besides being very prettily banded with lines varying in different specimens from brown to light yellow. The coloring of the whole genus is extremely variable, and must not be regarded as of specific importance. Long. 18, lat. 11.

**NASSA PAUPERATA.** *Lamarck, Vol. 10, p. 183.* Common, and found widely distributed like the preceding. It is smaller, more squat and sordid in appearance. Generally darker in color, but sometimes even white or covered with a greenish periostraca. Long. 18, lat. 13.

**NASSA RUFOCINCTA.** *A. Adams., Zool. Proc., 1851, p. 106.* A very small subturretted chesnut banded species with 11 to 13 ribs on the last whorl. Long. 10; rare. B. Sts., S.E.A. (Pig Island, Tamar; R. M. Johnston.)

**NASSA JACKSONIANA.** *Kiener, Mon. Bucc., pl. 19, f. 73.* Not uncommon. A white, thin, poor shell, smaller than *N. pauperata*; often found almost transparent. S.E.A. Long. 12, lat. 10.

**NASSA TASMANICA.** *Tenison-Woods.*

**PURPURA TEXTILOSA.** *Lamarck, Vol. 10, p. 77.* A coarse whitish shell, coarsely granulated and transversely ribbed, which the French naturalist somewhat fancifully compared to canvas; about 50 to 60 long by 37 to 42 wide; very common in all extra-tropical Australia.

**PURPURA HUMILIS.** *Crosse, Journ. Conch. 1865, p. 51.* Common in S. A. A small yellowish shell with equidistant red nodules. Long. 10.; lat. 7.

**PURPURA SUCCINCTA.** *Martyn Univers., Conch., 2 Vol. pl. 45.* Deeply sulcate and without granules. A doubtfully distinct species from *P. textilosa*, the gradations from one form to the other being readily found. The Tasmanian specimens are intermediate between *P. textilosa* and the extreme form of *P. succincta* as found in N.S. Wales and New Zealand. Reeve, perhaps on the authority of Krauss (*Sudafricanische Mollusken p. 118*), quotes this shell as being found at the Cape of Good Hope. Dr. E. Von Martens, however, states that in the South African shells examined by Krauss, sent to the Museum of Stuttgart by Baron Von Ludwig, there were a good many Australian species, and that Krauss was not aware of this.

**PURPURA MADREPORARUM.** *Sowerby, Gen. of Shells, fig. 12?* Shell irregular,

spire short or concealed, very finely striate, aperture partly stained violet purple. Long. 31, lat. 25. Rare. Extreme south of Bruni Island. Said to occur in the Eastern Seas upon madrepores.

*PURPURA LITTORINOIDES.* *Tenison-Woods.* An examination of many individuals has shown me that the outer lip is toothed, and the shell approaches a *Nassa*, especially in examples from S. Coast of Australia, where it is common. It may possibly require a new genus for its reception.

*PURPURA PROPINQUA.* *Tenison-Woods.*

*EBURNA (ZEMIRA) AUSTRALIS.* *Sow. Conch. Illust. fig. 5.* A small shining ovate shell with short spire, finely grooved, one rather deep groove on the lower third of body whorl; light chestnut spots at the edge of the channel. Long. 17, lat. 10, whorls 5. E. Rather rare. Common in S.A.

*CANCELLARIA LEVIGATA.* *Sow. Conch. Illust. fig. 24.* An almost smooth shell with faint spiral grooves on the upper whorls. Strongly grooved within the aperture. Long. 27, lat. 16, whorls 6. Not common. S.A.

*CANCELLARIA UNDULATA.* *Sow. Zool. Proc. 1878, p. 136.* Erect and sharply turreted, ribbed throughout with somewhat distant and obliquely waved ribs. Long. 40, lat. 23. Somewhat rare. It is said that a variety of this shell, *C. truncata*, occurs in the Philippines, *C. granosa* should probably be included with it. It has been doubted if this and the last shell occur in Tasmania, but I have seen many specimens, and some from Portland Bay, Victoria.

*CANCELLARIA TASMANICA.* *Tenison-Woods.*

*CANCELLARIA EXCAVATA.* *Sow.* Rare. N.W. Coast. W.F. Petterd.

*ANCILLARIA MUCRONATA.* *Sow., Thes., Conch., Anc., p. 63, p. 211.* This is believed to have been described from a fossil from the lower cainozoic beds at Table Cape. Mr. Legrand informs me that he has never found it but as a fossil. My reference to it in my paper on the Tertiary Fossils of Table Cape (see Proc., 1875) will need correction as the shell is there stated to be still living.

*ANCILLARIA MARGINATA.* *Lamarck, Vol. 10, p. 591.* Neatly margined at the suture with a broad orange brown band and a spiral ridge which is more defined as it reaches the apex. Long. 32, lat. 16. Rather common. Var. *Tasmanica* mihi. A smaller white shell.

*OLIVA HIEROGLYPHICA.* *Reeve, Icon. pl. 24, fig. 68.* A small oblong somewhat tumid shell, ivory white and shining, encircled with three bands of pale brown undulating and branching marks. The only Tasmanian Olive known. Rare. Brown's River. One specimen only from the East Coast. Long. 12, lat. 5, whorls 5.

*FASCIOLARIA FUSIFORMIS.* *Valenc. in Kiener, Icon. Cog. Viv., p. 13, pl. 4, fig. 2.* Smallest spire, varying considerably in size and with an *arcuate* columella; sometimes coronate or with faint tubercles on the upper whorls. Pale brown, with very little enamel on the columella, in which respect it differs from the two following. Common. Long. 50, lat. 20.

*FASCIOLARIA CORONATA.* *Lamarck, Vol. 9, p. 433.* Coronate fleshy white with scorched spots; variable in size sometimes, long. 170, lat. 85.

*FASCIOLARIA TRAPEZIUM.* *Linne, Syst. Nat., 12 Ed., p. 1224.* See references in *Lam., Vol. 9, p. 433.* This shell is variously described by many authors. It is found in the Indian Ocean of large size, and is said by Sowerby to occur in the East and West Indies. The Tasmanian examples are thick, ovately fusiform, shell crowned with few blunt tubercles; encircled with fine double lines and very minutely cancellate. Channelled in the posterior part of the mouth; periostraca sordid, olive brown; smaller than *F. coronata*, and not twisted; never larger than long. 100, lat. 50. Reeve seems to regard the Tasmanian species as varieties of *F. coronata*, but they are very different.

*VOLUTA ANGASI*. Sow., *Thes.*, fig 99, sp. 73. Common. This species was long confounded with *V. undulata*, which it closely resembles; it is smaller, and the brown lines or zebra-like markings are different.

*VOLUTA FUSIFORMIS*. Swainson, *Appendix to Bligh. Cat.* (not Kiener, see Reeve, *Icon. Voluta*). A conspicuous smooth brownish shell, netted with darker triangular lines; upper whorls with undulating lines; interior reddish orange. Long. 180, lat. 70. Common. N.W.

*VOLUTA PAPILLARIS*. Swainson, *Exotic Conch.* A Ponderous shell, very papillary at the apex; fulvous; netted and banded fulvous chestnut; columella solid, 3 to 5 plaited. Long. 136, lat. 12. A pale variety also. Rare. Macquarie Harbour, and in S.A.

*VOLUTA MITRÆFORMIS*. Lamarck, *Vol. 10, p. 104, V. Multicostata, Broderip.* A small shell, rarely seen in B. Sts. Found also in Java. Distinguished by numerous close longitudinal ribs, spotted brown and transversed by reddish lines; base transversely striate. Long. 40 to 50. Victorian coasts also.

*VOLUTA MAMILLA*. Gray in Sow., *Thes.*, p. 207, pl. 50, fig. 57. The largest of our volutes. Extremely rare. N. only. Long. 265, lat. 154.

*VOLUTA KINGII*. Cox., *Zool. Proc.*, 1871, p. 324. Probably only a pale variety of *V. angasi*, peculiar to the Islands of Bass' Straits.

*VOLUTA SCLATERI*. Cox., *Zool. Proc.*, 1869, p. 358. Flinders Island.

*MITRA BADIA*. Reeve, *Icon.*, pl. 20, fig. 157. This very variable and very common shell is found of almost every shade, from pale yellow to dark purple brown; smooth or polished aperture less than spire, plaits 4. Long. 26, lat. 10.

*MITRA GLABRA*. Swainson, *Exotic Conch.* p. 24, pl. 18. Elongately fusiform, smooth, flesh colored, with sordid periostraca. Long. 50 to 70, lat. about  $\frac{1}{2}$ . Rare in Tasmania but common in S.A.

*MITRA AUSTRALIS*. Swainson, *Zool. Illus. 1st Series*, p. 18. Deep brown or even black with white bands, smooth; columellar plaits  $3\frac{1}{2}$ ; posterior prominent. Long. 27, lat. 11, whorls 8. Rather rare. N. and E., S.A.

*MITRA PICA*. Reeve, p. 31, fig. 247. Smooth, somewhat inflated, delicately mottled, but generally found worn to chocolate color, with white undulating band above. Long. 20, lat. 9. Rather common.

*MITRA DECLIVIS*. Reeve, pl. 31, fig. 44. Smaller than *M. glabra* but very similar. It may be only a variety. Long. 55, lat. 18. Rare. E. only.

*MITRA WELDII*. n.s. This shell was given to me by Mr. Legrand as *M. vineta*, but I have been unable to trace it. Small banded orange and dark brown; translucent with faint ribs on upper whorls. Long. 10, lat. 4. Rather common. Long Bay and Blackman's Bay, and S.E.A.

*MITRA TASMANICA*. Tenison-Woods.

*MITRA SCALARIFORMIS*. Tenison-Woods.

*MITRA LEGRANDI*. Tenison-Woods.

*MITRA TERESLE*. Tenison-Woods.

*MITRA SCITA*. Tenison-Woods.

*MITRA GRANATINA*. Swainson and Tenison-Woods.

*MITRA FRANCISCANA*. Tenison-Woods.

*MITRA SEMILIVIDA*. Tenison-Woods.

*MARGINELLA MUSCARIA*. Lamarck, *Vol. 10, p. 441.* Ovately oblong, shining, diaphanous, pale orange with white margin; quadruplicate. Long. 15, lat. 8. Very common.

*MARGINELLA TURBINATA*. Sow. *Thes.* p. 385, pl. 75, fig. 70. Tumid with short spire and faintly crenulated suture. Long. 9, lat. 6. Rare. S.

*MARGINELLA FORMICULA*. Lamarck, *Vol. 10, p. 441.* Smaller, and very

pale yellow, with plicate nodules on upper part of whorls. Common. Long. 10, lat. 5½.

MARGINELLA VOLUTIFORMIS. *Reeve, Icon. pl. 24, fig. 131.* An ovate ivory white shining shell, whorls tumid above, lip varicosely reflected; quadruplicate. The figure in *Reeve* much too large. Long. 7, lat. 4. Somewhat common.

MARGINELLA TASMANICA. *Tenison-Woods.*

MARGINELLA STANISLAS. *Tenison-Woods.*

MARGINELLA MINUTISSIMA. *Tenison-Woods.*

MARGINELLA ALLPORTI. *Tenison-Woods.*

COLUMBELLA SEMI-CONVEXA. *Lamarck, Vol. 10, p. 171.* The large common *Columbella* of extra tropical Australia and Tasmania. It is found of almost every color, variously marked, and even pure white; outer lip denticulate. With this species must be united the *C. saccharata*, *Reeve*, which is only one of the many variations to which it is subject. Long. 18, lat. 8, whorls 6.

COLUMBELLA LINCOLNENSIS. *Reeve, Icon. pl. 29, fig. 184.* An acuminate solid shell; white, variously marked with pale chestnut and reddish brown. Common. S.A. Long. 12, lat. 4, whorls 7.

COLUMBELLA IRRODATA. *Reeve, Icon. pl. 25, fig. 153.* Distinguished by its acicular form and color of yellow dotted with orange, encircled beneath the suture with snowy spots shaded with orange. King's Island. Very common.

COLUMBELLA ROBLINI. *Tenison-Woods.*

COLUMBELLA XAVIERANA. *Tenison-Woods.*

COLUMBELLA LEGRANDI. *Tenison-Woods.*

COLUMBELLA MILTOSTOMA. *Tenison-Woods.*

COLUMBELLA BADIA. *Tenison-Woods.*

COLUMBELLA (ÆSOPUS) PILOSA. *Angas, Proc. Zool. Soc., 1867, p. 111.* A small turretted lirate species, with zone of faint brown spots. N.C., rare; and S.E.A.

COLUMBELLA MINIMA. *Angas.* This shell is probably *C. interrupta*, *Angas*. It has a mamillated *Natica*-like apex, as in that shell, and is striated at the base, but the coloring is sometimes different. The specific name chosen by Mr. *Angas* is pre-occupied (see *Zool. Proc.*, 1851) and as his own name has already been bestowed in the genus, my designation may be retained.

NATICA CONICA. *Lamarck, Vol. 8, p. 632.* A smooth, polished, conical shell, pale pinkish, banded darker on the upper part of the whorls. Long. 41, lat. 25. Very common. S.A., S.E.A.

NATICA POLITA. *Tenison-Woods, Proceed. of Society, 1875,* where it is described as a fossil among those of Table Cape. It has since been found by Rev. H. D. Atkinson, W. Legrand, and others about Bruni Island. Small, white, deeply channelled at the suture.

NATICA TASMANICA. *Tenison-Woods.* More nearly resembling *Natica leucophaea*, *Reeve*, than any other, but that shell is a dull brown and lead color, with a deep red enamel all round the mouth and callus, the latter closing the umbilicus. It occurs at Port Jackson.

NATICA NANA. *Tenison-Woods.*

RUMA UMBILICATA. *Quoy, Voy. de l'Astrol., Vol. 2, p. 224, pl. 66, fig. 22.* A thin, milky shell, yellowish white, with three bands of chestnut spots. Common, and S.A.

RUMA GLOBOSA. *Tenison-Woods.* I now doubt if this shell is more than a white variety of the preceding.

**SIGARETUS ZONALIS.** *Quoy, loc. cit. Vol. 5, p. 2, pl. 66, fig. 1 to 3.* Ovate, depressed, obsoletely striate, with a short, scarcely prominent spire, milky white; columella thin, arcuate, with an umbilicus covered. Long. and lat. 18. Common and in S.A., as far as King George's Sound, where Quoy obtained it. S. Hanley describes *S. australis* (Conchologists' Book of Species, London, 1842, pl. 1, p. 57) which Reeve (Icon., pl. 3, fig. 15 and 16) considers a different species, being more constricted at the spire. I cannot see any difference in all the specimens examined by me.

**CASSIS SEMIGRANOSA.** *Lamarck, vol 10, p. 37.* A white or brownish shell, granulated at the upper part. The granulations commence in the posterior portion of the last whorl, and then extend over all the spire. Common, and in S.A.

**CASSIS PYRUM.** *Lamarck, Vol. 10, p. 33.* An ovate, ventricose, smooth shell, pale brown pink, last whorl nodulous at the angle. About 50 long. Common and in New Zealand and S.A. *Mueller and Frauenfeld.*

**CASSIS NIVEA.** *Brazier, Zool. Proc., 1872, p. 6.6.* I cannot regard this as more than a white variety of *C. pyrum*. It is a variable shell in color, sometimes being banded and without nodules. W.

**CASSIS PAUCIRUGIS** *Menke, Mollusc., Nov. Hollandiæ, p. 23, sp. 107.* N. Coast only.

**SCALA AUSTRALIS.** *Lamarck, Vol. 9, p. 76.* A turretted white shell, with an acute spire, ribs very straight, resting on a keel at last whorl. Long. 25, lat. 9. A large quantity of brilliant blue pigment is yielded by the animal. Common and S.A.

**SCALA (CIRSOTREMA) VARICOSA.** *Lamarck, Vol. 9, p. 3.* Tamar Heads, rare. W. F. Petterd. The specimen submitted to me was decollated, and the apex closed with a hemispherical septum.

**SCALA GRANULOSA.** *Quoy, Voy. de l'Estrol., Vol. 2, p. 75.* The ribs in this white shell are almost obsolete, and the shell more ovate. It is often mistaken for a worn specimen of *S. australis*. Long. 28, lat. 13. B. Straits only.

**SCALA ACULEATA.** *Sow. Zool. Proc., 1844, p. 12.* A small, white, narrow shell, with prominent distant varices following each other at the suture; outer lip anteriorly emarginate and lobed. Long. 15, lat. 7, whorls 7. Rather uncommon, B. Sts. only. Found also at Hong Kong, Macassar, Malacca, Amboyna, (*Hinds*); Philippines generally. *Cuming.*

**SCALA DELICATULA.** *Crosse, Journ. Conch., 1864.* A Minute, translucent, shining, acuminate shell, but I cannot guarantee the identification. N. and S.A.

**SCALA JUKESIANA.** *Forbes, Append. Voy. Rattlesnake, p. 383, fig. 7.* A small, white, polished shell, with very distinct varices. Long. 11, lat. 3, whorls 9. Rare. If this identification is correct, this species ranges from tropical N.A. to Tasmania.

**SCALA LINEOLATA.** *Sow. Zool. Proc., 1844, p. 11.* A short, stout, dusky shell, with pale brown bands. Long. 15, lat. 6, whorls 7. Rare. N.

**SCALA PHILIPPINARUM.** *Sow. Zool. Proc., 1844, p. 12.* The shell that is thus named in Tasmania and N.S.W. does not quite agree with Mr. Sowerby's diagnosis. The varices are thin and reflexed.

**CROSSEA LABIATA.** *Tenison-Woods.*

**ACUS BICOLOR.** *Angas, Zool. Proc., 1867, p. 111.* A delicate, smooth, shining, faintly coloured shell, the lower half of the first whorl pale chocolate and obsoletely grooved with lines of growth. Long  $17\frac{1}{2}$ , lat. 5, whorls 10.

**TEREBRA (HASTULA) BRAZIERI.** *Angas, Zool. Proc., 1871, p. 16, pl. 1,*

fig. 15. Stout, sharply ribbed and polished, and longitudinally marked with flexuous chestnut lines. E., common; S.E.A., Port Stephens; Port Jackson, Brisbane Water, *Brazier*; Port Elliot, S.A., *Bednall*.

TEREBRA. *Tenison-Woods*.

TEREBRA ADDITA. *Deshayes, Jour. Conchy.*, 1857. A very elegant plicate shell, with the ribs divided in the middle of the whorl by a groove. I am not sure of this identification; it was only from a figure in *Reeve*, which is smaller and darker in color. Port Arthur; rare. Long. 21, lat. 5, whorls 8.

TEREBRA KIENERI. *Desh. Zool. Proc.*, 1859, p. 294. I have not been able to identify this shell, which from its description would appear to be only a variety of the preceding. It is not known in Tasmania.

TEREBRA NITIDA, *Hinds, Zool. Proc.*, 1843, p. 152 (*Reeve's* citation of *Hinds, Z. p.*, 1852, is wrong). Unknown in Tasmania. In this and in the preceding cases the habitat given by *Deshayes* is "Terre de Van Dieman." Some part of N. Australia bears that name also, and there the genus is much better represented than in Tasmania. The species occurs abundantly in Port Phillip.

RINGICULA AUSTRALIS. *Crosse*.

STYLOPTYGMA TASMANICA. *Tenison-Woods*.

STYLIFER TASMANICA. *Tenison-Woods*.

EULIMA TASMANICA. *Tenison-Woods*.

EULIMA MICANS. *Tenison-Woods*.

EULIMA PROXIMA. *Sow. in Reeve, Icon.*, pl. 6, fig. 28. White, polished, smooth, the outer lip produced in the middle. Long. 12, lat. 4, whorls 16. B. St. Rare.

ODONTOSTOMA TASMANICA. *Tenison-Woods*.

ODONTOSTOMA LACTEA. *Angas, Zool. Proc.*, 1867, p. 112. Thin, pellucid, milky. Long.  $6\frac{1}{2}$ , lat. 3, whorls 6. Rare.

TURBONILLA ANGASI. *Angas (T. nitida), Zool. Proc.*, 1867, p. 112. White, shining, closely ribbed. Long. 10, lat. 3. Rare; S.E.A. I have doubts if the specimens seen by me really came from Tasmania. Mr. *Angas* has described this shell as *T. nitida*, but that name is pre-occupied (see *Ann. Nat. Hist.*, Dec., 1860, p. 419, *T. nitida*, *A. Adams*, from Japan). I have therefore much pleasure in substituting the name of one who has rendered such good service to Australian conchology.

TURBONILLA MARLE. *Tenison-Woods*.

TURBONILLA MACLEAYANA. *Tenison-Woods*.

TURBONILLA TASMANICA. *Tenison-Woods*.

CINGULINA AUSTRALIS. *Tenison-Woods*.

ELUSA BIFASCIATA. *Tenison-Woods*.

SYRNOLA MICHAELI. *Tenison-Woods*.

SYRNOLA BIFASCIATA. *Tenison-Woods*.

PARTHENIA TASMANICA. *Tenison-Woods*.

ACLIS TRISTRIATA. *Tenison-Woods*.

CONUS NOVE HOLLANDIÆ. *A. Adams, Zool. Proc.*, 1853, p. 118. Common and extending as far as W.A. The only species collectors are likely to find in Tasmania.

CONUS PONTIFICALIS. *Lamarck, Vol. 7, p. 459*. Assigned to Tasmania by *Lamarck* and *Dellessert*, but I have met with no one who has seen the species there.

CONUS TASMANIÆ. *Sow. Supp. Thes. Con. Tasmania, Z.*

CONUS MACLEAYANA. *Tenison-Woods*. This was described by me as

*Tasmanicus*, but that name I find is pre-occupied. I name it after W. McLeay, Esq., F.L.S.

CONUS CARMELI. *Tenison-Woods.*

CYPRÆA ANNULUS. *Linné, 12 Edit., p. 1179.* A highly enamelled shell, somewhat like *C. moneta*, but has an orange circle on the back. Long. 22, lat. 17. Though Von. Martens discredits the statement that any *Cypræa* has been found in New Zealand, yet Mr. Legrand assures me that he has received specimens of this shell from thence. It is said to occur in the Molucas, and Lamarck gives also Alexandria as a habitat.

CYPRÆA ANGUSTATA. *Gray as of Gmelin, Zool. Journ. (London, 1824), Vol. 1, p. 497.* Purple brown with whitish margin on which only are smeared dark brown dots. Long. 30, lat. 19. Common. S.A.

CYPRÆA PIPERATA. *Solander, MS. teste Gray, loc. cit., p. 498.* A paler shell than the preceding, and spotted all over the back, with minute smeared chestnut dots. Reeve's figure is from a young specimen, which is banded, but the bands disappear with age. Long. 28, lat. 17. Not common. S.E.A.

CYPRÆA COMPTONI. *Gray, loc. cit.?* Rich brown, faintly banded, with the margins and base paler and spotted. Generally smaller in size than the two preceding. Somewhat common. S.A.

CYPRÆA (CYPROVULA) UMBILICATA. *Sowerby in Tank., Cat. 2260.* Deeply umbilicate and thickly spotted with pale chestnut, base white, highly enamelled. Long., in rather a small species, 88, lat. 50. Rare. N. Coast, and Barren Island. Thirty pounds have been given for this shell.

CYPRÆA SCOTTI. *Brod. Zool. Jour., Vol. 5, p. 330, pl. 14, fig. 1 and 2.* I cannot find any trace of this species among collections. Reeve gives Swan River and Port Lincoln as its habitat. In more than one work it is spoken of as Tasmanian.

TRIVIA AUSTRALIS. *Lamarck, Vol. 10, p. 545.* A finely ribbed white or pinkish shell, singularly marked with livid brown patches. Common and S.A. Long. 15, lat. 11.

BIROSTRA MACCOYI. *Tenison-Woods, Transactions Royal Society, Victoria, 1877.* A unique specimen in National Museum, Melbourne, found at Tamar Heads by W. F. Petterd.

CERITHIUM DUBIUM. *Reeve, Icon. pl. 12, fig. 78.* A pyramidal shell with varices angulated at the middle of each whorl, fulvous brown and spotted. Common. Long. 18, lat. 8, whorls 8.

CERITHIUM RHODOSTOMA. *Adams in Sow., Thes., Cerith., sp. 49, fig. 105.* A small turretted granular shell with the channel almost closed like in *Cerithidea*. Our specimens are white. Described by Reeve as from Tasmania but not common. Not uncommon in B. Strait, Victoria, and S.E.A. Long. 8, lat. 3½, whorls 8.

CERITHIUM SEROTINA. *A. Adams in Sowerby's Thes., sp. 48, fig. 102.* Not known to collectors here, unless, as I suspect, it is a variety of *Bittium granarium*.

LAMPANIA AUSTRALIS. *Quoy, Voy. de l'Astrol., pl. 55, fig. 7.* Rather swollen, blackish, ribbed irregularly, and spirally grooved, whorls rounded beneath, aperture obliquely subquadrate, outer lip produced in the middle, thickened and channelled at the columella, sometimes prettily variegated with white bands. Long. 35, lat. 16. Common, and S.E.A. and V.

BITTIUM GRANARIUM. *Kiener, Icon. Con. Viv. p. 72, pl. 19, fig. 3.* Oblong, cylindrical, solid, reddish brown, faintly plaited and spirally girt with distant granular reddish ribs. Common, and S.A. Long. 26, lat. 8, whorls 8 to 16.

BITTIUM TURRITELLA. *Quoy, Voy. de l'Astrol.* Much larger, with regular rounded plaits and deep transverse striae. Very common and S.A.

BITTIUM LAWLEYANUM. *Crosse, Journ. de Conch., 1863, p. 87.* Small,

elongate, turreted, numerous spiral keels, sordid brown. Long. 8, lat. 2, whorls 7 to 8. Common. S.

CERITHIOPSIS ATKINSONI. Var., *Tenison-Woods*. Perhaps no more than a variety of *Cerithiopsis crocea*, *Angas, Zool., Proc.*, 1872. It is not, however, orange in color, and it is a narrower shell. Long Bay, dredged from sand at 10 fathoms by Rev. H. D. Atkinson. Rare.

CERITHIOPSIS ALBOSUTURA. *Tenison-Woods*.  
TRIFORIS TASMANICA. *Tenison-Woods. var. a.*

TURRITELLA TASMANICA. *Reeve, Icon., pl. 9, fig. 42*. An acuminate shell with flattened whorls and two or three inconspicuous keels, forming a raised area to the centre of the whorl. Long. 45, lat. 10, whorls 16. Common, and in S.A.

TURRITELLA GRANULIFERA. *Tenison-Woods*.

TURRITELLA TASMANIENSIS. *Tenison-Woods*.

TURRITELLA ACUTA. *Tenison-Woods*.

TURRITELLA SINUATA. *Reeve, pl. 11, fig. 62*. Two keels, and deeply but broadly sinuate at the mouth; fleshy brown. Long. 21, lat. 7, whorls 14. Common.

VERMETUS DENTIFERUS. *Lamarck, Vol. 9, p. 65*. Common in B. Sts. Our only species and therefore easily distinguished.

TENAGODUS AUSTRALIS. *Quoy, Voy. de l'Astrol., Vol. 3, p. 302*. This is what is generally known as the large *Siliquaria* of our coasts, with a line of round dotted perforations along the slit. Common. N. Good specimens 65 mil. with 4 to 5 convolutions.

TENAGODUS WELDII. *Tenison-Woods*.

DENTALIUM TASMANIENSIS. *Tenison-Woods*.

DENTALIUM WELDIANA. *Tenison-Woods*.

LITTORINA UNIFASCIATA. *Gray, King's Voyage in Australia, Appendix, Vol. 2*. Ovately conical, white or bluish white, whorls sub-convex, last sub-angular, throat brown-purple with anterior white spiral bands, spire acute. Long. 26, lat. 12. Common, and in all extra-tropical Australia.

LITTORINA PALUDINELLA. *Reeve, Icon., pl. 16, fig. 84*. Minute, dark olive, horny, apex acute, aperture dilated. Diam. 1 to 5 mil. Common.

LITTORINA HISSEYANA. *Tenison-Woods*.

LITTORINA UNDULATA. *Gray in King's Voy. loc. cit.* Like *L. unifasciata* but more globose and with zigzag lines. Probably only a variety, for in a good series of specimens every gradation of one form to the other can be traced. A careful investigation of large collections of *Littorinas* would, in my opinion reduce the number of species considerably.

LITTORINA PHILIPPI. *Carpenter, Cat. Maz. Shells, p. 349*. Is said to occur in Tasmania as well as S. Australia, but I believe the identification in both cases to be very doubtful.

RISELLA NANA. *Lamarck, Vol. 9, p. 150*. A small, corroded, sharply angulated shell with zebra-like markings. Very common and in V. This shell is the female of the two following. See *Proc. Lin. Soc., N.S.W.*, 1876.

RISELLA AURATA. *H. and A. Adams, Gen. Moll., pl. 33, fig. 5*. A yellow mouthed acutely angled species, nodular at the suture and larger than the last. Common on N. Coast, and in S.A. Long. 24, lat. 18. I quite agree with Mr. Angas in regarding this as only a variety of the following.

RISELLA MELANOSTOMA. *Gmelin, p. 3581, No. 90*. The black mouth and lugubrious habit may distinguish this shell which is near in form to the preceding. This or the *R. aurata* is figured in Woodward's Manual as *R. nana*, pl. 9, fig. 14. Common. Gmelin states that this shell has a deep

black mouth; Deshayes says brownish. There is a *Risella (Trochus) melanostoma* described by Reeve, Zool. Proc., 1842, p. 185, which seems the same.

AMPULLARINA FRAGILIS. *Quoy, Voy. de l'Astrol., Vol. 2, pp. 15, ps. 10 to 16.* A thin paludina-like shell, fawn colour, with faint brown bands. Long. 18, lat. 15, whorls, 4-5. Common, and in all extra-tropical Australia. Brackish water, estuaries, and the coast salt lakes. It is also common as a fossil in the raised beaches of S.A.

AMPULLARINA QUOYANA. *Deshayes.* A coarser species of doubtful distinctness. S.E.A.

AMPULLARINA MINUTA. *Tenison-Woods.*

FOSSARINA PETTERDI. *Crosse, Jour. Conch., 1864.* Abundant on the Southern Coasts at low water. W. F. Petterd.

FOSSARUS TASMANICUS. *Tenison-Woods.*

FOSSARUS BULMOIDES. *Tenison-Woods.*

SOLARIUM LUTEUM. *Lamarck, Vol. 9, p. 100.*

SOLARIUM ? Two specimens of this genus from Recherche are in Mr. Legrand's collection, apparently they are new but too worn for determination.

DIALA TESSELATA. *Tenison-Woods.*

DIALA PUNCTATA. *Tenison-Woods.*

DIALA TUMIDA. *Tenison-Woods.*

RISSEO AGNEWI. *Tenison-Woods.*

RISSEO CYCLOSTOMA. *Tenison-Woods. Var. a Rosea.*

RISSEO MELANURA. *Tenison-Woods.*

RISSEO ANGELI. *Tenison-Woods.*

RISSEO (CERATIA) MACCOYI. *Tenison-Woods.*

RISSEO (CERATIA) MARLE. *Tenison-Woods.*

RISSEO (CINGULA) MARLE. *Tenison-Woods.*

RISSEO (CINGULA) ATKINSONI. *Tenison-Wood.*

RISSEO (ALVANIA) CHEILOSTOMA. *Tenison-Woods.*

RISSEO (ALVANIA) FASCIATA. *Tenison-Woods.*

RISSEO (SETIA) BRAZIERI. *Tenison-Woods.*

RISSEO (SETIA) SIENNÆ. *Tenison-Woods.*

RISSOINA ST. CLARÆ. *Tenison-Woods.*

RISSOINA FLINDERSII. *Tenison-Woods.*

RISSOINA CONCATENATA. *Tenison-Woods.*

RISSOINA VARIEGATA. *Angas, Zool. Proc., 1867, p. 113.* Solid, white, banded with livid markings, plicate, and finely striate. Long. 7, lat. 3.

RISSOINA CINCTA. *Angas, Zool. Proc., 1867, p. 114.* A pretty chestnut banded species. Rare. Long. 6, lat. 3, whorls 6. Rare, and in S.E.A.

RISSOINA NIVEA. *A. Adams, Zool. Proc., 1851, p. 264.* White, opaque, with numerous straight ribs and faint raised lire. Long. 11, lat. 4, whorls 7. Common.

RISSOINA GERTRUDIS. *Tenison-Woods.*

RISSOINA TURRICULA. *Angas, Zool. Proc., 1867, p. 114.* A turriculate, minute, white shell, with coronate whorls and distinct rounded ribs, mouth anteriorly produced with a spiral keel behind. Long. 6, lat. 2. Common, and S.E.A.

TRUNCATELLA MARGINATA. *Kuster. Bass' Straits.*

TRUNCATELLA SCALARINA. *Cox. Bass' Straits.*

TRUNCATELLA TASMANICA. *Tenison-Woods*. Bass' Straits.

TROCHITA CALYPTREFORMIS. *Lamarck*, Vol. 7, p. 627 (*Trochella*, *Gray*, *Zool. Proc.*, 1867, p. 735). Spirally much convoluted, with velvet-like periostraca; white, tinged purple inside.

AMALTHEA CONICA. *Schumacher Essai, d'un Nouveau, Syst. des Habitations des Vers. testaces*, Copenhagen, 1817, p. 181, also pl. 21, fig. 4, a, b, c. Common. Parasitic on other shells, and varying much in form and color.

COCHLOLEPAS FOLIACEA. *Quoy*, loc. cit., Vol. 3, plate 72.

COCHLOLEPAS SUBRUFa. *Sow*. Very plentiful at low water, Tamar Heads.

NERITA ATRATA. *Quoy*, *Voy. de l'Astrol.*, pl. 65, fig. 41 and 42. A black, rounded species, common in all extra-tropical Australia. N. Coast of Tasmania only. Long. 21, lat. 24. This shell has been identified with *N. atrata*, Chem., which is said to occur in the Atlantic within the tropics. Gray, in the Appendix to King's Voyages, probably originated this. Reeve gives New Zealand as habitat. Many authors speak of a blackish *Nerita* from those islands, but the specimens I have seen are not different from *N. punctata*, a S. American species, with which E. Von Martens identifies our Australian shell. Very common in Portland, Victoria.

PHASIANELLA TRITONIS. *Chemnitz*, *Conch.*, Cat. 9 to 120, figs. 1033-34. The common pheasant shell of the Southern Coasts of Australia and all Tasmania. It attains to a large size and varies exceedingly both in shape and color. From this fact many of the species created are surely no more than varieties. Long., in the largest specimens, 9, lat. 39.

PHASIANELLA VENUSTA. *Reeve*, *Icon.*, pl. 2, fig. 2. A variety only.

PHASIANELLA SANGUINEA. *Reeve*, *Icon.*, pl. 3, fig. 3. A solid shell of five rounded whorls. Bright red with pale zigzag lines shaded with brown. Long. 40, lat. 25, but sometimes larger. B. Sts., but common in S.A.

PHASIANELLA ZEBRA. *Gray*, *Reeve*, pl. 3, fig. 4. Only a variety of the last with broad diagonal bands.

PHASIANELLA VENOSA. *Reeve*, pl. 3, fig. 5. A rare variety with brown banded lines on a lighter ground.

PHASIANELLA VENTRICOSA. *Quoy*, *Voy. de l'Astrol.*, pl. 59, figs. 8 and 9. Another variety. King's Island. Rare.

PHASIANELLA RETICULATA. *Reeve*, pl. 3, fig. 7. A rare reticulated variety.

PHASIANELLA ANGASI. *Jour. Conch.*, 1864, p. 344, pl. 13. A small, narrow, reticulated shell. Very rare. The identification in Tasmania is doubtful. S.A.

PHASIANELLA ROSEA. *Angas*, *Zool. Proc.*, 1867, p. 114. A minute, thin, shining species of uniform rose color. Long. 2, lat. 1½, whorls few. In sand from islands in B. Sts., and Blackman's Bay. W. F. Petterd.

PHASIANELLA DELICATULA. *Tenison-Woods*. This shell was described by me in *Proc. Tas. Roy. Soc.*, 1876, as *P. pulchella*, but that is the name of the British species.

TURBO (LUNELLA) UNDULATUS. *Chemnitz*, *Conch. Cat.*, Vol. 10, pl. 169, fig. 1640, etc. A fine globose umbilicate shell with dark green undulating lines, nacreous inside. It has a smooth solid spiral operculum sometimes an inch in length, the shell itself attaining to a great size in S.A. In Tasmania it is smaller. A common fossil in the raised beaches in Australia, where its numbers and size are extraordinary.

TURBO SIMSONI. *Tenison-Woods*. A doubtful species, possibly young of preceding.

TURBO (SENECTUS) CIRCULARIS. *Reeve*, pl. 10, fig. 46. A non-nacreous, deeply channelled, and granulosely ribbed shell; color, pink and mottled

with red ; no umbilicus, columella white. King's Island only. Long. 28, lat. 30. Not larger in S.A., where it is not common.

TURBO STRAMINEA. *Martyn*. See *Proc.* 1876. Rare.

CARINIDEA FIMBRIATA. *Swainson, Proc. Roy. Soc. Tasmania, Vol. 3, p. 39*. A trochiform, nacreous shell, concave at the base and the whorls flattened at the edge to a kind of flange ; transverse ridges with small scales. This shell occurs in Australia, where it has received the name of *Uvanilla squamifera*, *Kock, in Philippi, Abbild. uber Besch., Conch., pl. 4, fig. 9* ; but Swainson's name and genus have priority. Besides, this species would not belong to Gray's genus *Uvanilla*, which was proposed for shells with the edges of the whorls spinous. Swainson's genus is thus characterized (*Lard, Cat. Cyclop. Shells and Shellfish, by W. Swainson, Lond., 1840, p. 350*) : Operculum shelly, imperforate, spire pyramidal, acute, base concave and carinated, aperture oval, entire, slightly angulate anteriorly, columella turned inward.

CARINIDEA TASMANICA. *Tenison-Woods*. Possibly only young of the following.

CARINIDEA AUREA. *Jonas Zeit., f. Mal., 1844*. Nacreous, pale, yellow, depressed, with diagonal ribs, which divide and become granular at the base. *C. granulata*, *Sow., Proc. Roy. Soc. Tas., 1854, p. 40*. Mr. Angas follows Jonas in placing this shell in the genus *Labio*, but Oken's *Labio*, which Gray follows, would include *Trochocochlea*. See *Gray's Brit. Mus. Cat.* Common, and S.A. Alt. 11, lat. 17. The shelly operculum is a generic distinction of much importance.

ASTELE SUBCARINATUS. *Swainson, Proc. Roy. Soc. Tasmania, Vol. 3, p. 36, pl. 6, figs. 1 and 2*. This shell, of which only very few specimens have ever been found, was made the type of a new genus, *Astele*, by Swainson. I subjoin his remarks on the genus. Diam. 28, alt. 23, whorls 7. E. Shell nacreous, pyramidal or trochiform, unarmed, body whorl convex below, no columella, umbilicus large, closed only by the terminal whorl of the spire, aperture broader than high, margin of lips thin. A. Adams (*Zool. Proc., 1863, p. 506*) has made a new genus named *Eutrochus* for the same species, not knowing of Swainson's description. The genus approaches very near to *Solarium*, and has a wide perspective umbilicus reaching to the apex.

LIOTIA TASMANICA. *Tenison-Woods*.

LIOTIA INCERTA. *Tenison-Woods*.

LIOTIA DISCOIDEA. *Reeve, Zool. Proc., 1844*. Latticed with transverse ribs and longitudinal bars, besides being finely striate. Very like the preceding, but without the curious squamose nodæ. Maj. diam.  $6\frac{1}{2}$ , min. 5. Common and in Philippine Islands.

LIOTIA AUSTRALIS. *Kiener, Spec. Conc. pl. 4, fig. 7*. A depressed white discoid shell with prominent ribs, and longitudinal very fine divaricating liræ ; mouth broadly reflected and coarsely ribbed. Diam. 14, whorls 4. Rare.

LIOTIA ANGASI. *Crosse*. Moderately plentiful ; Pittwater. W. F. Petterd.

CYCLOSTREMA KINGII. *Brazier MS. ?* I cite this shell, which I have not seen, on the authority of Mr. Legrand.

CYCLOSTREMA JOSEPHI. *Tenison-Woods*.

CYCLOSTREMA MIGRA. *Tenison-Woods*.

CYCLOSTREMA WELDII. *Tenison-Woods*.

CYCLOSTREMA SUSONIS. *Tenison-Woods*.

CYCLOSTREMA SPINOSA. *Tenison-Woods*.

CYCLOSTREMA IMMACULATA. *Tenison-Woods*.

MONILEA ROSEA. *Tenison-Woods*.

MONILEA TURBINATA. *Tenison-Woods.*

ETHALIA TASMANICA. *Tenison-Woods.*

ADEORBIS PICTA. *Tenison-Woods.*

MINOLIA TASMANICA. *Tenison-Woods.*

CLANCULUS NODULOSUS. *A. Adams, Zool. Proc., 1854, p. 39.* I have not seen this shell, which is white, variegated with red, but the whorls are nodulous and not granular.

CLANCULUS ALOYSII. *Tenison-Woods.*

CLANCULUS PHILOMENA. *Tenison-Woods.*

CLANCULUS DOMINICANA. *Tenison-Woods.*

CLANCULUS RAPHAELI. *Tenison-Woods.*

CLANCULUS ANGELI. *Tenison-Woods.*

CLANCULUS CONSPERSUS. *A. Adams, Zool. Proc., 1851, p. 163.* A trochiform, coarsely granular shell, with last whorl sub-angular, variegated red and white; toothed on the outer lip. Long. 11, lat. 13, whorls  $4\frac{1}{2}$ . B. Sts., and N.E.

CLANCULUS RUBENS. *A. Adams.* A deep red coarsely granulated shell which I believe to be the *C. rubens* quoted by G. F. Angas (*Zool. Proc., 1865, p. 178*) as of A. Adams, but with no reference. I cannot find that Mr. Adams published his description. Rare. Bass' Straits. Dimensions same as last.

CLANCULUS UNDATUS. *Lamarck, Enc. Meth., pl. 447, fig. 3.* A large, handsome, solid, purple, red shell, with small black spots on the granulations. The enamel of the mouth is often much spread over the base as a transparent film. Common, and in S.A.

CLANCULUS MAUGERI. *Adams, Zool. Proc.* A dull, brown shell, more conical than the last and sometimes larger. Rare in Tasmania and Victoria, not uncommon in New South Wales.

CLANCULUS VARIEGATUS. *Adams, Zool. Proc., 1851, p. 160.* A rather thin, depressedly conical shell, acutely angulate at the base, which is flat, granular, with oblique microscopic striae between; pale brownish red; larger than any of our species except the two preceding. 18 to 20 mill. in diam., whorls 5. Very common, and S.A. I cannot distinguish this shell from *C. zebrides* of the same author.

CLANCULUS GIBBOSUS. *A. Adams, Zool. Proc., 1851, p. 162.* A depressed shell, granulated, white, and irregularly banded with zigzag reddish brown lines; tooth bifid and umbilicus almost like a *Solarium*; diam. 10 to 18. Common. N. only and V.

CLANCULUS NODO-LIRATUS. *A. Adams, loc. cit.* Smaller than the last, pink or reddish, variegated with lines of white and dark spots; small granular ribs with fine striae on the interstices; diam. 8 to 10. Tooth small. Common.

EUCHELUS CANALICULATUS. *Lamarck, Vol. 9, p. 181.* A somewhat small, turbinated shell, obsoletely toothed and nacreous, with numerous fine granular lirae, pinkish white with minute brown spots. Long. 17, lat. 17, whorls 5. *E. baccatus*, Menke, which occurs in extra-tropical Australia may be identical with this species, but it seems to me a larger, more depressed shell, and paler in color.

EUCHELUS TASMANICUS. *Tenison-Woods.* The smallest species, but exactly like the above in form, color, etc.

EUCHELUS SCABRIUSCULUS. *Ad. and Ang. MS., and Zool. Proc., 1867, p. 215, sp. 181.* A dusky umbilicated shell. Long. 6, lat.  $4\frac{1}{2}$ . Long Bay. Common. Rev. H. D. Atkinson. There are two *Euchelus* shells from Samoa, which show very distinctly the peculiar features of the genus. *E.*

*instructus* and *E. atratus*. *E. scabriusculus* is very similar to both these but smaller. S.E.A.

THALOTIA CONICA. Gray, in *King's Voy., Append., Vol. 2, p. 479*. A solid conical shell, light red, with finely granular lines, regularly spotted purple red. Long. 20, lat. 13. Common. B. Sts., and N.E. only, but very common in S.A.

THALOTIA PICTA. Wood's *Index Testaceologicus, Suppl., pl. 6, fig. 28*. More acute than the preceding, with very fine liræ, and elegantly flamed with carmine and white. *T. ramburi*, Crosse (S.A.), may be only a variety of this. Rare. N. only.

THALOTIA MARLE. Tenison-Woods, *Proc. Roy. Soc. Vict., 1877*. Common in Victoria. Rare in Tasmania and N. only.

THALOTIA DOLOROSA. Tenison-Woods.

ZIZYPHINUS ALLFORTI. Tenison-Woods.

ZIZYPHINUS LEGRANDI. Tenison-Woods.

ZIZYPHINUS GRANULATUS. Born, *Test. Mus. Cæs. Vind., p. 337, pl. 12*. A British species said to occur in Tasmania, but if my identification of the shell is correct, it is only a variety of *Z. armillatus*, differing from age.

ZIZYPHINUS EUGLYPTUS. Adams, *Zool. Proc., 1854, p. 58*. This, at best, is only a variety of the following.

ZIZYPHINUS ARMILLATUS. Wood, *Index Test. Suppt., pl. 9, fig. 5*. Of pinkish red colour, transversely grooved and granulate; apex often with a beautiful bluish green metallic lustre. A fine large, conical shell, varying considerably in size and depth of color. Large specimens long. 33, lat. 32, whorls 8. Rather common and S.A.

ZIZYPHINUS FRAGUM. Philippi, *Zeit. Mal., p. 106*. Shell conical, dull white, faintly tessellated with brown, whorls convexly sloping and spirally closely granular. Its name is not inaptly suggested by its resemblance to a strawberry. Alt. 10, diam. 13, whorls 6. Rare. Islands in B. Sts.

ZIZYPHINUS INCERTUS. Reeve, *Icon., pl. 5, fig. 28*. This is a reversed shell, which was thought by Reeve to be an accidental variety. It is, however, always found thus. This fact and the somewhat convex base show anatomic peculiarities which ought to be of generic value.

ELENCHUS BADIUS. Wood, *Index Test., Supp., pl. 6, fig. 46*. A very common, smooth, brown shell, common in all S. Australia. This shell, the largest of the genus, with many synonyms, is the one principally used for ornamental purposes; the outer shell is dissolved by weak acid, exposing the brilliant violet nacre. Swainson named it *splendidulus*, from its great beauty. Long. 30, lat. 15, whorls 6. *Elenchus fulmineus*, Kiener, is a variety distantly banded with diagonal zigzag greenish white lines. *Elenchus lineatus*, Lamarck, *Vol. 9, p. 181*, is another variety, very closely variegated with diagonal lines. *Elenchus roseus*, Lamarck, *loc. cit.*, is a rose red variety. But none of these distinctions are of specific value, for almost every intermediate grade can be found in a handful of specimens.

ELENCHUS BELLULUS. Dunker, *Phil. Abbild., t. 7, fig. 6*. A highly enamelled tumid solid shell, brown, with transverse lines, which are curiously connected with double short white lines, shaded with vermilion. These lines extend in fascia round the spire. Long. 17, lat. 10, whorls 6. Uncommon. B. Sts. only and in S.A.

ELENCHUS IRISODONTES. Quoy, *Voy. de l'Astrol, Vol. III., p. 246, t. 63, figs. 7 to 12*. *Monodonta virgata*, Menke. Much smaller than *E. badius*, beautifully variegated with bands and lines of various shades of green and white; nacre apple green. Used also for ornamental purposes. Long. 12, lat. 7, whorls 5. Common.

ELENCHUS NITIDULUS. Phil. *Kust. Conch. Cat., pl. 43, fig. 10*, as *Trochus*

*n. Cantharidus n.*, *Adams Zool. Proc.*, 1851, p. 169. About the size of *E. bellulus*, with a produced aperture, the enamel minutely dotted in sloping lines, last whorl angular, throat brilliant green. Long. 18, lat. 13, whorls 7. One of the commonest species.

*BANKIVIA VARIANS*. *Beck in Krauss Sudafric. Moll.*, 1848. "This species" says Mr. Angas (*Zool. Proc.*, 1865, p. 181) "is very abundant on all shores of extra-tropical Australia. It varies in color from green to white brown, purple and rose, besides being banded and striped in an infinity of patterns." H. and A. Adams describe (*Gen. Moll.*, p. 425) another species *B. major*, as Tasmanian. I have been unable to find the shell. Some authors give the name *purpurascens* after Deshayes (*Manuel de Conch.*). It was supposed to occur also in S. Africa (*Phil. Handb. Conch.*, p. 212) but this arose, as I have already noted, from Baron Von<sup>n</sup> Ludwig sending to Stuttgart, Australian with African shells. It has, however, been found in America. One very young specimen *teste Carpenter, Brit. Mus. Cat. Maz. Shells*, p. 226. The affinities of this singular shell are very doubtful. Woodward (*Manual Moll.*, p. 144) says it would be called *Chemnitzia* (?) if fossilized. Very common.

*GIBBULA MULTICARINATA*. *Tenison-Woods.*

*GIBBULA COXI*. *Angas, Zool. Proc.*, 1867, p. 115, pl. 13, fig. 26. Orbicularly conical, deeply umbilicated, solid, whitish, shining, marbled olive and pink, whorls biangular, with two prominent rounded keels. Rare, and S.E.A. About 8 mil. in diam. Varies much in coloring.

*GIBBULA SULCOSA*. *A. Adams, Zool. Proc.*, 1851, p. 186. Rare. A small conical shell about 8 mill. high, umbilicate, sulcate, and faintly obliquely striate, spotted with rosy lines and dots. It is found as far north as the tropics of Australia.

*GIBBULA WELDII*. *Tenison-Woods.*

*GIBBULA AUREA*. *Tenison-Woods.*

*GIBBULA DEPRESSA*. *Tenison-Woods.*

*TROCHOCOCHLEA AUSTRALIS*. *Favanne, Conch.*, pl. 8, fig. A1 (*le ratelier*). There is such confusion about this shell that I shall give what I believe to be its synonymy. *Chemnitz Conch.* tom. 11, tab. 196, fig. 1890. *Monodonta australis*, Lamarck ani., s. vert. tome. 7, p. 30, No. 11. *T. concamerata*. Gray and Wood Ind. Test. Sup. pl. 6, fig. 35. *T. striolatus*, Quoy and Gaim., *Zool. de l'Astrol.* Vol. 3, p. 253. *T. striolatus*, Angas, P.Z.S., 1865, p. 182, No. 170. *Encyclop. Methodique His. Nat. des Vers.*, *T. australis*. Mr. F. G. Angas says in his notice of the shell (loc. cit.), "Faintly edged, and painted with irregular wavy longitudinal lines of yellow on a black ground. *L.* (*sic.* perhaps a misprint for *T.*) *striolatus* of Quoy from Tasmania and S. Australia is much more depressed and has a tessellated style of painting, although regarded as a synonym by Mr. Hanley in his edition of Wood's Index." I think Mr. Angas would alter his opinion in Tasmania where every variety of form and every variety of color from pale yellow to green, and from white to black, and every variety of tessellation may be found on the same beach.

*TROCHOCOCHLEA CONSTRICTA*. *Lamarck, Vol. 9, p. 180*. The largest species, oblique, obtuse, conical, dull flesh color, or sordid white, or yellowish, often a reddish pink; whorls 4-5, tumidly convex, furnished with rounded very conspicuous keels, 8 on body whorls, 2 on the others, the whole shell traversed with oblique fine lines of growth; mouth subcircular; outer lip double, outer margin calcareous pinkish white, channelled at the origin of the keels, where it is often stained deep black which sometimes continues in a line round the mouth; mouth nacreous, in a well-defined line, with prominent liræ; nacre silvery, columella purely white, terminating in a blunt tubercle; enamel spread slightly over base, on which 3 or 4 ribs are often

marked with black spiral lines. Height 20 to 70 mil. Common in all Tasmania and extra-tropical Australia.

*TROCHOCOCHLEA TENIATA.* *Quoy and Gaim., loc. cit., p. 251, pl. 63, fig. 15.* (There is reason, however, for thinking that the figure refers to Lamarck's *T. constricta*). Small, smoother and much less conspicuous keels, 3 to 6 (at most) in body whorl; color, long zigzag streaks of white and blue, black, greenish, or even red (especially on dead, old, and dry shells), outer lip generally margined with black, throat of dark pinkish naere, seldom lirate, columella brownish, tubercle obsolete. Long. 18, lat. 16 mil. Always smaller than the preceding, and with the same geographical distribution. With this shell I unite *T. multicarinata*, Q. and G., and *T. porcata*, Adams, and even then it is only a doubtful species.

*TROCHOCOCHLEA COMPTA.* *Tenison-Woods.*

*TROCHUS (DILOMA) ODONTIS.* *Wood. Index, Test, Suppl., pl. 6, fig. 37.* Small, depressed, dark blue, with lines of fine yellow spots. Mouth naere rose color, with green margin. Common, and in all extra-tropical Australia. *Diloma* is a questionable genus of Philippi not admitted by Gray. The horny operculum, the animal, and all the habits of this shell would unite it with *Trochocochlea*; but the shell itself is smooth; the interior especially of the upper whorls is a brilliant rosy naere; the foot lappets fringed and they are spotted yellow like the shell.

*TROCHUS (DILOMA) AUSTRALIS.* *Tenison-Woods. Proc. Roy. Soc. Vic., 1877.*

*STOMATELLA IMBRIGATA.* *Lamarck, Encycl. Meth., pl. 450, fig. 2.* Elegantly grooved and striate, and densely imbricate with raised scales; dull, white, nacreous inside. Maj. diam. 29, min. 23. B Sts., rare, and in S.A.

*GENA STRIGOSA.* *A. Adams, Zool. Proc., 1850, p. 37.* The only species known in Tasmania. Oblique, and variously striped with green, red, etc.; outer lip slightly sinuate. Long. 21, lat. 11, alt. 5. Bass' Sts., rare, and in S. A. The figure in *Reeve, pl. 2, fig. 12*, is very defective.

*HALIOTIS NEVOSA.* *Martyn, Univer. Conch., v. t. 11, fig. 63.* This common ear-shell of the coasts of Australia and Tasmania has received a host of names. It is even now, I believe, unnecessarily divided into two or three species. Some of its varieties extend into the genus *Padollus*, as it is frequently found with the mesial spiral rib. *H. coccoradiata*, *Reeve*, is another variety. A scabrous irregularly rugose shell, variously whorled, red brown being the prevailing shade, and very nacreous within.

*HALIOTIS GLABRA.* *Swainson, Cat. Bligh Collection; (H. albicans of Quoy, Angas, etc., but Swainson's name was published in 1830).* A very large, solid, smooth species, generally worn white, but in young shells banded or broadly rayed with chestnut or green; lines of growth few, deep, and irregular. N. and in S.A.

*HALIOTIS CARINATA.* *Martini, tab. 14, fig. 140.* This species or variety, for it is uncertain which, was described by Swainson in the Bligh Catalogue, and again by Dr. Gray (*teste Angas loc. cit.*, who gives the reference, *Gray, MS., Brit. Mus.*) as *H. emme*. Somewhat common, and S.A.

*HALIOTIS ELEGANS.* *Koch. in Philippi. Abbild und Besch. Conch. Haliotis, pl. 4, figs. 1 and 2, Teinotis elegans, Gray.* Swainson says he found this species in the islands in Bass' Straits. *Proc. Roy. Soc., Vol. 3, part 1, p. 49.*

*SCHISMOPE ATKINSONI.* *My Scissurella atkinsoni.* See *Proc. Roy. Soc. Tas., 1876.*

*IANTHINA COMMUNIS.* *Lamarck, Vol. 9, p. 4.* Occasionally drifted on to the East Coast, as also, probably

*IANTHINA EXIGUA.* *Lamarck, Vol. 9, p. 5.* A small elegantly striate species. "It is necessary that more material should be collected and the

animals observed before a decided opinion can be expressed on the species of this genus. Some reduce all the forms to *one* or *two* species. Dr. Gray conjectures that two, *I. fragilis* and *I. prolongata*, are the sexes of one species."—*Carpenter, Cat. Maz. Shells, p. 185.*

IANTHINA BIPARTITA. *Gray?*

CREPIDULA ———? East Coast. W. F. Petterd.

CREPIDULA ———! Frederick Henry Bay. W. F. Petterd.

FISSURELLA SCUTELLA. *Gray, Brit. Mus. Cat. Fissurella, No. 42.* A trapeziform, ovate, flattened, concentrically ridged shell; pink, with brown rays. Somewhat common in S.A. Long. 29, lat. 23.

FISSURELLA AUSTRALIS. *Krauss, Sudafric. Moll., p. 67, pl. 4, fig. 10.* Deeply nodosely latticed with ribs and riblets, orifice small, ovate, obscurely blotch rayed with light rust brown. Long. 18, lat. 14, alt. 8. Rare, E. only; but it occurs in N.E. Australia. Described by Krauss as from Natal, but for the reasons already given (vide *Purpura textilosa*) his specimen probably came from Australia.

FISSURELLA NIGRITA. *Sowerby.* North Coast and Blackman's Bay. W. F. Petterd. A small, black, flattened shell.

FISSURELLA CONCATENATA. *Crosse, Jour. Conch, 1863.* Long Bay, Rev. H. D. Atkinson; N.W. Coast, R. Gunn; George Town, W. F. Petterd. Deeply pitted all over with hexagonal markings. Rare.

MACROSCHISMA TASMANICA. *Tenison-Woods, var. a Rosea.*

EMARGINULA EMARGINATA. *Blainville, Malac., p. 48, fig. 2, E. australis, of Quoy.* A coarsely sculptured white shell with very prominent curved anterior ribs. Common. V. The largest Tasmanian species. Long. 23, lat. 18, alt. 14.

EMARGINULA RUGOSA. (Quoy?) *Sowerby, Thes. Conch., Fissurellidæ Emarginata, sp. 49, fig. 72.* White, rayed with nodose unequal ribs, the fissural one prominent, fissure short and narrow. Long. 16, lat. 12, alt. 8. Not common.

EMARGINULA TASMANIÆ. *Sowerby, loc. cit.* Variety of preceding.

EMARGINULA TENUICOSTATA. *Sow. loc. cit.* Another variety.

SCUTUS ELONGATUS. *Blainville, Bulletin des Sciences Nat. Feb., 1817, p. 28; Parmophorus australis* of Lamarck. A large white shell with orange markings on the inside enamel. Somewhat common; S.A., S.E.A. Long. 110, lat. 55. The animal larger than the shell; black, with long tentacles, whence it is known as the "Elephant" by sea side visitors.

TUGALIA AUSTRALIS. *Sow. Thes., Fissur., pl. 14, fig. 18.* Whitish, oblong, depressed, with very fine ribs, and minute anterior notch, Long. 17, lat. 10. Rare. S.E.A. The specimens of this shell I have seen from Sydney, Victoria, etc., have been identified with *T. ossea*, Gould, do not correspond with Gould's description, which, moreover, he refers to N. Caledonia, Fiji, etc. I, therefore, propose the name of *Tugalia australis*.

TUGALIA TASMANICA. *Tenison-Woods.*

ACMÆA SEPTIFORMIS. *Quoy, Voy. de l' Astrol., pl. 71, figs. 43, 44.* Oval, gray, spotted with pale olive and dark brown margin within. Long. 15, lat. 11, alt. 5. Somewhat common. S.E.A.

ACMÆA MARMORATA. *Tenison-Woods.*

ACMÆA CRUCIS. *Tenison-Woods.*

ACMÆA COSTATA. *Sow. Zool. Voy. Beagle, (so in Angas' list, which I have not been able to verify).* My own idea is that the shell is different, and was never described until Angas himself did so as *Patella alticostata*. (See Proc. Zool. Soc., 1865.) Solid, depressed, corroded, very irregularly ribbed, often transversely barred in the interstices. One of the commonest

mpets in all extra-tropical Australia. Ribs about 17, interior white and brown stained. Long. 32, lat. 26, alt. 10.

*ACMÆA CANTHARUS.* *Reeve, Icon., pl. 4, fig. 131.* Ovate, smooth, thin, convex, apex anterior and generally corroded, smooth, reticulated black and white; interior like tortoise shell. Long. 24, lat. 19. Common in Australia and New Zealand.

*ACMÆA FLAMMÆA.* *Quoy and G., Vol. de l'Ast., Vol. 3, p. 354.* This is probably the same as *A. subundulata*, *Angas, Zool. Proc., 1865, p. 155.* Somewhat high, apex anterior, faintly ribbed, white with brown striae, often radiating in the form of a cross.

*ACMÆA CONOIDEA.* *Quoy, Voy. de l'Astrol., Vol. 8, pl. 71, figs. 5 to 7.* A small, high, conoid shell, generally eroded; apex very obtuse. Long. 10, lat. 8; alt. 7. Common, S. and E.

*ACMÆA PETTERDI.* *Tenison-Woods.*

*ACMÆA ALBA.* *Tenison-Woods.*

*PATELLA ACULEATA.* *Reeve, pl. 32, fig. 90.* A deeply convex shell, rayed with many ribs, scaly or prickly and narrowly compressed. Recherche Bay, common. Reeve gives no habitat for this shell, which is also found in Port Jackson; generally covered with harsh brown spongy tissue, not unlike some algæ, but which may be an appendage to the animal. Long. 40, lat. 33.

*PATELLA TRAMOSERICA.* *Martyn, Univer. Conch., ed. Chem., pl. 5, fig. 3, (pl. 16 in original).* Ribs close set, obscurely nodosely tuberculated yellowish orange or vermilion, and rayed with black, with white spots on the interstices, interior bluish white, silky or metallic at the margin. By transmitted light distinctly coloured crimson and yellow. Long. 57, lat. 50. Generally depressed, but this varies as well as the shape of the shell, which is oblong to orbicular. Common, and in Australia and New Zealand. A most variable shell in size and coloring. I have found every size, and almost every color, especially in the interior, which ranges from pale indigo to golden. In some there is no spathule, or it is black or blue and varied in every way. The most constant characters are, the silky lustre of the interior, and the crimson streaks on orange ground as seen by transmitted light. *P. limbata, Phil.*, is a synonym, or, at best, a N. Australian variety, it is a (*Philippi, Abbild. in Besch., Conch., pl. 3, fig. 1*) subconoid shell, with wide radiating ribs indistinctly noded, interstices narrow and black, deep orange exterior, interior orange at the margin, blotched with black, nucleus blue. Long. 55, lat. 45. Common. I regard this shell as a variety or not even a variety of the preceding. The somewhat broader ribs may distinguish it.

*PATELLA DECORA.* *Philippi, Icon. pl. 3, fig. 13.* A peculiar semi-globose ribbed form, with apex very much inclined to the anterior, blotched black and blood-like. Rare, and in New Zealand. Long. 40, lat. 32, though the Tasmanian identification is very doubtful.

*PATELLA USTULATA.* *Reeve, Icon., pl. 31, fig. 88.* Depressed apex, sub-marginal, coarsely ribbed, with many fine riblets in the interstices, scorched with rich brown, often corroded, white inside with narrow fringe of brown and yellow. Long. 35, lat. 29. Somewhat common, S. and E. Coasts. Reeve's species described from worn shells.

*PATELLA TASMANICA.* *Tenison-Woods.*

*PATELLA CHAPMANI.* *Tenison-Woods.*

*PATELLA RADIANS.* *Gmelin, 13th edit., Linne's Syst. Nat., p. 3720, also Sow. (Lottia radians) Genera Shells, Vol. 2, pl. 5, fig. 3; P. argentea, Quoy, Voy. Astrol., Vol. 3, p. 345, pl. 70, figs. 16 and 17.* Oval, narrow in front, apex anterior, distant radiating ribs, greenish black, or yellow with blackish

markings, silvery inside. Long. 23, lat. 19, alt. 6½. Very variable. Rare. E. Coast only, and in N. Zealand. A doubtful identification.

CHITON (LOPHYRUS) AUSTRALIS. *Mag. Nat. Hist.*, 1840, *Conch. Illust.*, fig. 46, and probably fig. 139; *Reeve*, pl. 2, fig. 10. An oblong rounded form of dark green color, with the lateral areas radiately ridged; margin bordered with small scales. The genus *Lophyrus* was proposed by Poli (*Testacea utriusque, Sicilia*, 1791 to 1795) for *Chitons* with the borders of the mantle covered with rounded scales regularly imbricated. I do not know of any other reliable species, though I would easily assign certain varieties, or very young or worn shells to the following species:—*Concentricus*, *muricatus*, *smaragdinus*. The *Chitons* vary wonderfully in color according to their age, and according to the rock to which they adhere to which they are in a remarkable manner assimilated.

CHITON (LEPIDOPLEURUS) LIRATUS. *Ad. and Angas, Zool. Proc.*, 1864, p. 193. A small, somewhat pale shell, with undulating decussate striæ, the back of the valves being like an edge-turned watch.

CHITON (LEPIDOPLEURUS) SPECIOSUS. *Ad. and Ang. loc. cit.*, p. 192. It is with very considerable diffidence that I differ from such high authorities, but I would suggest that this and the preceding are varieties of *C. ustulatus*, *Quoy. Voy. Astrol.*, Vol. 3, p. 393, pl. 75, figs. 19, 24. And I must frankly repeat my opinion already given, that I believe we have very few species of *Chiton*, instead of the number which naturalists have described, and that they are very variable and world-wide in their distribution. We might have hundreds more than the hundreds we have, if we were to take fairly into account the endless varieties of color, form, or marking to which different individuals of the same species are subject. The following species have also been attributed to Tasmania, though, as I have failed to trace them, I shall merely give the names and authorities.

CHITON PICEUS. *Gmel.*

CHITON PROTEUS. *Reeve.*

CHITON SINCLAIRI. *Gray in Dieffenbach's Travels*, Vol. 2, p. 263. A New Zealand shell whose Tasmanian habitat is doubtful.

CHITON GLAUCUS. *Gray.*

CHITON (PLANIFORA) PETHOLATUS. *Sow. Mag. Nat. Hist.*, 1840. A large greenish-blue species, with a rough coarsely hirsute margin. The interior of the valves a transparent light blue, while exteriorly they are finely granulated in undulating lines. I am perfectly confident that with this species must be united *C. (Plaxiphora) ciliata*, *Sow., Conch. Illust.*, p. 79.) Absolutely the only differences are the age and size by which the external markings are changed. I do not pronounce this opinion hastily, as it is nearly 20 years since I first became acquainted with the species, and have examined hundreds of specimens from all the S.A. Coasts south of the Murray, Portland Bay, Bass' Straits, and Tasmania.

CHITON (ACANTHOCHÆLES) ZELANDIUS. *Quoy, Voy. de l'Astrol.*, Vol. 3, p. 400. A species with little tufts of transparent spiculæ at the base of each plate. Isthmus Bay from 30 to 50 mill. long., common. I believe this shell to be identical with *C. crinitas*, Pennant, and *C. fascicularis*, the first of Britain, the second of the Mediterranean.

CRYPTOPLAX GUNNI. *Reeve, Icon. fig. 5* (as *Chitonellus*). From 1 to 2 inches long. N., common, and S.A.

CRYPTOPLAX SPINOSA. *H. Adams, Zool. Pro.*, 1861, p. 385. Animal with a large mantle and spinous plates, with a broad smooth central ridge. Long. 88, lat. 25.

SIPHONARIA DIEMANENSIS. *Quoy. Voy. de l'Astrol.*, Vol. 2, p. 327, pl. 25, fig. 1, etc. Sharply conical, radiately white ribbed, interstices rich brown,

interior highly polished with purple brown. Long. 21, lat. 15, alt. 10. Very common, and S.A., and S.E.A.

SIPHONARIA DENTICULATA. *Q. and G., loc. cit.* Variety of preceding. Pale inside and generally corroded. Long. 24, lat. 20, alt. 11. Not common, and S.E.A. and S.A.

SIPHONARIA ZONATA. *Tenison-Woods.*

CYLIGHNA ARACHIS. *Quoy, and Sow., Thes., p. 590.* Solid, cylindrical, white, with ferruginous periostraca; easily distinguished by its very fine undulating striæ. Long. 22, lat. 9. Rare. Long Bay. Rev. H. D. Atkinson.

CYLIGHNA ATKINSONI. *Tenison-Woods.*

APLYSIA CONCAVA. *Sow. Gen. of Shells, and Reeve, pl. 6, figs. 24, a and b.* Small, horny, very concave and strongly incurved, sub-auriculate on both sides of the apex, not very common. Cloudy Bay Lagoon, Bruni Island. Long. 7, lat. 5.

APLYSIA TASMANICA. *Tenison-Woods.*

TORNATINA MARIE. *Tenison-Woods.*

BULLA OBLONGA. *A. Adams, Sow., Thes. Bulla, sp. 50, pl. 123.* A large shell, reddish brown with pink spots and zoned indistinctly with 3 or 4 broad blue-black bands; has been mistaken for Quoy's *B. australis*; it is said to occur in the Philippines (*H. Cuming*), probably only a variety of *B. ampulla*. In S.A. (Guichen Bay, Lake Eliza, raised beaches, etc.), it is a common pleistocene fossil where it attains a large size. Long. 55, lat. 31.

PHILINE APERTA. *Linne Syst. Nat., 12 ed., 1787; Reeve 1, fig. 3.* A milky, translucent, very open shell. Long. 24, lat. 16. A large specimen of this is *P. angasi* of Crosse. Rare, and S.A.

HAMINEA OBESA. *Sow. in Reeve Icon., 16, fig. 13.* Milky and transparent. Long. 11, lat. 8. Rare. Islands in Bass' Straits, and S.A.

MARINULA PELLUCIDA. *Cooper, Mag. Zool. Br., Vol. 2.* A somewhat globose, pink pellucid shell with three prominent unequal plaits. Common, and in Australia.

OPHICARDELUS CORNEA. *Swainson, Proc. Roy. Soc. Van Diemen's Land, Vol. 3, p. 43.* An ovate, thin, light shell, covered with a periostraca and a thickened spire, olive brown with darker transverse bands. Amphibious. Oyster Cove. I suspect this is the same shell as that called *O. australis*, Quoy, in N.S. Wales.

OPHICARDELUS PARVA. *Swainson, loc. cit.* Like the last, but smaller, and more slender, and the plaits proportionately much larger. Long. 7, lat. 3. South Coast in swamps of brackish water.

AURICULA DYERANA. *Tenison-Woods.*

## CONCHIFERA, LAMARCK.

### ORDER PHOLALACEA.

BARNEA AUSTRALASIE. *Gray MS. Brit. Mus., Sow. Thes., pl. 107, fig. 73.* Very like *B. similis*, Gray, and in *Hutton's Cat. Moll., New Zealand*, except that it is rounded anteriorly and not acuminate. Rather uncommon. Long. 25, lat. 68.

TEREDO NAVALIS. *Linné, Syst. Nat., ed. 12, p. 1267.* Rare, and probably introduced.

GASTEROCHÆNA TASMANICA. *Tenison-Woods.*

HUMPHREYIA STRANGEL. *Ad. and Angas, Zool. Proc., 1852, p. 91.* Our only Australian *Aspergillum*, though another species, occurs in New Zealand. White, curved, and obsoletely carinate on each side. Rare, N.; also Islands in Bass' Straits.

**SOLENA VAGINOIDES.** *Lamarck, Vol. 6, p. 55.* Mottled with purple and flesh color; differing from *S. sloanii*, Gray, of N.S. Wales, in its curved form and greater width. Common. Long. 12, lat. 85.

**SAXICAVA AUSTRALIS.** *Lamarck, Vol. 6, p. 153.* No definite shape or color can be assigned to this shell, except that it takes every form according to the rock on which it lives. Lamarck made two genera, and three species of the above which occurs also in Australia. Not common. Long Bay. Rev. H. D. Atkinson.

**PANOPEA AUSTRALIS.** *Sow. Genera of Shells, No. 40, fig. 2.* Ovate oblong, handsome, wider anteriorly, posterior oblique, truncated, concentrically wrinkled. Rare, and even then seldom found alive. Long. 44, lat. 75.

**CORBULA ZELANDICA.** *Quoy, Voy. Astrol. Zool., Vol. 3, p. 511, pl. 85, figs. 12, 14.* I am very doubtful if this shell has been found in Tasmania. It occurs in New South Wales and New Zealand, and as the whole known species are great wanderers it may occur here. The genus is, however, unknown in South Australia, and the Tasmanian fauna is generally more similar to that coast than N.S. Wales.

**CORBULA ERYTHRODON.** *Lamarck, Vol. 6, p. 138.* The same remarks apply to this shell. It is, not, however, known in N.S. Wales, but undoubtedly occurs in China, Japan, and New Zealand. See *Von Martens, Crit., List Moll., N. Zealand, p. 4.*

**ANATINA ANSERIFERA.** *Spengler, Schrift., Nat. Ges. Z.U. Copenhagen, Vol. 3, p. 32, No. 8. Chemnitz, Vol. 19, p. 193.* Squarely oblong, sides nearly equally granuled; much larger and more square looking than the other Tasmanian species. Long. 32, lat. 70. Very rare.

**ANATINA CRECCINA.** *Valenciennes teste, Reeve, Icon. pl. 2, fig. 12.* Elongately oblong, thin, hyaline, minutely granuled, wrinkled near the umbones, anterior sides shorter, alternately beaked, gaping roundly, extremities reflected. Long. 32, lat. 68, alt. 19, but this is rather large. Rare, North Coast, Kelso, W. Legrand. Occurs also in S.A. and S.E.A., but much smaller.

**ANATINA TASMANICA.** *Reeve, Icon. pl. 3, fig. 20.* Ovate, umbones nearly central, translucent, shell widely gaping. Long. 25, lat. 50, alt. 17. Not common. S.E.A. also, but smaller.

**ANATINA ANGASI.** *Crosse, Jour. de Conch, 1864, Vol. 4, p. 349.* An oval, inequivalve species, split at the umbones, thin, and almost regularly rugosely striate. Rare, Oyster Bay, Frederick Henry Bay. W. Legrand. Long. 43, lat. 60, alt. 22.

**NEERA TASMANICA.** *Tenison-Woods.*

**MYODORA BREVIS.** *Stutchbury, Zool. Jour, Vol. 5, p. 99. Tab. Sup. p. 43, figs. 1 and 2.* A short, triangular shell, faintly flexuously ribbed, convex on one side, and flat on the other. Long. 25, lat. 28, alt. 5. Rare, S. Coast. W. Legrand.

**MYODORA OVATA.** *Reeve, Zool. Proc., 1844, p. 92.* This shell was described as coming from the Philippines, I doubt much if our species is the same. Like the following, but stouter, with somewhat prominent ribs on both sides.

**MYODORA PANDORIFORMIS.** *Stutchbury, loc. cit., figs. 3 and 4.* Oblong, ribbed on one side only. Long. 11, lat. 16, alt. 5. Rare, S. and E. coast.

**MYODORA TASMANICA.** *Tenison-Woods.*

**MYODORA ALBIDA.** *Tenison-Woods.*

**MYOCHAMA ANOMIOIDES.** *Stutchbury, loc. cit., pl. 42, figs. 1 to 4.* A pink, wrinkled, parasitic shell with the lower valve always attached to some other

mollusc. I have found them on many different shells. Rare, but somewhat common in S.E.A.

MYOCHAMA SP? Parasitic on Pectens at Long Bay. W. F. Petterd.

CHAMOSTREA ALBIDA. *Lamarck, Vol. 6, p. 585 (Cleidothærus chamoides Sow., Genera of Shells, figs. 1, 2, 3.)* Somewhat common in shallow places, such as Sorell, Pittwater, etc. This curious shell, which is always attached, was made the type of a very interesting genus by Sowerby, because of the loose ossicle in the hinge. The size varies from 20 to 50, or even 60 mil., but the latter size only in N.S. Wales.

MACTRA RUFESCENS. *Lamarck, Vol. 6, p. 102.* A solid, flexuously wrinkled shell, of pale brown color, but stained with purple inside and out. Long. 62, lat. 55, alt. 28. Common.

MACTRA PURA. *Deshayes, Zool. Proc., 1853, p. 15.* Solid, white, with thin, silky periostraca, triangular, equilateral, obtusely angled, posteriorly and obsoletely striate. Extends through Bass' Straits to W.A. Not common, E. and S. Coasts. Long. 46, lat. 50, alt. 27.

MACTRA CRETACEA. *Angas., Proc. Zool. Soc., 1867, p. 909 (as Spisula).* Small, transversely trigonal, chalky-looking white species, without any periostraca, and a distinct posterior angle. Long. 16, lat. 12½, alt. 8. Tamar Heads.

ANAPA TRIQUETRUM. *Hanley, Zool. Proc., 1843, p. 101.* A very thick, triangular tumid shell, whitish and concentrically striate. Long. 30, lat. 31, alt. 25. Rare in Tasmania, habitat very doubtful, though Mr. Hanley quotes it as from Tasmania. Very common in S.A., Guichen Bay especially. Mr. H. says, "I know of no species which could possibly be confounded with this extraordinary shell, which from the peculiar triangular cavity between the beak may prove the type of a sub-genus."

ANAPA TASMANICA. *Mihi.* Possibly only a small variety of preceding.

TELLINA DELTOIDALIS. *Lamarck, Vol. 6, p. 206.* Rather smooth, deltoid, compressed, arcuate, beaked anteriorly. Long. 38, lat. 46, alt. 11; much smaller in S.E.A. "This species varies greatly in size and aspect, and has a wide range over the south portions of Australia, Tasmania, and New Zealand."—*Angas, Zool. Proc., 1865.*

TELLINA ALBINELLA. *Lamarck, Vol. 6, p. 194.* The rose-colored and white zoned variety of this shell is the common species in Tasmania. Long. 30, lat. 54, alt. 5. On all exposed surf-beaten beaches. Very common at the mouth of the Murray, in S. Australia.

TELLINA DIEMANENSIS. *Deshayes, Zool. Proc., 1854, p. 361.* A much lighter, thinner, and more curved shell than *T. deltoidalis*, and of pale fawn color. Very rare. I have not been able to meet with the species.

TELLINA TRISTIS. *Deshayes, loc. cit.* Trigonal with eroded periostraca. Not known to me.

TELLINA (ARCOFAGIA) DECUSSATA. *Lamarck, Vol. 6, p. 205.* An orbicularly trigonal shell, subequilateral, conspicuously decussate. B. Sts. only. Long. 38, lat. 43, alt. 20. Common in S.A.

TELLINA MARIE. *Tenison-Woods.*

GARI COMPTA. *Deshayes, Zool. Proc., 1854, p. 321.* A species reticulated with cross striae, and with red-violet rays, which I have not seen.

GARI STRIATA. *Deshayes, Zool. Proc., 1854, p. 321.* Shining, compressed, finely striate, zoned with livid brown and purple. Long. 15, lat. 20, alt. 5. Common.

GARI ZONALIS. *Lamarck, Vol. 6, p. 182.* Smooth, compressed, very finely striate, with livid zones. Reeve, on the authority of R. C. Gunn, gives N. Tasmania as the habitat, but his figures and descriptions do not agree with those of Lamarck.

GARI ATKINSONI. *Brazier*. This is a manuscript name given by Mr. J. Brazier to a shell dredged by the Rev. Mr. Atkinson, Long Bay. I have not yet seen the shell, but these particulars were furnished me by Mr. Legrand.

HIATULA EPIDERMIA. *Deshayes, MS. Mus. Cum. testè Reeve, Icon. (Soletellina nymphalis)*, pl. 1. Oval, somewhat solid, purplish at the umbones, covered with an olive, shining, horny periostraca. Common, shallow estuaries. "This species ranges from Port Jackson to Swan River."—*Angas*. Long. 36, lat. 60, alt. 18.

HIATULA VITREA. *Deshayes, Zool. Proc.*, 1854, p. 326. Thin, white, glassy, and transparent. Said by Mr. Angas to occur in Tasmania, but I have met no traces of it, so it must be very rare. Common in S.A.

SEMELE DECORA. *A. Adams, Zool. Proc.*, July, 1853. Orbicular, somewhat inflated, densely reticulated with small radiating and concentric ridges. Long. 28, lat. 31, alt. 14½. I strongly suspect that this shell is no more than a small form of *Tellina decussata*.

SEMELE EXIGUA. *H. Adams, Zool. Proc.*, 1861, p. 385. Mr. Adams describes as from Tasmania an oblong transverse inequilateral shell, shining, thin, white, finely concentrically striate, posteriorly subangulate, with a strong fold continued to the ventral margin. I have never seen the shell, and it is not known to Tasmanian collectors.

SEMELE WARBURTONI. *Tenison-Woods*.

DONACILLA ELONGATA. *Deshayes, Mus. Cum. teste. Reeve, Icon.*, pl. 1, fig. 5. Oblong, very truncate anteriorly, with shining yellow periostraca. Long. 20, lat. 33, alt. 10. Very common, and S.A., and S.E.A.

MESODESMA ERYCINA. *Lamarck, Vol. 6, p. 134*. Compressed, ovate, periostraca rich olive. Common and in E. I. Archipelago. Long. 25, lat. 33, alt. 15.

MESODESMA PRÆCISA. *Deshayes, MS. Mus. Cum. teste. Reeve, Icon.*, pl. 4, fig. 31. Solid, white, shining, abruptly truncated anteriorly; periostraca slight. Long. 20, lat. 23, alt. 12. Very common.

LUTRARIA DISSIMILIS. *Deshayes, Zool. Proc.*, 1854. A large, straight, thick species, with a periostraca. Long. 100, lat. 46, alt. 24. Dead valves only washed ashore on the North-east Coast. W. F. Petterd.

CRASSATELLA KINGICOLA. *Lamarck, Vol. 6, p. 109*. Whitish, umbones strongly ridged, periostraca sordid, deep brown. Long. 80, lat. 85, alt. 45. Common, N. *C. castanea* of Australia is more transverse.

CRASSATELLA AURORA. *Ad. and Angas, Zool. Proc.*, 1863, p. 426. "This charming species is of compressed ovate form, and of a pale fulvous color, delicately marked with chestnut and crimson."—*Angas*. Long. 17, lat. 23. Bank's Straits, Tasmania.

CRASSATELLA BANKSII. *Ad. and Ang.*, loc. cit. This species is of a pale flesh color, fading into white bands towards the beaks, with two yellowish brown bands radiating to the ventral margin. Long. 11, lat. 17. Banks' Straits.

VENUS (CHIONE) HUMPHREYI. *Donovan Nat. Repository, Vol. 3, pl. 78*. Shaped like *V. conularis* and similarly striate, very shining, reticulated with angular rufous lines. "Lately discovered by Mr. Humphrey, on the sea coast of Van Diemen's Land, very near *V. striatulus* of Europe."—*Donovan, loc. cit.* The character above given appears so constant, that I think the species should be admitted. Common. Long. 29, lat. 36, alt. 19.

VENUS (CHIONE) CONULARIS. *Lamarck, Vol. 6, p. 368*. The well-known common *Venus* of South Australia and Tasmania. All must agree with Mr. Deshayes (see note to *Lamarck, loc. cit.*) in regarding this species and *V. strigosa*, *aphrodina*, *Peronii*, *aphrodinoides* and *elegantina* as mere

varieties in color, size, and, to some extent, shape, of the above. I have examined thousands of specimens and could find no single character in one species, which did not pass insensibly into another. In the raised beaches of S. Australia it abounds in extraordinary quantities, and is burnt for lime.

VENUS (CHIONE) LAMELLATA. *Lamarck, Vol. 6, p. 349.* The most beautiful of our bivalves, distinguished by its transverse elevated undulose frills, which are striate on the lower side, and of pink color, not unlike the gills of a mushroom. Common in Tasmania, and extending, though rarely to Port Jackson, and S. Australia as far as Guichen Bay. Long. 40, lat. 55, alt. 22, frills 6 at that size.

VENUS (CHIONE) STUTCHBURYI. *Gray.*

VENUS (CHIONE) ROBORATA. *Hanley, Zool. Proc., 1844, p. 161.* Solid, with numerous smooth, concentric, thick ridges, curved inwards, white, broadly rayed with pale pink at times. Common, and S.E.A. Long. and lat. 45, alt. 15.

VENUS (CHIONE) GALLINULA. *Lamarck, Vol. 6, p. 348.* Cordately elliptical, elegantly and closely covered with stout recurved ribs, margin finely dentate, whitish, sometimes fringed with sharply angulate red lines, interior of a uniform violet purple. Common, and V. Long. 30, lat. 39, alt. 20.

VENUS (CHIONE) MACLEAYANA. *Tenison-Woods.*

VENUS (CHIONE) STRIATISSIMA. *Sowerby, Thes. Conch., pl. 157, fig. 103, etc.* Small, oblong, ovate beautifully sculptured with radiating ribs and transverse lamellæ; mottled with red and brown. D'Entrecasteaux's Channel, W. Legrand, and in S.E.A. Long.  $8\frac{1}{2}$ , lat.  $11\frac{1}{2}$ , alt. 5.

VENUS (CHIONE) AUSTRALIS. *Sowerby, Zool. Proc., 1835, p. 22.* Like a *Corbis*, nearly latticed, fawn color with brown rays, differing from the last in the size, closeness and thickness of the lamellæ, which are also recurved. Long. 10, lat. 28, alt. 12. These dimensions agree with Sowerby's, but the N.S. Wales and S.A. specimens are much smaller. Rare. B.Sts. and S. Coast.

VENUS (CHIONE) SCALARINA. *Lamarck, Venus nitida, Quoy.* A variety of *V. conularis* only. q.v.

VENUS (CHIONE) LÆVIGATA. *Sowerby, Thes. Conch., pl. 159, p. 156.* Smooth, shining, ovate, acuminate produced posteriorly, and grooved; dusky fawn, with two or three smoky broad rays. Rather common, V. as far as Portland Bay. Long. 26, lat. 39, alt. 18. This is the measurement of specimens taken on the E. Coast. Elsewhere it is smaller.

VENUS (CHIONE) FUMIGATA. *Sowerby (as Tapes).* Is only a large dusky variety, the posterior grooving being either present or absent on different specimens.

CALLISTA DIEMANENSIS. *Hanley, Zool. Proc., 1844, p. 110.* Oblong, ovate, solid, rather variable in color, but generally fulvous bay, more or less rayed with ashy purple. Hanley says it is easily distinguished by the ashy purple ray under the umbones inside; this, however, disappears with age. Long. 24, lat. 33, alt. 15. This species was described by Deshayes (*Brit. Mus. Cat. Conch., sp. 25, p. 64*) as new and named *Dione multistriata*, under which name, but as *Callista*, it is quoted as a New Zealand shell by Hutton (*Cat. Mar. Moll. N. Zealand*). It is found sometimes double the size given, and then the colors are very pale.

CALLISTA PLANATELLA. A flat shell described by Lamarck from specimens in his possession, but previously described by Chemnitz, *Conch. Cat., 7, t. 43, litt. B? (sic in Lam)*. Said by Philippi (*in Abbild. Conch., p. 199, pl. 3, fig. 6*) to come from "Terra Van Diemanensis," which may refer to N. Australia. Deshayes (*Brit. Mus. Cat. Conchif., part 1, p. 59*) doubts if the shell is the same. Unknown in Tasmania.

**CALLISTA CANDIDA.** *Deshayes, loc. cit., ut. Sup. p. 60.* Habitat given as above. Unknown to Tasmanian collectors.

**CALLISTA DISRUPTA.** *Sow. Thes. Conch., p. 117, pl. 163, figs. 208 and 209.* Transverse, ovate, shining, striate, yellowish, but much variegated with purple brown. Long. 14, lat. 18, alt. 10. Rare; Long Bay; Rev. H. D. Atkinson.

**CALLISTA CITRINA.** *Lamarck, Vol. 6, p. 306.* Pale yellow, about the size of *C. rutila*, and said to occur in Tasmania, but I have not seen a specimen.

**CALLISTA RUTILA.** *Deshayes*, who gives in the *Brit. Mus. Catalogue, "Proc. Zool., 1852,"* as his reference, but no such name occurs. In *Reeve's Icon., pl. 5, fig. 18,* the description does not correspond with *Deshayes's loc. cit.*, nor does the figure. He refers to *Sowerby's Thes., p. 743, pl. 103, fig. 205,* who gives no habitat. The shell usually regarded as such in Australia and Tasmania, I believe to be new, and have described it under the following name.

**CALLISTA VICTORLE.** *Tenison-Woods.*

**DOSINIA IMMACULATA.** *Tenison-Woods.*

**DOSINIA GRATA.** *Deshayes, Brit. Mus. Cat. Conchifera, part 1, p. 8.* White, orbicular, with close, regular, almost lamellar concentric lines, and microscopically very closely radiately striate. Stained rusty with age. Common, and in Australia. I believe *Dosinia cydippe, A. Adams, Zool. Proc., 1855, p. 224* is the same shell. Long. 51, lat. 56, alt. 37.

**DOSINIA JAPONICA.** *Reeve, Icon., pl. 3, fig. 17.* South Coast, Southport, etc. This appears to me to be only a large specimen of the preceding, nor can I regard it either as distinct from *D. lamellata, Reeve, D. scabriuscula, Phil.*, or *D. incisa, Reeve.* They are all from N. Australia.

**DOSINIA CORYNE.** *A. Adams, Zool. Proc., 1855, p. 223.* Solid, smooth, compressed, and shining, striae very slightly elevated, pale yellowish white, I have not seen this shell.

**DOSINIA CROCEA.** *Deshayes, loc. cit.* Very near *D. japonica*, as above but has the lamellæ reflexed near the umbones, and a beautiful saffron inside. Flinder's Island is the habitat given, but it is not known in Tasmania. There is another Flinder's Island off S. Coast of Australia.

**TAPES UNDULATA.** *Born. Testacea., Musei. Cæsarei Vindobonensis, 1780, p. 67.* A peculiar oblong, shining, fawn coloured shell, almost equilateral, and with zigzag purple markings on the corselet. Said to be identical with Born's shell from the China Seas, but I strongly incline to the opinion that it is a different and undescribed species. Rare, Bass' Straits only, and E.A. Long. 28, lat. 36, alt. 13.

**RUPELLARIA DIEMANENSIS.** *Quoy and G., Voy. Astrol., pl. 84, figs. 25, 26.* Oblong, quadrate, ventricose, somewhat solid, radiately and transversely ribbed. The transverse ribs lamellose on the posterior margin. Long. 14, lat. 20, alt. 9. Common. Is this *Deshayes's Venerupis mitis?* See *Zool. Proc., 1853, p. 5.*

**RUPELLARIA BREVIS.** *Quoy and G., loc. cit., Vol. 3, p. 534, pl. 84, figs. 21, 23.* An ovately quadrate shell, strongly plicate at the base, and transversely striate, which I have not met with.

**RUPELLARIA RETICULATA.** *Tenison-Woods.*

**RUPELLARIA CRENATA.** *Lam., Vol. 6, p. 164.* Globose, irregular, oblong, imbricately sculptured and irregularly frilled. "It may be easily recognised," says Mr. Angas, (*Zool. Proc., 1867, p. 924*) "by its peculiar chalky appearance, blotched here and there with lilac," (or pink). Not common. S.A. also, common, Long. 25, lat. 44, alt. 19, but this is large.

**RUPELLARIA SUBDECUSSATA.** *Deshayes, Brit. Mus. Cat. Conch., part 1,*

*p. 196, No. 18.* Dull white, ovate, thin, very finely ribbed, and decussate, with irregular lines of growth. Not common. Long. 25, lat. 44, alt. 18.

*RUPELLARIA CARDITOIDES.* *Lamarck, Vol. 6, p. 164.* Oblong, square, ribbed, and concentrically regularly exfoliate. Not common, and in S.A. Long. 28, lat. 37, alt. 17.

*CARDIUM TENUICOSTATUM.* *Lamarck, Vol. 6, p. 372.* Ventricose, finely ribbed and somewhat shining, with sometimes a bristly periostraca, which appears under the microscope as a corrugated scurfy curved fringe along the ribs. Very common, and in all extra-tropical Australia. Long. 40, lat. 35, alt. 35. But often much larger.

*CARDIUM PULCHELLUM.* *Reeve, Icon, pl. 8, fig. 42.* Small, finely ribbed, and posteriorly tuberculated, whitish, handsomely rayed with orange. It occurs in S.E.A., but the Tasmanian specimens are much smaller, measuring only long. 8, lat. 9, alt. 5.

*CARDIUM PAPIRACEUM.* *Chemnitz, Conch. Cab., Vol. 6, p. 190, pl. 18, fig. 184.* I believe that this shell has been found in Tasmania, but all the specimens lately shown as such to me I can only regard as varieties of *C. tenuicostatum*.

*CARDIUM CYGNORUM.* *Deshayes.* River Mersey, and Tamar Heads. W. F. Petterd.

*CHAMA* ——— ? Circular Head. W. F. Petterd.

*LUCINA DIVARICATA.* *Linné, Syst. Nat., 12 edit., p. 1120.* A very pretty globose orbicular, waxy white shell, divaricately striate. Common, and in S.A. Long. 26, lat. 27, alt. 15. Found almost all over the world. It was found first in the Mediterranean, and, until lately, when found elsewhere, was thought to be another species. This is Von Marten's opinion (*Crit. List. Moll. N. Zealand, p. 46*), but the species are great wanderers, and the opinions of naturalists, as to the range of certain shells, have wonderfully changed since the revelations of deep sea dredgings.

*LUCINA MINIMA.* *Tenison-Woods.*

*LUCINA PECTEN.* *Lamarck, Vol. 6, p. 230.* Small, white, somewhat transverse and depressed, with numerous fine bifurcating striate ribs. Long. 14, lat. 13, alt. 8. Rare. King's Island. This shell occurs in the Mediterranean, West Indies, E. Coast of Africa, but I believe has never been detected in Australian waters before. There can be no doubt of the identification, as I have compared our shell with type specimens from Europe. Sowerby proposed to make a new species of the western forms, considering them distinct because of the remote habitat.

*LORIPES ICTERICA.* *Reeve, Icon., Lucina, pl. 10, fig. 60.* "A small white shell, finely concentrically (under the lens) radiately striate; ligament internal."—*Angas.* There is great difficulty in detecting the radiating striae in the Tasmanian specimens. Long. 8, lat. 9, alt. 5. Common.

*DIPLODONTA TASMANICA.* *Tenison-Woods.*

*PORONIA AUSTRALIS.* *Sowerby, Jour. de Conch., 1863, p. 287, pl. 12, fig. 8.* Very small, nearly smooth, tinged rose at the margins. Common everywhere, and in Australia. Long. 3, lat. 4, alt. 2. The generic name *Lascea*, of Leach, was anticipated by Recluz, and Leach himself abandoned it for *Autonoë*. Of his *Lascea*, Gwyn Jeffreys says, "he says nothing of the animal, and scarcely more of the shell."

*PORONIA SCALARIS.* *Phil.* Common, S. Coast, under stones at low water. W. F. Petterd.

*PYTHINA TASMANICA.* *Tenison-Woods.*

*GOULDIA PETERDI.* *Tenison-Woods.*

*KELLIA ATKINSONI.* *Tenison-Woods.*

**CARDITA RAOULI.** *Angas, Zool. Proc., 1872, p. 613.* White, tinted with rose, 13 ribs, which are scaly, nodulous, and spinous. South Coast. Long. 23, lat. 19, alt. 11.

**CARDITA QUOYI.** *Deshayes, Zool. Proc., 1852, p. 103.* Coarse, transverse, globose, whitish with ribs obsolete and irregularly nodose. Badger Island, not common. Long. 30, lat. 36, alt. 20.

**CARDITA GUNNI.** *Deshayes, Zool. Proc., 1852, p. 101.* This is my *C. Atkinsoni*, described in last year's Proceedings. It is often rayed with red streaks on a dusky ground. Small, transverse, ribs 16, regularly imbricately nodose.

**CARDITA AMABILIS.** *Deshayes, Zool. Proc., 1852, p. 102, pl. 17, fig. 89.* Suborbicular, with about 28 regularly crenately nodose ribs spotted chestnut, with a periostraca. Long. 16, lat. 17, alt. 10. South Coast, rather uncommon. *Deshayes* gives New Zealand as the habitat, but it does not occur in *Hutton's* list.

**MYTILICARDIA EXCAVATA.** *Deshayes, loc. cit., p. 100.* Oblong, with radiate ribs, supporting long irregular, lamellar arched scales. Tasmanian specimens from D'Entrecasteaux's Channel are dull yellow in color, while those from Sydney are orange and larger. Moderately common. Long. 9, lat. 16, alt. 10. Is this *Lamarck's Cardita aviculina*, which was thought to be identical with *C. calyculata* (?) *Brugieres*? *Lamarck* says that his specimens came from King's Island and Sealer's Cove. There is at any rate no resemblance between our species and *Brugiere's* shell.

**MYTILICARDIA TASMANICA.** *Tenison-Woods.*

**MYTILUS LATUS.** *Lamk. Hist. Nat., s. v., Vol. 7, p. 41.* This shell in its young state is sometimes almost an emerald green, but is always rayed with purple by transmitted light, it is depressed, with an acute edge, and well preserved specimens are covered with a bright olive shining periostraca. When old and worn it is solid, somewhat smooth, purple black, and shining, margins enamelled, and dull green, with scattered, coarse, black hairs, set in a kind of white calcareous disc. Very common on wharves, piles, etc., Hobart Town. Long. 96, lat. 50, alt. 40. Common in New Zealand. It has in Tasmania been confounded with the American *M. obesus*, *Dunker*, through a mistaken habitat given by *Reeve*.\*

**MYTILUS TASMANICUS.** *Tenison-Woods.* This shell, like the last, has a green enamel, but it is of a beautiful clear glassy green. It has also scattered black hairs, but they are set in a horny disc. It is tumid, and perhaps the largest species known. Not common, deep water. Long. 19, lat. 8, alt. 5, centimetres. I hardly doubt now that it is a darker, larger variety of the last species.

**MYTILUS DUNKERI.** *Reeve, Icon., pl. 5, fig. 17.* Said by Mr. *Angas* to be a Tasmanian species, but I have not met with it. Common in Port Phillip. More gibbous than *M. latus*, of which I regard it as a variety.

**MYTILUS ROSTRATUS.** *Dunker, MS., Mus. Cum., teste, Reeve, Icon. pl. 5, fig. 15.* Rather elongated and attenuate towards the umbones, reddish purple, and nacreous. Lines of growth conspicuously raised; surface covered with very fine, divaricating ribs. Common. Long. 39, lat. 8, alt. 19?

**MYTILUS HIRSUTUS.** *Lamarck, Vol. 7, p. 38.* Purple brown, sulcate, radiately striate throughout, and covered with long hairs, the shafts of which are prickly. Rare, but common in S.A. and S.E.A. and N. Zealand. Long. 40, lat. 24, alt. 18.

\* In my second series of New Tasmanian shells in the Roy. Soc. Tas. Proc. for 1876, *Mytilus dunkeri* is referred to as the shell whose habitat is given wrongly by *Reeve*. This is a misprint for *M. obesus*.

**MYTILUS CRASSUS.** *Tenison-Woods.*

**MODIOLA AUSTRALIS.** *Gray, Appendix to King's Voyage in Australia, p. 477.* Short and contracted posteriorly or convexly dilated anteriorly, sparingly bearded. Common, and in Australia, north and south. Often 70 to 80 mil. long. Every conchologist has doubts whether this shell is distinct from *M. tulipa*. Knowing what we now do of the range of shells, I am inclined to think it is not.

**MODIOLA ALBICOSTATA.** *Lamarck Vol. 7, p. 19.* Large, smooth, shining, dark chestnut, with darker rays. The central white rib described by Lam. is only seen on worn specimens. Common. Long. 71 (?), lat. 31, alt. 25. Var. 1. *polita*; var. 2. *nebulosa, Mihi.*

**MODIOLA ARBORESCENS.** *Chemnitz Conch. Cab., Vol. 2, p. 198, fig. 2016; Lamarck (M. picta), Vol. 7, pl. 21; Sowerby, Genera of Shells fig. 1* (the latter the best figure); also *Reeve*. A flattened yellowish white shell, clouded with red and arborescent black markings on the edge. Very rare. Long Bay, Rev. H. D. Atkinson. About 45 mil. long.

**MODIOLA CUMINGIANA.** *Dunker, MS. Mus. Cum. teste. Reeve, Icon., pl. 9, fig. 63.* Oblong, wedge shaped, curved, gibbous, tumid anteriorly, finely striated and obtusely angled, but conspicuously smooth in the middle; dark, horny with shining periostraca. Not common. Long. 14, lat. 22, alt. 12. Long Bay, Rev. H. D. Atkinson. Tamar Heads, W. F. Petterd.

**VULSELLA TASMANICA.** *Reeve, Icon. pl. 1, fig. 3.* Pale, horny, squamose, and closely striate, uncouth and very variable in shape. Relative measurements vary, as it takes every shape. About 30 to 18 is the average. Common, and S.A.

**AVICULA PULCHELLA.** *Reeve Icon., pl. 8, fig. 22.* "An exceedingly transparent shell, curiously painted with interrupted rays of black spots, narrow red flames, and fine opaque white spots."—*Reeve*. Very variable, the brown and white spots alone visible sometimes. Common, and V., and all the East Coast of Australia. Said to occur in the Philippines. In Tasmania it is almost always found on seaweed. Long. 23, lat. 3, alt. 11.

**PINNA TASMANICA.** *Tenison-Woods.*

ORDER PECTINACEÆ.

**TRIGONIA MARGARITACEA.** *Lamarck, Vol. 6, p. 514.* The largest of the few Australian *Trigonia*, and the only one found in Tasmania.

**ARCA TRAPEZIA.** *Desh. (lobata, Reeve.)* Very plentiful, Tamar Heads, at low water, not found on the south side of the island. Found also in W. Indies.

**ARCA FASCIATA.** *Reeve Zool. Proc., 1844, p. 125, and Icon., pl. 15, fig. 99.* Closely ribbed, and transversely finely striate, shell white with faint brown, transverse bands, and having periostraca on the edges. Common. Islands in Bass' Straits, S. Tasmania, Tamar Heads, always much worn. Long. 27, lat. 51, alt. 18.

**PECTUNCULUS RADIANS.** *Lamarck, Vol. 6, p. 495.* A reddish rayed ribbed shell, very common here, and in S.A. Long. 34, lat. 37, alt. 21.

**PECTUNCULUS OBLIQUUS.** *Reeve? N.E. Coast.*

**PECTUNCULUS FLABELLATA.** *Tenison-Woods, Trans. Roy. Soc. Vict., 1877.*

**NUCULA GRAYI.** *D'Orbigny, Amerique Meridionale, p. 53.* Ovate, very transverse, acuminate at both ends, thin, inflated, very smooth, olive and shining. Very rare. Long Bay, Rev. H. D. Atkinson. *Reeve* gives New Zealand as the habitat, but it is not known there.

**NUCULA MINUTA.** *Tenison-Woods.*

**LEDA CRASSA.** *Hinds, Zool. Proc., 1843, p. 99 (descr. Nucula).* Solid,

white, ventricose, with thick, rounded, concentric ridges, and brownish black epidermis, a depressed area under the beak, marked by a notch in the ventral valve. Rather uncommon. Long. 17, lat. 29, alt. 12.

LIMOPSIS TENISONI, *Mihi*. This shell was named by me *L. cancellata* in Roy. Soc. Proc. Tas., 1876, but I find the name has been given by Reeve. I therefore dedicate the shell to Colonel Tenison, of Kilonan Castle, Lord Lieutenant of the County of Roscommon, Ireland.

PECTEN FUMATUS. *Linné, Syst. Nat.*, 12 edit., p. 1144. This I regard as identical with *P. laticostatus*, Gray, which occurs also in New Zealand. They would have been recognised as identical long ago, but for the foregone conclusion that the common shells were necessarily different because of the different habitat. Facts, proving exceptions to the rule, have been evaded by the creation of new species, by which science has been burdened and retarded.

PECTEN ASPERRIMUS. *Lamarck, Vol. 7, p. 145*. Very common in all S.A. and Tasmania. Wonderfully variable in color; specimens of every hue,—violet, orange, yellow, scarlet, and purple, may be found; gracefully ribbed, each main rib having smaller ones beside it, and all studded with small spines, always regular in form, and never disturbed with lines of growth. It has received many names from its varieties, such as *P. australis*, *P. rubrum*, etc. Fossil specimens are very common in the pliocene rocks of Government House quarry, Adelaide.

PECTEN BIFRONS. *Lamarck, Vol. 7, p. 131*. Common and in S.A. A depressed oblique shell, about the dimensions of *P. laticostatus*, but variable in form. It has a few radiating main plaits upon the valves, which are thickly lined with fine radiating riblets. The surface is finely shagreened in a reticulate manner, and the insides of the valves are deeply saturated with violet purple; the ribs vary very much, sometimes they are few, and like flattened keels; for this reason I cannot distinguish Messrs. Adams and Angus's *P. tasmanicus* (*Zool. Proc.*, 1863, p. 428), whose specific character as distinguished from *P. bifrons* is merely in the form of the ribs.

PECTEN MARIE. *Tenison-Woods*.

RADULA LIMA. *Linné, Syst. Nat.*, 12 edit., p. 1147. Waxy white, with many lamellose or spinous ribs. Not common and very small, though in S.E.A. it is often found 120 mil. long.

RADULA BULLATA. *Born. Sow. Gen.*, fig. 3. Narrow, inflated, white, faintly rayed, ears small. Long. 25, lat. 15, alt. 12, N. Coast only, Not very common.

PLACUNANOMIA ——— ? A broken valve adhering to *Mytilus latus*, but too imperfect for determination, was shown to me. It had some of the characters of *P. zelandica* (Gray in *Dieffenbach's, N.Z. Vol. 2, p. 260.*)

OSTREA EDULIS. *Linné, loc. cit.*, p. 1148. The common species, world-wide in its distribution, with the upper valve flat, and the lamellæ of the lower forming imbricated folds. There are specimens in the Museum of the Royal Society of Tasmania, from N.W. Bay, measuring 185 long. by 123 mil. wide. The variety of *P. purpurescens*, of S.A., is not known here, neither is *O. virescens*, *Angas*.

OSTREA MORDAX. *Gould, Proc. Bost. Soc.*, Vol. 3, p. 345. The "rock oyster" of N.S. Wales. Not common, being found in one or two places only on the E. Coast.

OSTREA RUTUPINA. *Jeff. var O. edulis*. The small, regularly formed variety, not flaky, to which the "native oyster" belongs. Not common.

OSTREA ANGAS. *Sowerby in Reeve's Icon. pl. 13, fig. 28, species 27*. An inequivalve, laminately frilled species. Rare. The Tasmanian species are smaller than Reeve's figure.

SPONDYLUS TENELLUS. *Reeve, Icon., pl. 18, fig. 67.* Ovate, finely radiately ridged, minutely striated and imbricated; scales irregular, white and pale transparent rose color. Rare, N. Coast only and in S.A. This may be a different species from that of the name from the Pacific and, therefore, new. Long. and lat. 70, alt. 45.

CLASS BRACHIOPODA.

WALDHEIMIA FLAVESCENS. *Lamarck, Vol. 7, p. 330.* This well known gregarious ribbed species, scarcely needs description. It is very variable. Found in all Southern Australia, but only on the N. Coast of Tasmania.

KRAUSSIA LAMARCKIANA. *Davidson, Zool. Proc., 1852, p. 80.* Very small and radiately ribbed. In great abundance under stones at low water, Tamar Heads. Occurs also in S.E.A., and New Zealand, and occasionally found at Long Bay. W. F. Petterd.

KRAUSSIA ATKINSONI. *Nobis.* This is a shell about the size of the last, but more depressed and with a smooth valve. Mr. Davidson says it belongs to the genus *Kraussia* or *Kraussina*, and he believes it to be new. Long Bay, Rev. H. D. Atkinson.

## CONFERVA BOMBYCINA.

BY THE REV. W. W. SPICER, M.A., F.R.A.S.

[Read 10th April, 1877.]

The Confervaceæ form a section of the great family of the Algæ, better known to us as sea weeds, although a large proportion of them inhabit fresh and brackish water, as well as the ocean. None of the Algæ are highly constituted, consisting as they do purely of cellular matter without a trace of vascular tissue. In fact they stand at the very bottom of nature's ladder; varying, however, greatly in point of size from the microscopic speck to the huge Gulf weed, whose tangle branches reach for hundreds of feet in extent.

Smallest of all plants probably, and simplest in its organisation is *Protococcus nivalis*, which, however, makes up for its minuteness by the marvellous abundance of the individual plants, and is well known to voyagers in the extreme North under the name of Red Snow. The red snow in fact consisting of snow, whose surface is covered for miles with this almost infinitesimally minute Algæ. Each plant is composed of a single cell, which multiplies by division, each new cell separates, and again divides into other cells, the division (be it observed), always occurring in multiples of *four*. As this process takes place with extreme rapidity (under favourable circumstances) the surface of the snow is speedily stained by these tiny organisms with a rich crimson hue.

Another form of these lowly organised plants is common enough in the old country, where it shows itself on gravel paths, and like hard rough soils, as a lightish brown amorphous mass, not unlike a lump of olive coloured jelly. This only occurs after *rain*, in dry weather the plant shrinks up and occupies so small a space as to be quite invisible. The Algæ indicated is a species of Nostoc, and when examined under the microscope it proves to be composed of an infinite number of filaments; each filament being moniliform, or having the appearance of numerous beads attached to each other in a regular series—the system of filaments being enveloped in a gelatinous pellicle. Nostoc, like most of the lower Algæ, propagates by division, the filaments breaking up into separate parts, and each part becoming the nucleus of a new mass of gelatine.

Nearly allied to these are to widely dispersed groups, well known to microscopists under the names of Desmids or Diatoms. These consist of infinitely minute unicellular algæ which are as varied in form as they are abundant in individuals. Scarcely a drop of standing water can be examined without a specimen being found, and the muddy

banks of tidal rivers are often coloured a light brown, for miles together, by their presence. The almost boundless variety and elegance of form by which Desmids and Diatoms are characterised, together with the great beauty of the sculptured siliceous coat, by which the latter are enveloped, have always rendered these tiny plants favourite objects for the microscope.

A step higher in the scale is occupied by the Oscillatoria. These are filamentous in their structure, the filaments (as the name Oscillatoria implies), being endowed with a peculiar wavy motion; the different parts bending from one side to the other with a never ceasing action. Indeed this capability of motion is one of the most singular and most mysterious characteristics of these minute organisms. For all or nearly all of them possess it, either in the whole plant, or some portion of it. The hair-like filaments of the Oscillatoria, as I have just said, wave to and fro with a slow graceful motion: the filaments of Nostoc are also said to have a slight movement in water, but I have never seen it myself, though I have often examined them. In another nearly allied section the Volvocinea, the members (which are globular in form), swim merrily in their drop of water, and as they at the same time revolve on their own axis, the sight is one to be remembered. Not less interesting is the passage of a Desmid or a diatom across the field of the microscope, conducted however in a much quieter and more sober fashion than are the wild gambols of volvox and its near relatives. A Diatom, whatever its form, moves steadily through the water, turning neither to the right hand nor to the left. If it meets with a fellow diatom or with any like obstacle (as is often the case), it pushes blindly on until the obstacle is removed, or it is itself shunted on one side, in which case its apparently purposeless journey is again resumed. What the object of this gift of motion may be or how it is effected, is entirely unknown. All sorts of conjectures have been indulged in and theories raised, each one in turn to be laid aside. Anyone, however, with a decent microscope may watch the process I speak of at almost any season of the year, and he would prove a genuine benefactor to science, who succeeded in penetrating the mystery of motion in these lowly organisms.

The case is different with the *higher* Algæ, among which the specimen before us may be reckoned. Here the plant itself is at rest, rooted (or rather *fixed*, for it has no proper roots) to some bulkier object. In lieu of itself being a wanderer, the plant discharges from special receptacles a vast number of Zoospores, which I may liken for simplicity's sake to the *seeds* of more highly developed plants; though in reality there is no sort of analogy between them. These Zoospores

are pear-shaped bodies, of the simplest possible structure, and at the apex of each are either *two* or *four* cilia or short thread, like processes. (You will observe, by the way, how the parts of these simple plants always seem to run into some multiple of *four*: just as in the far more complicated endogens the multiple of *three* and in the exogens of four or five, is the rule.)

As soon as the Zoospore is at liberty, it begins to rove rapidly about by means of its cilia, which are lashed violently and so produce a current in the water. After a time, (when I suppose it has sown a sufficiency of wild oats) it settles down on some fixed object, attaches itself by its pointed end, drops its cilia, and at once vegetates into an Algæ—thus affording in its life history a striking parallel to that of the Cirrhipeds (or Barnacles), among Crustaceans which have so long been a stumbling block to the disciples of Darwin.

Rising by gradual stages from the Oscillatores and their allies we reach the Confervæ—a conspicuous member of which is the matted specimen on the table. The members of this order consist of simple or branched filaments, divided into or rather made up of numerous cells of simple construction, filled with granular bodies, often disposed in elegant patterns, as may be seen in the species of Spirogyra, very common in our lagoons and waterholes. Confervæ exist in abundance in both fresh and sea waters, where they may be seen either in large shapeless masses or waving in the stream like bundles of light green silk.

How many species we may have in Tasmania, I know not, as the subject has never been investigated, though one well worthy the attention of some microscopist with plenty of time and patience at his command. Dr. Hooker (in his great work on the Tasmanian flora), mentions three *marine* Confervæ; and adds, “We have received specimens of several *freshwater* Conferva from Mr. Gunn unfortunately not in a state fit for examination or description.”

Two species are common in Great Britain, and are (I believe), universally distributed throughout Europe, viz.:—*Conferva bombycina* and *Conferva floccosa*, both determined by the great Swedish Algologist Agardh. It is to one of these, as we have seen by his letter, that Baron von Mueller is inclined to refer our specimen.

And if we are ignorant of the *species*, equally so are we of the cause of the combining together of the filaments into the curious paper like structure, which you see before you. I have often found on the edges of ponds and slow streams in England the thick blanket like strata of matted Conferva, to which the Baron draws our attention, and which are vulgarly styled “water flannel” in the old country. But these are

coarse and almost shapeless masses, and very different in appearance to the delicate sheets and ribbons, which the Tasmanian conferva weaves from its dead or dying filaments.

How this weaving process is carried out, or why the sheets should always present the same form and appearance is altogether unknown.

The following is the letter from Baron von Mueller alluded to in the above paper:—

“ So far as I can judge from the bleached and partly decayed state of the specimens sent by you, the matted algal substance occurring in fresh water at Hobart Town is either Agardh's *Conferva bombycina* or a species allied to it. The cells or joints are almost double the size of those of *C. bombycina* in its ordinary state, but I possess Danish specimens quite as large. The discovery of *C. bombycina* would not come suprisingly in Australia, as I have shown many years ago the likewise widely distributed *C. floccosa* to occur in fresh waters near Adelaide. The limits of allied species are not well defined in reference to cell contents; nor do your specimens admit of close examination in that respect. Your conferva is evidently also nearly allied to *C. Sandvicensis* of Gaudichaud. The internal organisation of the cell serves probably better for distinction than the size and form of the cell walls, which I found always very variable, as might be expected from the varied circumstances under which such kind of plants occur; whether temperature, or depth, or pureness of water is concerned.

“ Possibly among the matted masses sent by you may be remnants of a *Cladophora* and also sterile portions of an *Oedogonium*.

“ I have found here occasionally enormous sheets of similar constitution to what you sent, in swamps; these masses in dry seasons, after the evaporation of all water, would cover the bottoms of lagoons with a thick felt, so much so that I could obtain it by cartloads, finding the substance excellent for being converted into the best of filtering paper.

“ FERD. VON MUELLER.”

## ALIEN PLANTS.

By THE REV. W. W. SPICER, M.A., F.R.M.S.

[*Read 8th May, 1877.*]

The catalogue accompanying this paper includes all those members of the Tasmanian Flora which come under Hewett C. Watson's designation of Aliens. This is a happily conceived title, first instituted by that veteran botanist; and it was intended by him to embrace such species as have been introduced either by accident or design, and which have maintained their ground more or less firmly in their adopted country. I also include a few plants which, in Mr. Watson's more extended vocabulary, would probably be named by him waifs, strays, and casuals; but the number of these is so small that I have thought it better to bring them all under the general designation of Aliens.

In speaking of an introduced plant as an Alien it should be borne in mind that cultivated plants are not intended, so long as they remain under cultivation; for the simple reason that they owe their continued existence (not to any struggle for life on their part, nor to any special adaptability they may possess to found a new race in a new home), but to the care of the cultivator. Consequently, they can never, so long as they are under his care, influence the character of the native flora, or interfere with the progress and distribution of indigenous species. An alien plant, pure and simple, is one which, to whatever cause it may owe its origin, has either now, or from its first introduction, ceased to depend upon man, and has set up on its own account.

As far as I have been able to ascertain, Tasmanian aliens may be reckoned at 162 distinct species, with some 13 varieties, included in 119 genera. In adopting these numbers, I have not been guided by hearsay evidence, but have seen and examined living specimens of all with the exception of 21, which have not come under my observation, but to which I have attached the initials N.V. These, however, I give on the authority of Baron von Müller, Bentham and Hooker. I hope therefore, that the list given is a tolerably correct one up to the present date, and may be of benefit at a future day, when the distinction between aliens and natives has been either lost or considerably weakened by lapse of time.

In the year 1860 Hooker published in his great work on the Flora of Tasmania, a list of plants naturalised in the Australian Colonies, chiefly, however, in the neighbourhood of Melbourne. Of these 24 only are noted either as occurring in Tasmania or as ubiquitous, that is to say, such as are likely to be found in every part of the world. 58 more of Hooker's species can now be included in a catalogue of our aliens, from which it may be inferred, that 80 species (or one half more) have made their appearance in this island, since the publication of Hooker's work. Of the 82 named by him, I have been able to confirm the presence of all but 11.

The same illustrious author observes in the course of some introductory remarks; "It would be interesting to discover the date and particulars under which these plants were introduced, and so to register their increase and migrations as to afford to succeeding observers the means of comparing their future condition

with their present. In the early times of a colony there is comparatively little difficulty in distinguishing the colonists from the native species. But as the surface of the land becomes artificially disturbed, the habits of all its plants are influenced; the endemic species are driven from their native places, and take refuge in hedgerows, ditches, and planted copses, and, from their associating with the introduced plants, are apt to be classed in the same category with them; whilst the introduced wander from the cultivated spots, and eject the native, or taking their places by them appear like them to be truly indigenous\*."

Indeed already, though the colony is not yet a century old, the difficulty of discriminating between an Alien and a native is far from easy. If we find a plant persistently hanging about the precincts of the Royal Society's Garden, or, for the matter of that, any other garden, but not putting in an appearance elsewhere, we may safely conclude that it cannot claim civic rights, but is indebted for its first establishment in the colony to the fostering hand of the cultivator; though now it may have partially escaped from his grasp.

But what if we meet with some obscure British weed in a remote part of the island, where cultivation is almost unknown? In what category shall it find a place? Does it owe its origin to an accidental importation, which we cannot now trace back to its source—or were its ancestors in possession of the soil long before the white man set his foot on the island?

I am afraid that practically it is impossible to answer this question satisfactorily. We can only weigh probabilities, and balance the opinion of those who have had the best opportunities of studying the plants *in situ*.

Zoologists, and more particularly ornithologists, are wont to cut the gordian knot in a much simpler fashion. Instead of taking pains to ascertain whether a bird has a right to the title of native or not, an hour's residence in any given country suffices to confer upon it all the privileges of domicile. Hence it is, that the catalogue of British Birds is encumbered with such names as the Egyptian Vulture of North Africa (*Neophron percnopterus*), the Redwinged Starling of the United States (*Agelaius phoeniceus*), and even our Spinetailed Swift (*Acanthylis caudacuta*)—animals, which have no more claim to be called British, than would the monkeys of the lately exhibited menagerie have to be called Tasmanian, had they escaped from their confinement and been shot in the bush.

I cannot but think that the method of those who study the *Flora* of a country, is to be preferred, viz. : to be very jealous of admitting doubtful species, to investigate carefully the claims of each, and to rigidly exclude all such as they are morally certain have no real connection with the region under observation. At the same time it is right, for the benefit of those who come after us, that the names of the intruders should be carefully preserved, and, if possible, the date of their introduction registered.

I may as well state that I am unable to make any practical application of this last suggestion. I have searched our Transactions and similar sources of information, but with little effect. No one seems to have taken the trouble to place on record the first appearance or

\* Hooker. *Fl. of Tasm.*, 1 p., cv.

first introduction of any of the plants now naturalised in the island.

The American Waterweed appears, from inquiries I have made, not to have been noticed before the year 1862.

The seeds of the Prairie Grass were brought here in 1865.

The Bathurst Burr was first seen in the neighbourhood of Melbourne in 1857; and in New Zealand in 1863. It must have reached Tasmania, I imagine, at a later date than that, but when, I have no means of knowing.

As may be imagined, England has supplied us with by far the larger number of our Aliens. With regard to those species which are not of British origin, I have placed the names of their proper locality against them; and on reverting to the list, it appears that out of the whole number imported into the island, no less than 138 belong to the Old Country, leaving 24 only to be looked for elsewhere. The south of Europe and the countries bordering on the Mediterranean Sea have given 16 of these to our catalogue; of the remaining eight, four have wandered here from the Cape of Good Hope, three from America, and one from the West Indies.

I do not mean to imply that these plants have travelled direct to Tasmania from the localities intimated. On the contrary, many of them have probably reached our island by short stages, taking their time on the road, and halting in favourable spots. Others again have crossed the ocean to the Continent of Australia direct, have settled there for a while, and then, in the true spirit of emigration, have sent their offspring across Bass's Straits, or have come round in ships to Hobart Town. For example, the South American *Xanthium spinosum* had obtained an evil notoriety in Australia under the name of "Bathurst burr," long before it set foot in the neighbourhood of Launceston. Some species we know, have been purposely introduced. A pretty yellow oxalis (*O. cernua*) from South Africa, the wild rocket (*Diploaxis tenuifolia*) from England, a worthless onion (*Nothoscordum fragrans*) from South Africa, with some others, were originally brought as seeds to the garden of the Royal Society. They have, however, for some time altogether repudiated the gardener's paternal care, and seem quite capable of maintaining themselves. The oxalis and the rocket are gradually working their way to the outer world; the onion, however, seems loth to leave the snug quarters provided for it; but to make up for its stay-at-home qualities, it is spreading largely among the flower beds, and causing much trouble and annoyance.

It is scarcely necessary to say that most, if not all, of the useful grasses and clovers owe their introduction to a spirit of improvement, and not to accident.

Again, the presence of many species which have not been brought here with a useful or æsthetic object, may be accounted for with great certainty. Every bushel of corn that has been at any time imported from England was almost sure to contain the seed of the common spurrey provided it had been grown in a sandy soil. Every pet canary bird, that arrives in the island, conveys in its food-tin the germs of the pretty canary grass, which now abounds on our rubbish heaps and road sides.

The introduction of the marigold, the mint, the fennel, the watercress, and other common favourites of the garden or the table, may

be as easily traced. Given a fine climate and a congenial soil, it is easy to predicate of any chance seed or castaway root, that it will speedily germinate and attach itself to its new home.

But it is a far more difficult task to account for the naturalization of such plants as *Lavatera hispida* or *Trifolium tomentosum*—(I am compelled to employ the Latin titles, as they have not yet become common enough to have acquired the dignity of a local nomenclature). The former is a low shrub allied to the common mallow of England; the latter an insignificant trefoil. That they are aliens in the true sense of the word, we have the authority of Baron von Müller, and (in the case of *Lavatera*) of Bentham also, authorities from whom it is pure heresy to differ on such a subject as the geographical distribution of plants. Both species “hail” (as Americans say) from the sunny regions of South Europe; and where have they chosen to fix their abodes? *Lavatera* in the islands of Bass’ Straits, and *Trifolium* in the neighbourhood of Circular Head, localities ill adapted (one would suppose) for the reception of two South European plants, conspicuous neither for beauty nor value, and which could scarcely therefore owe their introduction to the hand of man.

I confess I am quite unable to account for such a phenomenon; and I will not waste time in mere conjectures.

I remember, when I was in the United States, some years ago, and was, as usual, indulging my botanical tastes, I used to hear my friends declare, that every one of their most noxious weeds came originally from Great Britain. There is no denying, that there was much truth in the remark; unquestionably a large proportion of the plants hurtful to pasture and corn-field had emigrated from the Mother Country.

Must we too, bring a like accusation against our *Alma Mater*? I am afraid we cannot avoid doing so. I believe, that if a sudden blight fell on all the alien weeds of Tasmania, and swept them away, there would be scarcely one vegetable enemy left to interfere materially with the labours of the agriculturist. In fact, I do not know of a single native species vigorous enough to occupy tracts of cultivated land year after year, or to cause serious alarm.

It would be well if we could say as much for our importations from the old country, and that we had not to lament the introduction of the Briar and the Californian Thistle—not to mention the Spear Thistle and the Milk Thistle, with its pretty marbled leaves—and a host of lesser plagues, such as the Stinging Nettle, and Sheep Sorrel, all of which had much better have remained at home.

Whether we have to thank Great Britain or, its true home, North America, for that pest of the pond and slow running stream—the American Water Weed—I know not. South Africa has sent us the Cape weed (*Cryptostemma*), and South America the Bathurst burr.

The three last named are at present harmless enough; but I much fear that the day will come when the colony will have bitter cause to regret their importation.

The Cape weed is not specially hurtful in itself, but as it spreads with great rapidity, it speedily occupies a large area, to the exclusion of grasses and other plants with far more valuable qualities.

Of the Bathurst burr, it is needless to say anything; its hooked capsules are the dread of the sheep farmer, wherever it flourishes on the neighbouring continent. Its progress appears to be slow in this island; but it is among us, and I fear will, some day, make its influence felt.

With regard to the other enemy, the American water weed or water thyme, I have seen the most disastrous effects produced by it in the old country. When once established, its growth is extraordinarily rapid, and it quickly fills up whatever pond or stream it favours with its presence. Every joint, however minute, takes root and forms a new plant, and, as may be easily imagined, fragments are constantly carried on the breasts, or legs of water birds from one point to another. It certainly seems slow to propagate in this country, from what cause I know not. But this is no argument, I fear, against its spread at a future date; for I have watched it in a canal in England, where for years it seemed only to exist in isolated patches, and then, for some mysterious reason, its vitality seemed to be suddenly awakened, and it almost filled the bed of the stream, so as to interfere with the flow of the water. What it can do, under favourable circumstances, I had an opportunity of witnessing lately at Brighton. A waterhole in a paddock was so completely choked up by it, that it seemed impossible to thrust another stem in between those already growing there.

On the other hand the plants, which I discovered two years ago in a quiet nook in the Jordan, appear to occupy about the same sized area; I do not think they have increased the least. I may mention, in passing, that any persons who wish to see this noxious water weed have only to step into Franklin-square, where it flourishes abundantly in the central basin.

And what have we among our aliens of an useful and ornamental nature to set against the evil done by these troublesome immigrants? First and foremost, we have a number of excellent grasses and clovers, palatable to cattle, and capable of enduring extreme drought far better than the native species. Many a roadside and spare corner is now clothed with a green verdure, which years ago was brown and useless in summer. Red and white clover, cocksfoot, fescue, meadow grass, rye grass, and some dozen other grasses, have escaped from cultivation and set up on their own account wherever they could find a suitable spot. One only of the introduced grasses brings a bad reputation with it. I allude to the Darnel (*Lolium temulentum*), which has always been looked upon as poisonous. But there is no doubt that this is a gross calumny, originating, probably, in the fact of its being apparently more liable than other grasses to the attacks of a fungus, which really is poisonous, the well-known Ergot. Darnel is, in fact, closely related to the Rye-grass, and, were it not that it is usually deficient in foliage, would be quite as valuable as a food plant.

I have found in a few places specimens of the Sainfoin (*Onobrychis sativa*), one of the most esteemed fodder plants in England. So highly is it valued that it is frequently termed the farmer's friend and the farmer's doctor; for farmers say, let their sheep be ever so sick or sorry they have only to turn them into a field of Sainfoin and they are sure to recover. Unfortunately we shall never be in a position to test its worth, because it is

purely a chalk plant; on any other but a chalky soil it inevitably sickens and dies out.

Spurrey (in botany, *Spergula arvensis*), another of our aliens, is a plant with a sort of two-fold character. In England it is despised and treated as a mere weed; whereas in most parts of Europe it is held in great favour as food for cattle. I have seen many acres devoted to its culture in France and Germany. Its value consists in its capability of growing on worthless soil. It is nowhere more at home than in a pure sand. Where grass and clover are stunted and useless, spurrey finds abundant nourishment, and clothes the ground with its branched stems and white starlike flowers. The finest specimens I have gathered came from the fields of almost pure sand, lining the shore at Kangaroo Point. The Germans distinguish two species, one of which under cultivation is said to attain a height of two or three feet, and must afford a large amount of fodder. I have never myself seen it above one foot high. But it might be worth the attention of agriculturists; as there must be many a sandy corner, especially near the coast, now quite worthless, which sown with spurrey, would afford a fair amount of sheep feed.

Among aliens of minor importance may be noted the following:—

The root of the common dandelion is wellknown in medicine under the name of taraxacum, and valued for its diuretic qualities.

In France the leaves are blanched, and form no mean addition to a salad, being crisp and slightly bitter.

The opium poppy (*Papaver somniferum*) is scarcely yet established, as I have found very few plants in a wild state. The properties of its seeds and of the juice extracted from the stem are too well-known to need description.

Another valuable member of the pharmacopeia—though at the same time an intensely poisonous one—is the henbane (*Hyoscyamus niger*). It exists sparingly in waste places, but might easily be brought under cultivation.

The fruit of the Caper Spurge is often in Europe pickled and used in lieu of the genuine caper; but belonging as it does to the family of Euphorbia, it must always be looked upon with suspicion. The plant is still a casual only in the island.

The chicory (*Cichorium intybus*) I have found but once on the bank of the railway just beyond Glenorchy. Whether it could be turned to profit here I have no means of knowing. The root, as you know, has of late years become a regular article of commerce, for the purpose of mingling with coffee.

I need scarcely say to any member present who passed his boyhood in the old country, how welcome the blackberry is to youthful palates, though I fear it will not be so welcome to the agriculturist, to whom it is better known as the bramble. It abounds on the northern coast and in the Ringarooma district; it is also spreading widely in the country about the Huon.

Even the much-abused briar has its services. Horses are very fond of its bright red fruit, of which it bears an enormous quantity; and a friend lately told me that some animals of his, which had the run of paddocks full of briars during the late long drought, retained their condition entirely through the nourishing properties of the "hips," which they will at all times greedily devour.

Another wide-spread alien is said to have valuable fattening qualities. I allude to the wire weed (*Polygonum aviculare*). I cannot speak from my own knowledge. The plant is certainly in more than sufficient abundance for ample experiments to be made.

There are a number of other small aliens, such as chickweed, groundsel, speedwell, and gromwell, which now only cumber the ground, but which would soon be turned to account if our hedges and woodlands were filled, as they might be, with singing birds imported from home. These would gladden our hearts with their cheerful music, and help largely in keeping down noxious weeds. It would be almost worth while to introduce the goldfinch and give it its liberty here, to aid in checking the inroads of the numerous thistles. Its fondness for their seed is a well-known fact. Indeed, its scientific name of *Carduelis* is meant to betoken this, the Latin name of a thistle being *Carduus*. In England they may be seen, in open down countries, where thistles most abound, in companies of a dozen or so, climbing among the stalks, and peering into the spiny heads in search of their favourite food. The species most frequented by them perhaps is that which we misname "Californian."

The Aliens have added but little to the ornamentation of our island. The Furze (*Ulex europæus*) is handsome when in flower; and there are few weeks in the year, when it may not be seen. Hateful too as is the briar in the eyes of the cultivator, no one can deny, that its delicate pink flowers give a loveliness to our paddocks and hedge-rows which they certainly would not possess, had the detestable bush never been introduced; its very abundance adds to its value from this point of view. The leaves and young shoots too are deliciously scented, and have earned for it in England (where, by the way, it is exceedingly rare) the fitting name of sweet briar. The marigold is conspicuous in waste spots, and the purple scabious makes a show on dry banks, or in neglected places. The large blue flowers of the chicory and the periwinkle will probably some day enliven meadow or woodland, but at present they have not dared to venture far beyond the boundaries of the garden. There is one tiny plant which is always welcome to Englishmen, for none perhaps brings "home" more forcibly before him; I mean the pink-tipped daisy. This too is among our Aliens; but it appears to be slow in accommodating itself to its new surroundings, reluctant to leave cultivated ground, and only occasionally occurring in paddocks mixed with English grasses.

Strange to say, Tasmania already produces a native Daisy, differing indeed both as to genus and species from its British prototype, but so similar in outward appearance that it requires a practised eye to tell them apart. In fact, the earliest investigators of Australian botany were completely deceived, and fancied they saw in the stranger the identical plant which whitens the grass plots of old England with its familiar flowers. The stranger, however, in point of fact, belongs to a distinct genus (*Brachycome*), and is rightly named *decipiens*.

Speaking generally, our Aliens, when once they have escaped from the trammels of civilization, appear to make good use of their freedom, and may be traced over large areas of country. No doubt, like their relatives in the lands from which they have sprung, they

are restricted in their wanderings by the nature of the different soils which they encounter, and are largely influenced by climate and temperature. But the materials are not yet collected on which may be founded a history of the movements of either our Aliens or Natives.

Another cause of the rapid dispersion of certain species may be found in the fact that useful plants are introduced almost simultaneously at widely distant points. From these points their descendants radiate, as from so many centres of creation, and quickly occupy the ground.

Other species again are restricted in an unaccountable manner to single spots. Southport alone produces the commonest of all English weeds, the Buttercup (*Ranunculus hirsutus*), where it was found many years ago, but from whence, so far as I can learn, it has never yet strayed. Southport also produces a common English Grass, *Hordeum pratense*. At Circular Head, and nowhere else, are associated the British *Caucalis nodosa*, and the more tender *Trifolium tomentosum* from Southern Europe. In like manner the hardy *Chenopodium murale* and the tender *Lavatera hispidula* meet together in the islands in Bass' Straits, and only in those islands; while the *Crepis virens* of Northern Europe appears to confine itself to Deloraine, from whence it was sent me by our valued friend, the Rev. J. E. Tenison-Woods, whose absence from our meetings we must all deplore.

The Order Compositæ, of which the last-named plant is a member, has furnished Tasmania with the greatest number of its aliens. It is by far the largest of all the Natural Orders, embracing not less than 10,000 species, adapted to live in every climate and on every soil. Consequently in every quarter of the globe we may expect to meet with an abundant supply of naturalised Composites. Tasmania draws from this source 32 species, or one-fifth of the whole of its alien flora. The family of the grasses comes next; of these we count up 29 immigrants. The leguminous, or beanlike, plants furnish us with 15 species; the *Cruciferae*, or cabbage tribe, with 11; the *Caryophylleæ*, or pinks, the *Umbelliferae*, or carrot tribe, with 7 each.

After these follow 26 Natural Orders of less importance, each contributing their 2, or 3, or 4 strangers, until the whole number of 162 species is made up.

It is not, of course, my intention to inflict upon you the names of our numerous aliens, of which a classified list lies on the table.

On the table also are specimens, dried and mounted, of all the species which I have been able to secure. These amount to 138 out of the 162; which I beg the Society to accept, and to place in the Museum.

## LIST OF TASMANIAN ALIENS.

All the species named inhabit Great Britain, except where some other locality is given.

*n.v.* Not seen by me.

\* Scarcely, or not thoroughly established.)

- 
- \* *Ranunculus muricatus* L. (S. Europe).  
 „ *hirsutus* L. Buttercup. *n.v.*  
 \* *Nigella damascena* L. Fennel flower (S. Europe).  
 \* *Aquilegia vulgaris* L. Columbine. *n.v.*  
 \* *Papaver dubium* L. Poppy.  
 \* „ *somniferum* L. Opium poppy.  
*Fumaria officinalis* L. Fumitory.  
 „ „ *pallida*.  
*Nasturtium officinale* Br. Water cress.  
*Sisymbrium officinale* L. Hedge mustard.  
*Capsella bursa pastoris* Mch. Shepherd's purse.  
*Lepidium campestre* Br. Pepperwort.  
 \* „ *sativum* L. Landcress.  
*Brassica sinapistrum* Boiss. Charlock.  
 „ *napus* L. Rape.  
 \* *Diplotaxis tenuifolia* D.C. Rocket.  
 \* *Raphanus raphanistrum* L. Radish.  
*Senebiera coronopus* Poir. Wart cress.  
 „ *didyma* Pers.  
*Reseda luteola* L. Dyers weed.  
 „ *ramosissima* Willd. (Medit. region.)  
*Sagina apetala* L. Pearl wort.  
*Arenaria serpillifolia* L. Sand wort.  
*Stellaria media* L. Chickweed.  
*Cerastium glomeratum* Thu. Mouse-ear chickweed.  
*Gypsophila tubulosa* Boiss. (Medit. Region.) *n.v.*  
*Silene anglica* L. Catchfly.  
 „ „ *quinquevulera* L. Spotted catchfly.  
*Githago segetum* Desf. Corn cockle.  
*Polycarpon tetraphyllum* L. Allseed.  
*Spergula arvensis* L. Spurrey.  
*Malva silvestris* L. Mallow.  
 „ *rotundifolia* L. „  
*Lavatera hispida* Desf. *n.v.*  
 \* *Hibiscus vesicarius* Cav. (S. Africa.)  
*Oxalis cernua* L. (S. Africa.)  
*Erodium cicutarium* L. Storksbill.  
*Ulex europeus* L. Furze.  
 \* *Spartium junceum* L. Spanish broom. (S. Europe.)  
 \* *Sarothamnus scoparius*. Koch. broom.

- Trifolium repens* L. White clover.  
 „ „ *roseum*.  
 „ „ *pratense* L. Red clover. n.v.  
 „ „ *tomentosum* L. (S. Europe.) n.v.  
 „ „ *procumbens* L. Hop trefoil.  
 „ „ *minus* L. Lesser hop trefoil.  
*Melilotus parviflora* Lam. (Medit. region.)  
*Medicago sativa* L. Purple medick.  
 „ „ *lupulina* L. Black medick.  
 „ „ *denticulata* Willd. Toothed medick.  
 „ „ *maculata* Sibth. Spotted medick.  
*Vicia sativa* L. Vetch.  
 „ „ „ *angustifolia* Roth.  
 \* *Onobrychis sativa* Lam. Sainfoin.  
*Rosa rubiginosa* L. Briar.  
 \* *Rubus fruticosus* L. Bramble or blackberry.  
*Alchemilla arvensis* L. Ladies mantle.  
*Poterium sanguisorba* L. Salad burnet.  
*Foeniculum vulgare* Gaertn. Fennel.  
 \* *Pastinaca sativa* L. Parsnip.  
*Caucalis infesta* Curt. n.v.  
 „ „ „ *nodosa* Scop. Hedge parsley. n.v.  
*Daucus carota* L. Carrot.  
 „ „ „ *proliferum*.  
*Scandix pecten veneris* L. Shepherds needle.  
*Conium maculatum* L. Hemlock.  
 \* *Hedera helix* L. Ivy.  
*Sherardia arvensis* L. Field madder. n.v.  
 \* *Centranthus ruber*, D.C. Spur valerian.  
*Dipsacus silvestris* L. Teazel.  
*Scabiosa atropurpurea* L. Purple scabious (S. Europe).  
 „ „ „ *albiflora*.  
 „ „ „ *phoenicea*.  
*Erigeron canadensis* L. n.v.  
 \* *Bellis perennis* L. Daisy.  
*Xanthium spinosum* L. Bathurst burr (S. America).  
*Anthemis nobilis* L. Chamomile.  
 \* *Achillea millefolium* L. Yarrow.  
*Matricaria inodora* L. n.v.  
*Chrysanthemum leucanthemum* L. Oxeye Daisy.  
 \* *Tanacetum vulgare* L. Tansy.  
*Gnaphalium candidissimum* Lam. (S. Africa.)  
*Senecio vulgaris*, L. Groundsel.  
*Calendula officinalis* L. Marigold (S. Europe).  
 „ „ „ *arvensis* L. Lesser marigold ( „ „ ).  
*Cryptostemma calendulaceum* Br. Cape weed (S. Africa).  
*Centaurea melitensis* L. Star thistle (Medit. region).

- Centaurea calcitrapa* L. n.v.  
*Silybum marianum* Gaertn. Milk thistle.  
*Onopordum acanthium* L. Cotton thistle.  
*Carduus lanceolatus* L. Scotch thistle.  
 „ *pratensis* L. Marsh thistle. n.v.  
 „ *arvensis* L. Californian thistle.  
*Amoseris pusilla* Gaertn. n.v.  
 \* *Cichorium intybus* L. Chicory.  
*Hypochæris radicata* L. Cat's-ear.  
 „ *glabra* L. „  
*Leontodon hirtus* L. Hawkbit,  
 „ *hispidus* L. „  
 „ *autumnalis* L. n.v.  
*Tragopogon porrifolius* L. Salsify.  
*Picris hieracioides* L. Ox-tongue.  
*Sonchus oleraceus* L. Sow thistle.  
*Taraxacum officinale* Wigg. Dandelion.  
 \* *Crepis virens* L. Hawksbeard.  
*Anagallis arvensis* L. Pimpernel.  
 „ „ *cærulea* Lam. Blue pimpernel.  
*Vinca major* L. Periwinkle.  
*Convolvulus arvensis* L. Bindweed.  
*Lithospermum arvense* L. Gromwell.  
 \* *Borrago officinalis* L. Borage.  
*Echium violaceum* L. (Medit. region.) n.v.  
 \* *Hyoscyamus niger* L. Henbane.  
 \* *Solanum marginatum* L. (Medit. region.)  
*Linaria cymbalaria* Mill. Toadflax.  
*Veronica hederæfolia* L. Ivy leaved speedwell.  
 „ *agrestis* L. Field speedwell.  
 „ *peregrina* L. (America.) n.v.  
*Verbascum thapsus* L. Mullein.  
*Mentha viridis* L. Mint.  
*Stachys arvensis* L. Woundwort.  
*Marrubium vulgare* L. Horehound.  
 \* *Plantago lagopus* L. Hare's foot plantain (S. Europe).  
 „ *major* L. Plantain.  
 „ *lanceolata* L. „  
 „ *coronopus* L. Stagshorn plantain.  
*Polygonum aviculare* L. Wireweed or knotgrass.  
 „ „ *littorale* Link.  
 „ *convolvulus* L. Black bindweed. n.v.  
*Rumex crispus* L.  
 „ *acetosella* L. Sheep's Sorrel.  
*Chenopodium album* L.  
 „ *murale* L. n.v.  
 „ *glaucum* L.

- Urtica urens* L. Stinging nettle.  
 „ *dioica* L. „ „ n.v.  
*Euphorbia helioscopia* L. Sun spurge.  
 „ *peplus* L. Spurge.  
 „ *lathyris* L. Caper spurge.  
*Elodea canadensis* Mich. American water weed.  
*Asparagus officinalis* L. Asparagus.  
*Nothoscordum fragrans* Knth. (W. Indies.)  
*Alopecurus pratensis* L.  
 „ *geniculatus* L. n.v.  
*Phalaris canariensis* L. Canary grass.  
*Holcus lanatus* L. Soft grass or Yorkshire fog.  
 \* *Piptatherum thomasi* Pal. (Medit. region.)  
*Agrostis vulgaris* With. Bent grass.  
*Polypogon monspeliensis* Desf.  
 \* *Cynodon dactylon* Pers. Doub or finger grass.  
*Anthoxanthum odoratum* L. Sweet vernal grass.  
 „ „ *gracile*.  
*Aira caryophyllea* L. Silver grass.  
*Arrhenatherum avenaceum* Pal. Oat grass.  
 \* *Avena sativa* L. Oats.  
*Poa annua* L. Annual meadow grass.  
*Briza maxima* L. (S. Europe.)  
 „ *minor* L. Quaking grass.  
*Dactylis glomerata* L. Cocksfoot.  
*Festuca myurus* L. Mousetail fescue.  
 „ *ovina* L. Sheep's fescue.  
 „ *pratensis* Huds. Fescue grass.  
*Bromus unioloides* Hmbt. Prairie grass (Central America).  
 „ *sterilis* L.  
 „ *mollis* L.  
 „ *racemosus* L.  
*Lolium temulentum* L. Darnel.  
 „ *perenne* L. Rye grass.  
 „ „ *aristatum*.  
 „ „ *ramosum*.  
*Triticum repens* L. Couch grass.  
*Hordeum murinum* L. Way bent.  
 „ *pratense* Huds. n.v.  
*Lepturus filiformis* Trin.  
 „ „ *incurvatus* Trin.

## SUMMARY.

|           |     |     |     |     |     |     |
|-----------|-----|-----|-----|-----|-----|-----|
| Genera    | ... | ... | ... | ... | ... | 119 |
| Species   | ... | ... | ... | ... | ... | 162 |
| Varieties | ... | ... | ... | ... | ... | 13  |

|                              |     |     |     |     |
|------------------------------|-----|-----|-----|-----|
| British species              | ... | ... | ... | 138 |
| Species from other countries | ... | ... | ... | 24  |
| „ well established           | ... | ... | ... | 134 |
| „ scarcely established       | ... | ... | ... | 28  |
| „ from a solitary station    | ... | ... | ... | 8   |
| „ not seen by me (n.v.)      | ... | ... | ... | 21  |

## ERGOT.

BY THE REV. W. W. SPICER, M.A., F.R.M.S.

[Read 12th June, 1877.]

In a paper on alien plants which I had the honour to read before the Fellows of this Society at their last meeting, I took occasion to mention that one of the imported grasses a *Lolium* (known in England as Darnel), had an evil reputation, as it was believed to be poisonous—but that this was a calumny on the grass—the fact being, that the several species of *Lolium* though not themselves poisonous, are apt beyond other fodder grasses, to be infested by a very poisonous fungus, the well known Ergot. Curiously enough within the last few days, our Curator has placed in my hands specimens of a highly ergotised *Lolium*, not however the Darnel, *Lolium temulentum*, but a much more valuable plant, the common Rye grass, *Lolium perenne*. The specimens are before you, and I thought it might be of interest if I drew your attention to a danger which, where it exists is generally in great abundance. Ergot is a fungus, belonging to the genus *Cordyceps*, which, (like so many of the order to which it belongs) is parasitical upon other plants. Many of the species indeed attack the lower animals, and probably some of those present have witnessed its effects in what are called “vegetable caterpillars” where the fungus grows from the head of the victim and completely destroys it. One of the best known is *Cordyceps robertsii* peculiar to New Zealand; but we have one at least in this colony, *Cordyceps gunnii*.

However, this is much too large a subject to enter upon now. The particular species of *Cordyceps* before us infests many of the grasses, more especially rye, maize and rye grass, and is one of the most deadly and dangerous poisons in existence. Its habit is (as may be seen in these specimens) for the spores to fasten on the growing seed, whereby the character of the latter is completely changed both structurally and physiologically. Under the strange influence exercised by the Ergot, the seed instead of growing into a healthy grain becomes elongated, slightly curved and exceedingly hard, so that it has the appearance of a black horn or spur growing out of the centre of the glumes. The plant too, from being one of the most nutritious of fodder grasses imbibes a poisonous principle, of the deadliest nature. The first effect in those who swallow it, is to produce a loss of appetite and stupefaction. Dogs that have been experimented on, howl frightfully until they are completely under its influence, and then lie down and groan. In fowls the comb and crop are said to turn black. It is unhappily no less notorious for the

dreadful effects it produces on the human frame, when it exists in considerable quantities in bread corn (as it often does in rye, in the north of Europe) causing the most terrible ulcers and gangrenes, which at length destroy the limbs.

However, every evil has a counter-balancing good, and Ergot is not altogether vile; as in the hands of medical men it has been found to be a valuable medicine, though I understand that its action is uncertain. This may be owing to the fact that the quality of the ergot varies with its place of growth and other circumstances. The best (from a medical point of view) is said to come from rye plants grown in dry airy situations on a sandy or chalky soil, whereas Ergot grown in damp shady valleys is of inferior quality. Moreover the plant has no dangerous action until it is quite ripe, but as a week is sufficient to bring it to maturity there is not much consolation in that. There are two kinds recognised, one of which is purple inside when the Ergot is broken across, whereas the other has a white interior. Our present specimens belong to the latter category.

Of its history in this island I know nothing, never having had it brought under my notice before. Hooker in his great work on the Flora of Tasmania merely observes:—"Ergot occurs on grasses in Tasmania, but it is uncertain to what species of *Cordyceps* it owes its origin." It would be well perhaps, if the attention of farmers was drawn to the subject, with a view to stamping out the obnoxious fungus, wherever discovered. At the same time it must be stated, that the human subject (so far as Tasmania is concerned) is not likely to be affected by it, inasmuch as I never heard of its attacking wheat, and what rye is grown here is not made into bread. The quantity of the latter cereal too is infinitesimal, for I find by returns issued in to-day's Hobart Town *Gazette*, that out of 68,882 acres devoted to the cultivation of the cereal grasses, 67 only are occupied by rye, against 38,977 acres of wheat.

## NOTES ON THE HOBART TOWN STORAGE RESERVOIR.

By T. STEPHENS, Esq., F.G.S.

[*Read September 11th, 1877.*]

The question of the water supply of Hobart Town is one of annually increasing importance. The supply itself has been largely increased, but is, and must continue to be insufficient, so long as no provision is made for securing a reserve which may be utilised when the direct service from Mount Wellington is reduced by a dry season, or by other causes. Until a further provision is also made for filtering the water before it enters the town, it must continue to bring with it the impurities with which it necessarily becomes charged during the passage through open channels or imperfectly covered flumes. Attention must soon be directed to the now useless storage reservoir, on which so large a sum has been expended to no useful purpose, and it may be well to inquire into the causes of failure, and consider whether there is any hope of its ever being made even partially available for the objects for which it was designed.

It is almost superfluous to remark that the whole of the area lying between the Derwent and Mount Wellington has been subjected to very great geological disturbance. Any one passing up the Huon road may see at a glance that the sedimentary rocks have been greatly dislocated by the intrusion of igneous rocks in vast masses and dykes, producing a variety of disturbances among the sandstones of the locality. At the toll-gate, however, there is a more important displacement which does not appear to have been caused by merely local intrusions. Here a vast mass of the mudstone, a member of the Upper Palæozoic Series of the southern rocks, has been vertically elevated, together with the originally overlying sandstones, some of the remains of which may be seen on the opposite side of the Sandy Bay Rivulet. The relations of the mudstone to the sandstone formation which abuts against it are, at this point, somewhat obscure; but on both sides there are unmistakeable indications of an extensive fault, which appears to cross the Hobart Town Rivulet, not far from the Cascades Brewery, and I have no doubt that it traverses the valley occupied by the storage reservoir almost, if not quite, on the very site of the dam. Here then is a very simple explanation of the cause of the leakage which I have been told gave a good deal of trouble soon after the embankment was first made, and which has been, I believe, attributed to landslips. This, however, is not a case of simple landslips, though they will always occur under like conditions. Where an extensive fault of this description has been occasioned by the violent disruption of a vast mass of variously compacted rocks there is necessarily a fissure of unknown depth along the line of fracture, and the rocks on both sides being more or less shattered by the grinding process to which they have been subjected, will surely slide and settle down whenever they have been undermined by natural and other causes, as in the present instance. Another great fault crosses the valley close to the upper

end of the Reservoir, but this has no important bearing on the subject under discussion. There may, however, be a third fault at right angles to the others and running along the original bed of the rivulet ; but I am at present inclined to think that the apparent break in the mudstone rocks is merely one of the results of the sub-aerial erosion by which the existing valley has been chiefly formed.

It will be readily seen that in the first instance an unfortunate selection of a site was made, a site which would have been objectionable for any reservoir, and especially so for one which required so high an embankment to hold back the necessary quantity of water. Whether any geological examination of the spot was made I do not know, but I imagine that the engineer was attracted by the favourable surface configuration, and did not suspect that its weakness lay in its apparent strength. But it was not alone the selection of the site that was in fault. Had no other mistakes been made it is quite possible that the Reservoir might have done good service up to the present time, though there would always have been a danger of from leakage from the cause which I have described. The next mistake was the laying a line of iron pipes under an earthen embankment. This was quite a common practice at the time, as was shown at the inquiry held after the bursting of the Sheffield reservoir ; but here the pipes were not only laid under the embankment, but they were supported by piers of masonry at intervals, which precipitated the inevitable disaster. The unequal pressure caused by the irregular settlement of the sand and clay after a time cracked the pipes, the fracture being only discovered by a leakage near the outlet at the bottom of the dam. Previously to this, as far as I can ascertain, the inner slope of the dam had been lined with a facing of large stones, and this facing, though intended for quite another purpose, aided materially in preventing any serious damage to the properties situated below the embankment when the final catastrophe took place.

The particulars of the last stage in the history of the reservoir, I have gathered from different sources, having had no personal knowledge of what was done until after the event. It seems that when the fracture of the outlet pipes was discovered, it was decided to make a drift-way or tunnel through the dam in order to discover and repair the breakage, and this drift-way was actually carried through the dam to within a few feet of its inner face. For some 40 feet, or thereabouts, from the entrance, it was lined with ashlar masonry, but the rest—the most dangerous part—was merely lined with sawn timber, placed at intervals to support the sides and roof. The result which followed was inevitable, though it might be delayed for a time. Gradually the water found its way either through cracks in the puddle wall, or along the line of piping, into the tunnel, carrying out in solution the clay and earth which intervened between the pressure and the point of least resistance, until the timbered end of the tunnel caved in, and allowed it a free exit. I have not been able to ascertain what depth of water there was in the reservoir at the time, but there was evidently a considerable pressure, and sufficient to have caused a destructive flood if it had not been for the stone lined portion of the tunnel, and the stone facing of the dam which I have referred to above. But for the latter, the water would probably have entered the tunnel in volume

sufficient to force an outlet outside the tunnel walls ; after which it would meet with no resistance.

The question of the repair of the dam, preserving the necessary outlet for the water, is emphatically one which only a skilled and experienced engineer should decide ; but it may be discussed from a non-professional point of view. When a similar, though less serious fracture occurred in the outlet pipe of the Yan Yean Reservoir, it was ingeniously repaired by introducing rings of boiler-plate securely connected with each other so as to form a continuous lining ; the large diameter of the pipes (nearly 3ft.), favouring the adoption of a plan which would have been otherwise impracticable. In the present case there seems to be no alternative but to make an open cutting through the dam along the line of the pipes, carrying it down until a solid bottom is reached. There would be considerable difficulty in filling in such a cutting so as to make the whole solid ; and the difficulty is, of course, much greater when an outlet for the water has to be retained. But the geological conditions do not greatly favour the construction of a new tunnel through the adjacent bank, and the practical inconvenience attending the working of a syphon puts that method of discharge out of the question. Supposing that a good bottom is reached, the next thing would be to put in a foundation of concrete, on which to build a strong culvert, extending from the base of the tower to the mouth of the present tunnel. This culvert, in which the pipes would be laid, should be built with wing walls or rings of solid masonry at intervals along its whole length, and there ought also to be deep lateral cuttings into the embankment on the right and left of the culvert for the same reason ; the object being to prevent the leakage of water, which always makes for the junction of old and new work or of two different materials. The filling in would be the most important part of the business, and would require the most careful oversight ; no contract work would be admissible.

Allowing that the dam thus repaired could never be quite safe under the full vertical pressure which was originally contemplated, it might yet be of considerable service. To relieve the pressure, and still make provision for the storage of a considerable body of water, it might be found desirable to form a second dam at the point where the reservoir begins to contract in width, provision being made for perfect control over the flow of water to the lower part of the reservoir. The upper part might be easily enlarged and improved to make up for the diminished vertical height of water contemplated to be allowed in the lower ; but these additions and extensions would entail considerable extra expense, and their discussion is somewhat outside the proposed limits of this paper.

In any case the old bye-wash would have to be greatly lowered, and precautions taken to prevent the scour which has been so destructive at its lower end, either by a series of steps, or by a paved channel at a steep gradient, the former being the preferable course. For such work only the hardest freestone should be employed : the mudstone, which has been much used in some parts of the works is quite unsuitable.

The chief point remaining for consideration is the filtering of the water. Fortunately the foreign elements are chiefly sand and mud, which only require repose to precipitate them, and this may be easily

effected in the upper part of the reservoir. A separate and shallow basin should be formed, with an accurately levelled weir over which all the water should pass in an almost imperceptible stream, and the filtering of the water might be further secured by a bank of gravel and broken stone along its whole length. It is hardly necessary to add that this scheme contemplates the passage of the whole water service through the reservoir, under ordinary circumstances. By no other means can the water be properly purified before it enters the town.

## PLANTS AS INSECT DESTROYERS.

BY THE REV. W. W. SPICER, M.A., F.R.M.S.

[*Read 10th July, 1877.*]

Being much attached to Botany, and, in a less degree perhaps to Entomology, I have put together a few notes, bearing upon both these sciences, and bringing before you one out of the many points, at which the two great families of plants and insects cross each other's paths—one, it must be added, in which the latter get decidedly the worst of it.

We all know, to what an enormous extent insects are dependent on plants for support. In the supply both of food and protection Flora proves herself a veritable mother to her humble friends. But there is a dark side in the character of even this gentle deity, whom we are apt to associate with all that is cheerful and smiling; and it is astonishing to see in how many ways and under what different aspects she puts forth her "insecticidal" functions. Directly or indirectly the members of the Vegetable Kingdom help largely to thin the ranks of the little creatures which visit them.

To "begin at the beginning," we must go back to the old pre-historic times, when insects had nothing to fear from man's organ of inquisitiveness; for the simple reason, that man did not then exist; or, if he did walk the earth, his intellect was of the lowest, and collections and museums were undreamt of. I allude to the days when amber was forming, and vagrant insects were every day being entangled in its viscid toils, and there preserved for the wonder and admiration of modern scientists. Amber is a semi-transparent substance of a light yellow or brown colour, capable of taking a high polish, and therefore is much employed in the manufacture of heads of canes, mouthpieces of pipes, necklace beads and such small matters. Probably the most important use that has hitherto been made of amber is to be seen at Zarskoja-selo, a favourite residence of the Czars of Russia, not far from St. Petersburg. Here there is a room, about thirty feet square, the walls of which from floor to ceiling are entirely lined with this substance.\* It was presented by Frederick the Great to the Empress Catherine, whose initial E (Ekatarina) is interwoven with the Prussian arms in the devices on the walls. If we may give credit to old Homer, this is not the first time that amber has been used for the decoration of a palace; for he writes,

"The spoils of elephants the roofs inlay,  
And studded amber darts a golden ray."<sup>†</sup>

The principal source of supply is the coast of the Baltic Sea in Eastern Prussia, between Memel and Dantzic, where it is disseminated in the sand or clay. It is searched for in the sea or on the shore, or is picked from the cliffs with iron hooks at the end of long poles, or lastly it is regularly mined, the shafts sometimes being sunk to a depth of a hundred and fifty feet. Saxony supplies a small quantity, in bituminous clay mingled with lignite. It also occurs in Sicily in beds of clay and marl; in Poland it is found in sandy districts at long distances from the sea; it also occurs in

\*A. B. Reichenbach (Vollständige Naturgeschichte).

†Homer (Odyssey, iv. Pope's Translation).

Siberia, and Greenland, in Sweden, Italy and other parts of Europe. Amber occurs in varying quantities in nodules or nuggets of different sizes, sometimes as fine as grains of coarse sand, at others of much larger dimensions. One of the largest pieces on record is deposited in the museum of minerals at Berlin. This great mass, which measures upwards of thirteen inches in length, eight inches broad, and four to six inches thick, with a weight of over thirteen pounds, was found near Gumbinnen in Eastern Prussia in the year 1803. The fortunate possessor received one thousand thalers (or one hundred and fifty pounds) for his prize. Its real value, however, far exceeds that sum. There is no doubt of the vegetable origin of amber ; it is in fact a resinous exudation from an old-world pine-tree named by Göppert, *Pinites succinifer*, which was nearly allied to our modern spruce. Consequently amber is in its nature exactly analogous to the lumps of resin which occur in every forest of firs in the present day. Indeed if anything were wanting to prove its originally fluid condition, it would be the fact, that particles of leaves and wood, fragments of mosses, and, above all, insects, are constantly found embedded in it. Of the latter no less than eight hundred species have been detected.\*

It is evident that the little creatures settled upon the treacherous resin, when it was in a semi-fluid state, and were of course retained there by the viscid nature of the substance. The gummy matter, as it flowed from the tree, gradually surrounded its victims, and at last entirely enclosed them in their premature and transparent tomb ; so that the question of the poet Pope can be answered with more certainty now, than in his day—

“ Pretty, in amber to observe the forms  
Of hairs, or straws, or dirt, or grub, or worms.  
The things, we know, are neither rich nor rare ;  
But all the wonder is—how got they there !”

The insects themselves are in different degrees of preservation. Some, which were evidently engulfed in the sticky matter, immediately that they got entangled in its folds, are as perfect as on the day that they were suffocated. Others have been consigned to a more lingering death ; the resin has exuded very slowly, and the victims have not only died before they were surrounded by it, but, having been trapped in bright dry weather, their bodies have become dessicated and withered ; nay, in some instances a white mould has begun to form round them, plainly discernible in the pellucid amber. At least two minute fungi have been detected ; *Penicillium curtipes*, and *Brachycladium thomasinum* ; traces of other genera also occur.† As a rule the enclosed insects are not widely different from—indeed many species are actually identical with—those now in existence.

At least one half of the insect orders have had their representatives embalmed in the golden fluid ; most of them, as may be easily imagined, being such as frequent woods and forests. Among Beetles are numerous Bostrychids and weevils : the Orthopterous Order supplies locusts and grasshoppers ; the Dictyoptera a small cockroach. In the Hymenopterous Order we have ants, ichneumon flies, and a bee allied to the South American Trigona ; among Lepidoptera,

\* Hartwig. The Subterranean World.

† Berkely (Cryptogamic Botany).

which are comparatively rare, appear a large hawk-moth and several caterpillars. Of Neuropters there have been captured among others an ant-lion, a lace fly, dragon flies, and white ants. In a piece of amber lately in my possession there were no less than 27 white ants, besides several detached wings, together with a moth and a small beetle. Various kinds of Hemipters, or bugs, have been found; also divers Homopters (such as a Cicada and a Flata); while of Dipters or flies the list is well nigh interminable.

Other transparent resins, which embrace insects in their deadly folds, are known in commerce as copal and gum-anime or elemi.\* Though largely employed in the arts, and exported in great quantities from certain localities—Angola alone supplies about two million pounds annually—little is known of their real origin, nor indeed whether there may not be several kinds of resin erroneously combined together, partly fossil, and partly recent, under the name of copal and anime. That they are of vegetable origin (as in the case of amber) there seems to be no question, though the exact species of tree which produces them is scarcely yet known. Whatever it may be, it does not belong to the Pine tribe. In all probability the matter is a product of two Leguminous plants, *Hymenea* and *Trachylobium*, species of which are indigenous to Southern India, South America, and Africa, both west and east. With regard to the latter region, Dr. Kirk, British Consul at Zanzibar, informs us, through the Linnean Society, that “Specimens removed from the living tree show that large masses equalling the fossil in size are still produced, and are as full of insects as were those of the ancient forests.” Indeed so large a number of organic remains does “anime” contain, that its name of “animated” is fully justified. But while the *Trachylobium* of East Africa still gives forth an amber like resin from its stem, and the same resin exudes from the roots of the American and Indian *Hymenea*, the learned traveller Dr. Welwitsch states as his decided opinion—(also in a paper read before the Linnean Society)—that the copal of Western Africa is, like amber, of a fossil nature “produced by trees which in periods long since past adorned the forests of that continent, but which at present are either totally extinct, or exist only in a dwarfish posterity. The copal is either dug out of the loose strata of sand, marl, or clay, or else it is found in isolated pieces, washed out and brought to the surface of the soil by heavy rain-falls, earth-falls, or gales.” Burton also, in a recent work on Zanzibar, speaks of gum copal as though it were mainly, if not essentially, of a fossil nature.

From these statements it would appear that the copals of commerce are of both fossil and recent origin.

Having thus come down to our own days, we will notice first the lowest forms of vegetable life, but perhaps the most mischievous, the universally distributed “fungi;” as the onslaughts committed by one of its members is often patent to the eye. I allude to the fungus, called *Empusina* by one author, and *Sporendonema* by another, to which the common housefly so frequently falls a victim. One of these may often be seen during the autumn quite dead, but with all the semblance of life on the window pane; apparently glued down to the glass by its proboscis and outstretched legs; if

\* Burton (Zanzibar).

you touch it, the chances are it falls to pieces, being a mere dry shell, the interior of which has been completely eaten out. If you have seen this phenomenon, you will probably have also noticed—(though perhaps without attaching much importance to the fact)—that the fly was surrounded by a filmy cloud which covered the glass, and extended over it for an inch or two on every side. But in point of fact this delicate white mass is the real “*causa doloris*,” “the head and front of the offending”—it is a plant, a fungus, or mould. Now when a spore or seed of this mould comes in contact with a living fly, it forthwith sends out a delicate process which bores its way through the skin into the interior cavities of the body, just as does the mistletoe into the heart of the hawthorn or apple. Here it gives rise to minute corpuscles which, floating in the juices of the insect, multiply and lengthen into new filaments at the expense of the fly’s substance, and ultimately are the cause of its decease. \* No sooner does death ensue, than the filaments issue into the world through the openings between the segments of the animal’s abdomen, spreading on every side, each tiny thread being the fertile bearer of innumerable spores or seeds, destined to work like ruin among new generations of flies.

A second species of the same plant has been detected on the common gnat. Another of these moulds, *Botrytis bassiana*—(so named after its first investigator, Dr. A. Bassi)—attacks the silkworms of Italy and Southern France, producing a disease called Muscardine, which has for some years caused great apprehension among silk-growers. Its true character, in spite of the incessant and careful observations that have been brought to bear upon it, has even yet scarcely been made out with any certainty. It is not even ascertained whether it is identical generically with the fungus which attacks the flies.

It is probable, however, that both of them are merely incipient states of some more highly organised plant. † Be this as it may, of its destructive powers there is no doubt, more especially during the caterpillar stage of the insect’s existence; though the chrysalis is sometimes affected in the cocoon. The germs of the fungus once introduced spread through the fatty matter stored up beneath the skin, propagating themselves with extraordinary celerity, and sooner or later causing the death of the victim. It is only when life is extinct, that the plant shows itself externally, throwing up spore-bearing stems. These quickly ripen, and are the means of scattering the disease far and wide, for it has been ascertained that the mere contact of a spore with the insect’s skin, without actual inoculation, is quite sufficient to ensure its growth. Where the disease has once established itself, all remedial measures appear to be hopeless, and the proprietor usually turns his attention to procuring a new stock from an uninfected source.

*Cordiceps* is the name of a fungus consisting, in its perfect form, of a stem varying in length from a few lines to four or six inches, and terminating in a pointed or club-shaped head of spores.

It is the same fungus to which I drew your attention a short time ago, when making some remarks on ergot in rye-grass. Ergot is, in

\*Huxley. (Opening address, British Association, 1870.)

†Berkely. (Introduction to Cryptogamic Botany.)

fact, an imperfect state of this plant, which appears to be very indiscriminate in its tastes.

This curious fungus counts its victims by myriads in the insect world, either in the larval, the pupal, or the complete form; neither does it confine itself to one order of insects, having been detected on beetles, wasps, moths, and a variety of others. How the spores first find their way into the bodies of the little creatures is perfectly inexplicable. Certain it is that the parasite fixes itself within the insect near the back of the head, and from thence grows up into the perfect plant, the animal's body forming both support and nourishment. The example which has been longest before the world is that of *Cordiceps robertsii*, a native of New Zealand, where it is well-known under the name of *Hotete*; it is parasitical on the larvæ of a moth called *Hepialus virescens*. The caterpillar when about to assume its chrysalid dress, buries itself below the surface of the ground, generally at the root of a tree named *Rata* by the natives, (*Metrosideros robusta*). It is during its subterranean existence, and while yet in the larval state, that the fungus begins to form, gradually growing up through the soil to a height of seven or eight inches, consuming meanwhile the internal substance of the caterpillar, which of course never arrives at its next stage of being. Of this wonderful production Dr. Hooker writes:—"I am still much at a loss to account for its development. It is found in spring; the caterpillar is buried in the ground, as is the lower part of the fungus. Both Mr. Taylor and Mr. Colenso hold the same opinion, that in the act of working the soil the spores of the fungus are lodged in the first joint of the neck, and the caterpillar settles head upwards to undergo its change, when the vegetable develops itself. The whole insect seems entirely metamorphosed into vegetable, with the exception of the skin and intestines."\*

Many other species of this remarkable fungus, about twenty-five altogether, have been traced in different countries, all parasitical on various insects. The larva of the British Ghost Moth (*Hepialus lupulinus*), which buries itself in the ground previous to becoming a chrysalis, is attacked by *Cordiceps entomorrhiza*. It consists of a white branched mycelium spreading externally over the insect, and internally absorbing the natural structure. From near the head of the larva, generally from the second joint of the body, arises a stem, nearly two inches in length, bearing at its summit a small egg-shaped head in which the fructifying organs are placed, the length and direction of the stem being influenced by the position of the insect. The stem is externally of a dirty yellowish colour, and the head of a brick-red or livid brown. The whole substance is fleshy and fragile when fresh, so as to snap readily when roughly handled.†

The chrysalis of another British Moth has been found with the stem of *Cordiceps militaris* growing from its head.

Nor is the vegetable less pernicious to the perfect insect. A species of ichneumon-fly falls a victim to *Cordiceps myrmecophila*, and there is a West Indian wasp, which is condemned to carry about "the clubs of this fungus with their curled stems, until the

\*Hooker. (Journal of Botany, 1841.)

†M. C. Cooke. (Science Gossip, 1866.)

unhappy insect sinks under the exhaustion produced by the waste of its fatty tissue."\*

In South America there is a family of ants (*Cryptocerus*) which are so frequently attacked by a *Cordiceps* that they are called by the natives of Peru "*Tamshi-mama*, that is mother of *Tamshi*, because the ant is supposed at its death to take root in the ground, and to grow upwards into the liana, *Tamshi*, which is in reality the tough air root of an epiphytal *Carhudovica*." The fungus, protruding from the earth, "looks not unlike a slender truncheon of liana, and might be mistaken for such, on a superficial inspection." †

Ascending to the higher forms of vegetable growth we come to some, which are genuine traps, in which the prisoners are retained until death puts an end to their struggles.

There can be little doubt that the plants themselves derive direct benefit from the consumption of the captured insect, feasting on the decaying animal matter, and imbibing the gases which arise from its corruption, and that they deserve the name of predatory or carnivorous, as truly as do the eagles and lions of the animal kingdom. In point of destructive power and of ingenuity in the method employed, a plant produced in the sandy bogs of Carolina in the United States, stands at the head of the list ; this is the Venus's Fly trap (*Dioncea muscipula*), and most admirably does it answer to its name. It is a lowly plant with a single naked flower stalk, which springs from a rosette of leaves spreading round the central stem. The upper half of each leaf is divided into two equal parts by a strong mid-rib. The margins are fringed with a row of stout spiny bristles, so that it may be likened to two upper eyelids joined at their bases. The leaf is slightly hollow on either side of the mid-rib, the upper surface is dotted with minute reddish glands, and each hollow portion is furnished with three slender bristles. The sensitiveness of the leaf chiefly resides in these bristles. If an insect alights on the leaf, and touches one or more of them, the sides suddenly close with a force so great as to imprison the little creature. In vain does the captive struggle to escape ; the greater are its efforts to disengage itself, the more firmly is it hugged by the enclosing leaves ; directly, however, it ceases to make a movement, the leaves relax their hold, only however to recover their former position should the struggle recommence. A bystander might imagine the leaf to have some kind of reasoning power, so exactly coincident are its movements with those of the insect it wishes to retain.

In the same natural order with the wonderful *Dioncea* is also found, the *Drosera* or Sundew, of which we have several species in this island, readily distinguished among our wild plants by the conspicuous red hairs, each surmounted by a viscid gland, with which the leaves are covered. It is from the presence of these glands glittering in the sun's rays, that the plant derives its common name. They, too, form the deadly trap, fatal to the unwary fly or ant, that touches them. No sooner is the presence of one of these felt, than the neighbouring hairs begin to bend towards the victim, and attach themselves to it ; the more distant ones succeed, until the leaf itself

\* Berkely. (Introduction to Cryptogamic Botany.)

† R. Spruce. (Venomous Reptiles, etc. Ocean Highways, July, 1873.)

is folded over it, and a regular process of digestion commences. That the movement of the hairs is not due to their being pulled together by the struggling prisoner, is proved by the noteworthy fact that they do not begin to bend over towards it until its struggles have ceased. Moreover the same motion follows on placing a piece of meat on the leaf; whereas not the slightest change is perceptible when an atom of wood or worsted is substituted.\*

Similar tales are told of other species of the same family. At the Cape of Good Hope a practical use is made of *Roridula*, a genus closely allied to *Drosera*, "the branches being hung up for the purpose of catching flies."†

Of course all plants furnished, like the Sundew, with viscid glandular hairs—even though they may not have the sensitive property with which that vegetable is gifted—are indirectly the cause of death to thousands of insects which come in contact with them, when in search of food or rest. They are veritable traps, though not of so ingenious a character as those just mentioned.

*Sempervivum glutinosum*, a house leek of the Canary Isles, has the stem, (as implied in the second name) daubed from top to bottom with a sticky varnish. Many species of the mouse-ear-chickweed (*Cerastium*) have flower stalk and calyx clothed with glandular hairs. Another genus of the same Natural Order—*Silene*, with eight or nine British species—has obtained the common name of "Catchfly" from the fact of some part of the stem being covered with a viscid matter, to which unwary insects may be seen clinging in death. Of a similar nature are the leaf buds of the horse-chestnut and the *Tacamahac* poplar (*Populus balsamifera*), which are painted over with a peculiar varnish of a very adhesive nature.

But the "viscid" principle is not the only one employed to beguile simple insects. Nature has other methods equally efficacious for working out her ends. Sometimes the throat of the Corolla is furnished with a ring of stiff hairs, which all point inwards, thus allowing of the entrance of a vagrant insect, but rendering its exit very difficult, and often impossible. Many a poor fly has been in a position to quote—with a depth of feeling which only bitter experience can give—the well-known lines of Virgil :

Facilis descensus Averni est ;

Noctes atque dies patet atri janua Ditis ;  
Sed revocare gradum, superasque evadere ad auras,  
Hoc opus, hic labor est. Pauci, (quos æquus amavit  
Jupiter, aut ardens exivit ad æthera) virtus)  
Dis geniti, potuere.‡

Not the least remarkable of these predatory vegetables is the Californian Pitcher plant, (*Darlingtonia californica*), which flourishes in spongy bogs at an elevation of five thousand feet above the sea. It is a vigorous plant, the stout flowering stems reaching three feet in height, and having seeds as large as walnuts. At a short distance the pitchers present the appearance of jargonelle pears, supported with the largest ends uppermost between ten and twenty-four inches above the ground. This results from the pitchers being quite turned

\* A. W. Bennett. (Paper read before the British Association, September, 1873.)

† Barber. (Transactions Linn. Soc. 1870.)

‡ Virgil. (Æneid. VI.)

over at the top, so as to form a dome somewhat longer than broad, and the uppermost half of the pitcher being of a decided ripe pear yellow. They are all twisted spirally, especially in the upper portion ; and they contain at the lower part a layer of from two to five inches of the closely packed remains of insects of all sizes from minute beetles to large powdery moths. When a sharp knife is passed through a lot of brown pitchers withering round an old plant, the stumps resemble a number of tubes densely packed with the remains of insects ; but what it is that attracts the insects is by no means clear. Within the pitcher the surface is smooth for a little way down ; then isolated hairs appear ; and soon the chamber becomes densely lined with sharp needle-like hairs all pointing downwards, so decidedly indeed, that they almost lie against the surface from which they spring. These hairs are slender, transparent, and colourless, about a quarter of an inch long and very rigid. The poor insects evidently travel down these conveniently arranged stubbles, but none seem to turn back. The pitcher, which may be a couple of inches wide at the top, narrows very gradually at the base where it is a little more than a line in diameter. For some little distance above this point, the hairs all converge, and the unhappy fly goes on till he finds his head pressed against the thick firm bottom of the cell and his rear against myriads of bayonets. Very small creatures fill up the narrow base, and above them larger ones densely pack themselves to death in the hope of fighting their way out. When held with the top upwards, a reddish juice with an exceedingly offensive odour will sometimes drop from them.”\*

Another method of destruction, of a more peculiar nature, is found in the dogbane, (*Apocynum androsæmifolium*), a North American plant. Here we see certain toothlets on the inner surface of the flower, endowed with an extraordinary degree of irritability. No sooner does an insect, eager to secure the honey-like nectar, apply its proboscis to the flower, than these segments close over it, and the victim is held in a hopeless captivity, until death puts an end to its struggles. The vice-like toothlets then relax their hold, and the body falls off. In consequence of this curious faculty the plant has acquired the name of *Gobe-mouche* in France, while to the Germans is it known as *Fliegen fanger* or flycatcher.

We have seen how pertinaciously plants attack and destroy insects, by enveloping them in deadly folds, by gradually eating their very vitals, or by catching them in traps and gins of ingenious make ; but perhaps the last mode of destruction we should credit them with is that of drowning their victims ; and yet it is one to which they have constant resource. The Teazles of Europe—both the common wild kind (*Dipsacus silvestris*), and that so largely employed in the manufacture of cloth (*Dipsacus fullonum*)—do a considerable amount of murder in this way. In these plants the leaves are placed in opposite pairs, and are in technical language “connate ;” that is to say, the bases of each pair of leaves are as closely combined, as though they were one leaf, thus forming a hollow cup, which retains the rain and dew so successfully, that it is rarely empty even in very warm weather. Hither then, insects eagerly

\*W. Robinson. (Transactions Linn. Soc. 1870.)

resort to slake their thirst, and are drowned by thousands. Teazles abound in every hedge row in England; and it is a rare thing to look into one of these natural reservoirs without seeing it dark with the bodies of gnats, flies, and small moths.

We have analogous examples in many of the pine apple plants (*Bromeliaceæ*), which flourish in tropical lands, and whose fleshy leaves are capable of holding a considerable amount of water at their base. What destruction they cause among the insect tribes may be seen by the following passage:—

“The ground was clothed with the dwarf *Sumara* and other *Bromelias*. These may be compared with the “*arbres des voyageurs*” in various regions. A full-grown plant gives a pint of water collected between the stalk and the bases of the leaves; when fresh it is pure, wholesome, and free from vegetable taste, but not nectar. After a time of drought the fluid becomes turbid, a fine black mould collects in it, and dead insects and live tad-poles (especially those of a small pale yellow frog, (*Hyla luteola*) require it to be filtered.”\*

A different, but equally effective class of drowners, is known under the name of Pitcher plant, for specimens of which we must look to the genera *Sarracenia*, *Heliamphora*, *Cephalotus*, and *Nepenthes*.

All of these plants are constructed on nearly identical principles, viz., the conversion of the leaf, either entirely, or at the point only, into a cylindrical cup, with or without a cover, and always containing a supply of fluid. This fluid is not true water; that is to say, it does not descend from the clouds, but is distilled by the plant itself. Consequently the statement that the lid of the Pitcher is raised at night to catch the dew, and closed during the day to prevent evaporation—has no foundation in fact.

The liquid has been analysed by Dr. Völeker, who finds that it consists mainly of citric and malic acids, the same acids, as give their pleasant flavour to most fruit; thus confirming Lindley’s statement, that the fluid of the Pitcher plant “emits while boiling an odour like that of baked apple.”†

The same property of secreting a transparent liquid exists also in certain arums, one species of which *Richardia æthiopica*, commonly called the lily, adorns our gardens with its large flowers, in the shape of the classical *cornucopia*. I have never observed the phenomenon in this colony, but in England where *Richardia* is a green house plant, the dripping of water from the points of the leaves may often be seen.

Curiously enough the same property is shared by some tiny insects of the Homopterous Order, known as plant lice. In these species, which appear to be confined to Africa and Madagascar, a limpid fluid exudes from the apex of the abdomen in such quantities as to form a continuous shower.‡ Bach states in his “*Wunder der Insekten Welt*,” that “on placing a quart bottle under a mass of half-grown larvæ, 60 or 70 in number, from which large drops were falling in quick succession, it was filled in an hour and a half.”

As nature, however, has provided neither the *Richardia* nor the

\*Burton. (Highlands of the Brazil).

†Lindley. Vegetable Kingdom.

‡Livingstone. Missionary Travels.

*Homopters* with a special receptacle, the fluid simply falls to the ground and is lost.

This is far from being the case with the Pitcher plants, which utilise their fluid for their own ends; innumerable flies and beetles crowding in to the tempting reservoirs, and there meeting with watery graves. Occasionally it would appear that the *Sarracenia* is employed artificially as a flycatcher in the United States. In South Carolina, for instance, the leaves are detached, taken into a sitting-room, and placed in a vertical position. Very soon the flies are attracted to the orifice of the Pitcher, where they appear to suck up a sweet clammy substance, exuding from the interior of the tube with great avidity. In a few seconds they have marched down the fatal passage, from whence they drop into the treacherous pool at the base, never to see the light again, their return being effectually guarded against by a ring of hairs, which is fitted to the interior of the tube, and which all point downwards. If the room is much frequented by flies, it takes but few hours to fill the Pitcher with victims.\*

But however agreeable the fluid may be to the flies, or however useful the leaves may be as a trap, its treacherous properties are sometimes, in an indirect manner, anything but agreeable to the weary traveller, who hoping to enjoy an agreeable draught, finds only a mass of corruption. "We had been told (writes Wallace), that we should find water at Padang Batu, (Malacca); but we looked about for it in vain, as we were exceedingly thirsty. At last we turned to the Pitcher plants, but the water contained in the Pitchers—about half a pint in each—was full of insects."†

A kind of Pitcher is produced on an asclepiadaceous plant growing in India, the *Dischidia rafflesiana*. "It is a creeping plant having a long twining stem which is destitute of leaves until near its summit, and this may be a hundred feet from the roots, on which, therefore, it can scarcely depend for nourishment by absorption of fluid from the ground. Its supplies of moisture from a tropical atmosphere would be very uncertain if there were no provision for storing up what it occasionally collects; but with such an one it is furnished. The pitcher seems formed of a leaf, with its edges rolled towards each other and adherent; and the upper end, or mouth, from which it is suspended is quite open, and adapted to receive whatever moisture may descend from the air, whether in the form of rain or dew. It is accordingly always found to contain a considerable quantity of fluid, in which a number of small black ants are generally seen. These are probably attracted by it, and their decomposition may, as in the case of the *Sarracenia*, render it yet more nutritious to the plant."‡

It is worthy of observation, from a geographical point of view, that each main division of the globe is provided, among its vegetable stores, with a special executioner of insects. *Dionæa*, *Sarracenia* and *Darlingtonia* are told off to North America; *Heliamphora* to South America. In Asia we find *Dischidia* and *Nepenthes*. Australia

\* Macbride. (Transactions of the Linn. Soc. xiii.)

† Wallace. (Malayan Archipelago.)

‡ Carpenter. (Vegetable Physiology.)

has its *Cephalotus*; and also shares with Europe and Africa the services of the less conspicuous genera, *Drosera*, *Roridula*, and *Byblis*.

## OCTOBER, 1877.

The monthly evening meeting of the Society was held on Monday, October 15, James Barnard, Esq., in the chair.

Mr. Dagobert Lewald, who had been previously nominated by the Council, was balloted for and declared duly elected as a Fellow of the Society.

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

1. Number of visitors to Museum, 1,556.
2. Ditto to gardens, 4,918.
3. Plants and seeds received at and sent from gardens.
4. Time of leafing, flowering and fruiting of a few standard plants in the Botanic Gardens during September.
5. Books and Periodicals received.
6. Presentations to Museum and Library.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq., table for September.
2. New Norfolk, from W. E. Shoobridge, Esq., abstract ditto.
3. Tamar Heads, from R. Henry, Esq., tables for August and September.
4. From the Marine Board, tables from Mount Nelson, for September; South Bruny, for August and September; Goose Island, for June, July, and August; Swan Island, for ditto; and Kent's Group, for May, June, July, and August.
5. Melbourne, from R. J. L. Ellery, Esq., printed records of the results of Observations from January to May, inclusive.
6. Windsor, New South Wales, from J. Tebbutt, Esq.—Results of observations taken during 1871-72-73-74-75-76.

The presentations to the Museum and Library were as follows :—

1. From Mr. J. Withrington—A bow and seventeen poisoned arrows from Fiji.
2. From Miss E. Yeoland—A very large and beautiful specimen of a species of Coral from Long Bay, D'Entrecasteaux Channel.
3. From Mr. C. Allport—30 eggs of Tasmanian birds.
4. From W. E. Shoobridge, Esq.—Two specimens of the Porcupine Ant-eater (*Echidna setosa*).
5. From Mrs. Gibbons, Kingston—One ditto.
6. From Mr. R. R. Rex—Rock specimens, copper ore, etc., from N.W. Coast of Australia.

[As to presentation No. 1, the SECRETARY remarked, recent investigations had thrown great doubts on the belief that these arrows carried poison. The late occurrence, after arrow wounds, of the symptoms, and the identity of these with tetanus, indicated that the fatal results were entirely due to the circumstance that the wounds were necessarily of that dangerous class called "punctured," where nerves were severely injured and irritated, rather than fairly divided. In many of these cases, too, the nervous system of the patient was no doubt in a depressed condition from the dread of poison, which would still further favour the occurrence of the tetanic affection.]

Mr. JUSTIN BROWNE (on behalf of Mr. Justice Dobson) exhibited a remarkably fine specimen of the great Mexican thistle, "Grande fleur rouge" (*Carduus sp.*), and read a short notice in reference to it. In its native habitat this splendid flower is found at an elevation of 12,000 feet, and till recently was supposed to have become almost extinct. Mr. Browne further observed, in the course of a few days he would place in the Museum for inspection a sample of the new fabric made by the Chinese, consisting of a mixture of Australian wool with their own cotton. The introduction of wool into China was likely to open a

splendid market for our staple produce, experience having proved that wool, when readily procurable, always to a great extent superseded cotton for clothing purposes.

Presentations of Books from America received through the Smithsonian Institution, Washington, October 2, 1877 :—

1. From Professor Henry—Smithsonian Report for 1875 ; Smithsonian Contributions to Knowledge, Vols. 20, 21.
2. From Dr. F. V. Hayden, United States Geologist—Geological Survey of the Territories, Vol. 9 ; “Invertebrate Palæontology,” by F. B. Meek, Vol. 10 ; “Monograph of the Geometrid Moths,” by A. S. Packard ; “Geological and Geographical Survey of Colorado, 1874,” by Dr. F. V. Hayden ; “Bulletin of U. S. Geological and Geographical Survey of the Territories,” Vol. 2, Nos. 2, 3, 4.
3. From the Boston Society of Natural History—Proceedings of the Society, Vol. 18, parts 1 to 4 ; Occasional Papers, No. 2, 1875 ; “The Spiders of the United States,” by N. M. Hentz, M.D. ; Memoirs of the Society, Vol. 2, part 4, Nos. 2, 3, 4.
4. From the Davenport Academy of Natural Sciences, Iowa—Proceedings of the Academy, Vol. 1., 1867-1876.
5. From the American Association for the Advancement of Science, Detroit—Proceedings of twenty-fourth meeting of the Association, 1875.
6. From A. Agassiz, Esq., Museum of Comparative Zoology, Harvard College, Cambridge—Bulletin of Museum, Vol. 3, Nos. 11 to 16 ; Memoirs of Museum, Vol. 2, No. 9 ; “On Some Insect Deformities,” by Dr. Herman A. Hagen, Vol. 4, No. 10 ; “The American Bisons, living and extinct,” by J. A. Allen ; Annual Report of Curator for 1875.
7. From the American Philosophical Society, Philadelphia—Proceedings, Vol. 15, No. 96, Vol. 16, Nos. 97 and 98, 1876.
8. From the National Exhibition Commission, Rio Janeiro—“Brazilian Biographical Annual,” by Joaquin Manoel de Macedo, Vols. 1, 2, 3.
9. From the Connecticut Academy of Arts and Sciences—Transactions, Vol. 3, part 1.
10. From the American Academy of Arts and Sciences, Boston—Proceedings, Vol. 3, 1875-6.
11. From the Essex Institute, Salem—Bulletin of the Institute, Vol. 7, 1875.
12. From the Buffalo Society of Natural Sciences—Bulletin, Vol. 3, No. 3.
13. From the Cincinnati Observatory—Catalogue of New Double Stars, 1876.
14. From the Chief Signal Officer, Washington—Daily Bulletins (Meteorological), February to November, 1873, 11 vols. (Duplicate of July).
15. From the Superintendent, United States Coast Survey—Five Volumes of Surveys, 1869 to 1873.

Colonial publications received :—

1. From the Royal Society of N.S. Wales—Journal and Proceedings of the Society, Vol. 10, 1876 ; Report for 1877 ; Annual Report of Department of Mines, N.S. Wales, 1876.
2. From John Tebbutt, Esq.—“Results of Meteorological Observations made at the Private Observatory, Windsor, N.S. Wales,” during the years 1871, 2, 3, 4, 5, and 6.
3. From Baron von Mueller—“Select plants eligible for industrial culture in Victoria,” pp. 293.

The SECRETARY read a letter from the Rev. H. D. Atkinson, enclosing a diagram of a strange fish caught at Circular Head. [The sketch having been shown to Dr. James Hector, F.R.S., of New Zealand, that gentleman recognised the subject of it as the "Hair Tail," *Trachypterus altivelis*, an ocean fish rarely found near land.]

The following communication, addressed to the Hon. Secretary, in reference to the so-called Brown's River Black potato, from Mr. F. Cotton, of Kelvedon, was read:—"My attention has been directed to an article in the *Tasmanian Mail* of September 1, on a potato called 'Brown's River Black,' but the right name of which is 'Kelvedon Purple.' Some historical account of the origin of the potato is given, and the *modus operandi* (an act of piracy) by which this new variety had its fair name so fraudulently altered to that of 'Brown's River Black.' The person to whom the colony (and the world) is indebted for the potato in question is rather obscurely hinted at, but as he is still living, and a member of the Royal Society of Tasmania, it is only proper and just that he should be introduced to the Fellows and his fair fame vindicated; also, that they should be acquainted with the means through which this valuable root was generated.

"In or about the year 1832 Captain Burney brought his vessel (the *Henry*) to Oyster Bay, to ship oil from the fishery of the late George Meredith, and wattle bark from the estates of Sherborne and Kelvedon. On that occasion he presented us with a bag of Brown's River potatoes called 'Rough Whites.' These were planted carefully, and when they flowered Dr. Story inoculated a few of the most promising with the flowers of the 'Irish Apple,' which was at that time the choicest potato in the colony. These impregnated apples when ripe were gathered and spread out to dry, and in the spring sown in a bed of fine mould. The produce of these seed apples was, the next season, planted in rows, and in the autumn dug up and sorted. Out of an almost endless number of varieties, four kinds were selected as worthy of further trial. The experience of the third year's planting was that but one of the four varieties was superior to the sorts then cultivated, and it was named by Dr. Story the 'Kelvedon Purple.' To Dr. Story then belongs the sole merit of giving to the world this valuable tuber, and the fact ought to be chronicled and the true name of the potato restored.

"This potato is somewhat of an oval shape, with a skin inclined to purple, but inside of a pure white; and it has this excellence that not only is it a good boiler and of superior taste, but its skin is almost free from indentations at the eyes so that there is no waste in paring. The haulm is of a pleasing green colour, and does not bear many apples. The produce per acre varies with the soil. I have heard of from fourteen to sixteen tons per acre, and of six potatoes filling an American bucket. The potato comes in early, and keeps good as long as the once famous 'Irish Apple,' now I believe extinct. I have heard of twenty-two tons per acre being grown at the Chain of Lagoons, East Coast, but am not informed as to the kind of potato. A brief account of the raising of the 'Kelvedon Purple' was sent to the late Dr. Ross about the year 1836, and by him published in the *Courier*. I have seen the 'Kelvedon Purple' growing in South Australia, and have no doubt that it found its way to California more than 20 years ago. I am disposed to believe that its excellence is not surpassed by any potato hitherto brought into use. We have obtained some of the choicest varieties, including one of the most prized in America, and have not met with one to compare with the Kelvedon Purple."

A valuable paper by the Rev. J. E. Tenison-Woods, F.G.S.,

F.R.G.S., etc., "On Tasmanian Siphonaria, including a new species," was read.

The Rev. W. W. SPICER, M.A., F.R.M.S., read a most interesting paper on "Insect Parasites." After the paper Mr. Spicer remarked that through the kindness of Admiral Barnard a request had been issued to all our lighthouse keepers for specimens of plants in their respective neighbourhoods. Mr. Spong, of King's Island, had alone replied hitherto, and had forwarded 47 species, but of these none were new. He might be allowed to take that opportunity of mentioning he had recently placed in the hands of Messrs. Walch for publication a manuscript containing a full description of every known plant in Tasmania. He thought the book, which would be moderate in price, would prove a ready and trustworthy guide for the local botanist, and he hoped moreover it would also tend, in many instances at least, to popularise the science of botany generally. (Applause.)

The usual vote of thanks to the authors of papers and donors of presentations concluded the proceedings.



## NOVEMBER, 1877.

The monthly evening meeting of the Society was held at the Museum on Monday, November 12, the Right Rev. the Bishop of Tasmania in the chair.

Dr. E. C. Barnard, who had previously been nominated by the Council, was balloted for, and declared duly elected as a Fellow of the Society.

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

1. Number of Visitors to Museum during October, 1,722.
2. Ditto to Gardens, ditto, 4,728.
3. Plants received at Gardens—From Aug. Simson, Esq., a very fine trunk of *Alsophila australis* from Gould's Country. From Mons. J. Linden, Ghent, Belgium, 50 plants (Palms and Orchids) in very good condition.
4. Time of leafing, etc., of a few standard plants in the Botanic Gardens during October.
5. Books and Periodicals received.
6. Presentations to Museum.

*Meteorology.*—

1. Hobart Town, from F. Abbott, Esq.—Table for October.
2. Mt. Nelson, table for October; South Bruni, ditto; Swan Island, table for September; King's Island, tables for July, August, and September; from Hobart Town Marine Board.

The presentations to the Museum were as follows :—

1. From A. Simson, Esq.—A collection of unusually fine crystals of oxide of Tin from Gould's Country, with a note.
2. From Mr. E. A. Smith—Fossilcast of Pecten from limestone near Sandy Bay.
3. From Mr. J. E. Baynton—Samples of "washdirt," tin nuggets, etc., from Gould's Country.
4. From James Scott, Esq.—A fine specimen of Fossil Wood from Mount Morriston, with a note.
5. From Charles E. Barnard, Esq., M.D.—A named collection of Fossil Fruits from Gulgong, New South Wales.

[In reference to this presentation, the following note from Dr. Barnard was read :—"These fossil fruits were found embedded in the argillaceous 'wash dirt' of the 'Black Lead,' Gulgong, New South Wales, at a depth of 150 feet, associated with leaves and wood, the remains of ancient forests. Immediately above this washdirt is a stratum of hard basalt, 15 feet thick; and above this again are strata of clays and gravel alternating. These latter contain no gold; which is only found here beneath the basalt."]

Mr. M. ALLPORT remarked that one or two of these fossils from the New South Wales tertiaries were very similar to some found in the Travertine at Geilston, near Risdon, and in both cases they were of older date than the basalt, which in New South Wales overlies the fossils, and at Risdon has displaced the beds in which they occur. If any of the leaves found could be accurately associated with the fruits much light might be thrown on the flora of that period, and far greater interest given to the fossils from both localities.

The Rev. W. W. SPICER read a paper on "Silk and Silk Producers."

A paper by the Rev. J. E. Tenison-Woods, "On some new Tasmanian Marine Shells," was read by the Secretary.

Mr. ALLPORT read a very interesting paper "On the present stage of the Salmon Experiment."

After some conversational discussion, the Secretary announced that the Council, after due deliberation, had determined to open the Museum to the public on the afternoons of Sunday from 2:30 to 5 o'clock. This action was taken in the interest of all those whose occupations rendered them unable to visit during week days. The experiment would be continued for two or three months, after which period its continuance would be determined by the number of visitors.

The usual vote of thanks to the authors of the papers, and the donors of presentations having been accorded, the meeting terminated.

ON TASMANIAN SIPHONARIA, INCLUDING A  
NEW SPECIES.

[By REV. J. E. TENISON-WOODS, F.G.S., &c.,  
Corr. Mem. Roy. Soc., Tas., &c., &c.]

[Read 15th October, 1877.]

Some time since, that is in May, 1876, I read a paper before this Society on some Australian *Patellidæ*, on which occasion I referred to two Tasmanian species of *Siphonaria*, *S. denticulata* and *S. diemanensis*, which were the names I supposed them to have received from Messrs. Quoy and Gaimard. (*Voyage de l'Astrolabe*, Vol. 2, p. 327, and 340.) Since reading that paper I have had an opportunity of seeing type specimens of both these shells, and I find that the one I considered to be identical with *S. denticulata*, var. *Tasmanica* mihi., is an undescribed species of a very marked character, to which I now give the name and description found below:—

*SIPHONARIA ZONATA*. n.sp. *S.t. irregulariter ovata, latere siph. distincte subrostrata, tumide conica, alta, vertice mediano, subacuto; costis 40-50, tenuibus, planatis, canali siph. plus minusve interruptis. Cæruleo-albida, lineis vel fasciis olivis varie concentricè zonata, sæpe autem atra vel corrossa, intus pulchre nitente intensè fulvo pupureo, margine dentata. Impressio muscularis fulvo-albida latere canali irregulariter prolongata.*

Shell irregularly oval, distinctly subrostrate on the siphonal side, tumidly conical, high, vertex median, subacute; ribs 40 to 50, thin, flattened, more or less interrupted by the siphonal canal. Color bluish-white, concentrically and variously zoned with olive lines or bands, sometimes the apex is entirely olive, but these lines vary in every shell, often stained black or corroded. The interior is beautifully enamelled, and stained an intense purple brown, with a brownish white spathula which is continued more or less into the siphonal channel. The margin is dentate, rarely dotted with white. The size of the shell varies. Long. 20-25. Lat. 15-19. Alt. 8-12, millimetres.

The animal has been already described in the paper referred to. It generally is found above the tide marks on the hollows of rocks. It appears to be gregarious and is very common on all the South Tasmanian coast. I think I have also seen it on the rocks near Queenscliff, at the entrance to Port Phillip.

In order to point out its affinities I will mention all the species of *Siphonaria* known as Australian. *Siphonaria diemanensis*, Quoy and Gaimard, has distinct brown interstices or grooves between the ribs. *S. scabra*, Reeve, Port Jackson, is a thinner and more depressed shell, though, in my opinion, only a variety of *S. diemanensis*. *Siphonaria denticulata*, Quoy and Gaimard, appears to be only another variety, of larger size, somewhat closer ribs, and paler colour. It is totally different in the interior from *S. zonata*. *S. funiculata* is another pale variety of *S.*

*diemanensis*, very like *S. denticulata*, in fact I see no difference, except that it is smaller. *S. bifurcata* is a thin flat species, of pale internal colour, found in Port Jackson. *S. Baconi* is a West Australian species, said to occur in South Australia, but the specimens I have seen from South Australia, and those under that name in Port Jackson collections, I should call varieties of *S. diemanensis*. In Reeve's monograph there are two species named *S. funiculata*, viz., pl. 2, fig. 6, said to come from Van Diemen's Land, and pl. 7, fig. 35, with an unknown habitat. This has a hooked apex. The specific title of the first species so named may be dropped as only distinguishing a variety of *S. diemanensis*. I find that Mr. G. F. Angas refers to *S. funiculata* thus, in the *Pro. Zool. Soc.* 1867, 232, *S.f.*, Reeve, *Conch. Icon.*, pl. 2, fig. 6. "A conical species, ribbed with white, denticulated, and stained in the interior with brown. It varies considerably in colour. Found also in Tasmania, *S. atra*, Quoy and Gaimard, a Pacific and Japan species is said to occur also in Port Jackson."

In the collection at the Sydney Museum there is a species named *S. funiculata*, which I should say was only a pale depressed variety of my *S. zonata*, but it does not in any way correspond with Reeve's description and figure of the first of the two species so named by him. I can only conclude that a mistake has been made in the identification by Australian naturalists, and thus the shell now described, which is an entirely new and distinct species, has been regarded as *S. funiculata*, Reeve, and so passed over.

## SILK AND SILK PRODUCERS.

BY THE REV. W. W. SPICER, M.A., &amp;c.

[*Read November 12th, 1877.*]

The employment of insects for the special purposes of mankind may be placed under three principal heads, viz., Medicine, Food, and Clothing. With regard to the two first, one may almost write, as did old Herrebow, the author of a Natural History of Iceland, the 72nd chapter of whose work runs thus—"Concerning snakes. There are *no* snakes in Iceland." For it is quite astounding—when we consider their number (not less than 150,000 species), and the varied properties they possess—how few insects are pressed into man's service either for curative or culinary purposes. In the present day, Hygeia entrusts her reputation and the safety of invalids almost entirely to vegetable and mineral substances; while, as for the cookery book, we may search in vain for the name of an insect among the myriad of delicacies, which pamper modern appetities.

But, if Science is reserved in the employment of insects in the pharmacopœia, ignorance and credulity have given full flight to their fancy.

"Fools have rushed in, where angels feared to tread."

Had one of our ancestors a distressing toothache? There were ready at hand the weevil and the ladybird, either of which could be crushed and applied to the afflicted part. Nay, did he wish to get rid of the offending organ altogether, he had but to touch it with the ashes of burnt "emmetts or pismires," and straightway the tooth would drop from the gum. Had he the misfortune to sprain his leg or bruise his foot? Two at least of the beetles, which dwell in excrementitious matter, *Geotrupes* and *Aphodius*, were specifics held in high estimation. The yellow matter which exudes from the joints of the bilbeetle, was held to be as efficacious in dropsy or rheumatism, as in hydrophobia—and no doubt was so. Another infallible remedy against the bite of a mad dog consisted of the fat white maggots generated in the putrid carcase of the dog itself—truly a case of Homœopathy run mad!

That foul disease leprosy could not stand before the bruised body of a meal worm. The great jaws of the stag beetle when powdered proved a certain cure in most of the maladies incidental to childhood. The different tree bugs were good against ague; the male cricket taken internally could drive away a cold. Was the cold accompanied by headache? There were plenty of remedies at hand, such as earwigs and cockroaches. This last insect was specially valuable; for according to Dioscorides (whose receipt is unhesitatingly reproduced by Mouffet in the 17th century), the fat of the cockroach pounded with oil of roses is singularly efficacious in earache, and the same insect boiled in oil removes warts. Lastly, snake-poison was rendered perfectly harmless, if the patient could be induced to swallow one or two bed-bugs!

Civilised peoples have never been much in the habit of utilising insects as food. The only example I know of is that of the Romans,

who were partial to a large grub ; though it is doubtful what the particular insect was. We know that it bore the name of "Cossus";\* but naturalists are much divided on the knotty question of what is the true Cossus of the ancients. It was certainly not the animal to which Linnæus gave the title. Again in Leviticus xi. 22, "The beetle after his kind" is mentioned among the articles of food which the Jews might eat ; but there is no doubt that the original word (*chargol*) is incorrectly translated.†

If, however, insects cannot be said to hold an important position in regard to medicine and food, there is no doubt, that in arts and manufactures they play a distinguished part. The number of species employed may be small, but certainly a considerable void would be created, were all the insects to be blotted out, which contribute to our necessities or luxuries in this respect.

To insects we are indebted for one of the principal articles of clothing. Silk—to which I propose to devote the remainder of this paper—the produce of an insignificant moth has in the course of ages become one of the most important manufactures which the world has witnessed.

The education of the insect and the manufacture of the article have alike come to us from the Northern Provinces of China, where sericulture has been established from a very early period. Chinese annalists carry it back to the 27th century before Christ ; and they attribute its establishment to the foresight and care of Si-ling-chi, wife of the emperor Hoang-ti. Setting aside trade tradition, the mention of silk as an article of manufacture occurs for the first time in the writings of Ezekiel, the prophet, about 550 B.C., who speaks of its use among the Jews as an indication of wealth and glory.‡ It is well to mention that there are two earlier allusions in our version of the Bible to the employment of silk. The first is in Genesis xii. 42, where "Pharaoh," it is said, "arrayed Joseph in vestures of *fine linen* ; the last two words are given in the margin as "silk." Again, in the Book of Proverbs,§ the clothing of the virtuous wife is described as of "silk and purple." The original word in both cases is "Shesh," of which "fine linen" appears to be the more equivalent.

We next read of silk in the Sacred Writings of the Book of Revelation,|| where it is enumerated among the luxuries for which Babylon was celebrated.

But although the ancients were acquainted with the article, they were entirely ignorant of its origin ; as we may gather from the poet Virgil, who speaks of

"Ethiop forests hoar with fluttering fleece,  
And downy foliage carded by Chinese."¶

By Ethiopia, I may mention, is intended the modern Abyssinia ; and it is curious, that Pliny speaks also of Ethiopia as the home of cotton ; for he says that that country "possesses scarcely any trees of importance, *except* those which bear wool."

Two centuries later the celebrated Roman physician, Galen, employed silk as threads for securing blood-vessels in surgical operations.

\* Pliny, Hist. Nat. xvii. 24.

‡ Ezekiel xvi., 10, 13.

|| Revel. xviii. 12.

† Smith, Dict. of the Bible.

§ Proverbs xxxi., 22.

¶ Second Georgic. Blackmore's translation.

Up to this period and for some time after, the little silk which reached Europe, was imported from Persia and India. The Emperor, Heliogabalus, about the year 220 B.C. was the first Roman, and therefore I presume the first European, who wore a garment of pure silk. It was not until the sixth century after Christ, when Justinian occupied the throne of Constantinople, that the real origin of silk became known to the world. About the year 550, two Persian monks, at the risk of their lives brought a few eggs from China in the hollow of a walking stick, and from that hour the mystery was solved. For a long period the breeding of the silk-worm was confined to the Greeks of the Lower Empire. Manufactories were established in Athens, Thebes and Corinth; from whence the Venetians, who were then what England is now, the carrying nation of the world, supplied Europe with silk goods. About the middle of the twelfth century Roger, King of Sicily, introduced the worm into Italy;\* and from this period sericulture became an established institution in Europe. It was not until the commencement of the eleventh century, that the mulberry was planted for the first time in France. At the present day the breeding of the worm, and the preparation and manufacture of the silk afford employment to thousands of the French population. In the year 1870 the value of the eggs and cocoons imported for home use amounted to the enormous sum of £2,053,000.

In England the manufacture of silk commenced in the 15th century, but made little progress until the Revocation of the Edict of Nantes in 1685 drove 50,000 fugitives from the shores of France, many of whom settled in Spitalfields, in the neighbourhood of London. Efforts have been made, from time to time, to rear the moth itself in England on a large scale. In 1609 James I. took the matter up with much earnestness, and mulberries were planted in large quantities on the spot where the royal residence of Buckingham Palace now stands.† The attempt however, met with no success, and the spot soon became a mere place of fashionable resort. Evelyn, in his well-known diary, makes an amusing allusion to it, under date May 10, 1654. "My Lady Gerrard treated us at Mulberry Garden, now the only place of refreshment about the town for persons of the best quality to be exceedingly treated at; Cromwell and his partisans having shut up and seized on Spring Garden, which till now had been the usual rendezvous for the ladies and gallants at this season."

Nothing whatever is known of the Silk-worm in its wild condition. It seems to be assumed by all biological writers, that the insect came originally from Northern China; but beyond this, all is a blank in the life-history of this important insect.

As a captive, domesticated for thousands of years, we see in the Silkworm (*Bombyx* or *Sericaria mori*) a moderately large moth of a dirty white hue, with ill-formed wings—so ill-formed indeed, that the creature is quite incapable of flight. The antennæ, which are much darker in colour than the rest of the body, are very beautiful in the male insect, being deeply pectinated, or cut into narrow divisions, like a comb, with a double set of teeth placed back to back. Beyond its pretty antennæ, *Sericaria* has nothing to commend

\* Gibbon, Decline etc. LII.

† C. Knight, London, S. James' Park.

it, thus justifying Taschenberg's remark, in his *Wirbellose Thiére* : "The most useful of all insects, like the loveliest songsters among birds, is clothed in the soberest garments."

The larva (or "worm" *par excellence*) is a stout thick-bodied grub, of nearly the same tint as the moth, with a small head and naked body, of which the first segment is much swollen, and the last but one bears an upright horn. The worm feeds by preference on the mulberry—not the common sort with the luscious fruit, known to botanists as *Morus nigra*, but another species, *Morus alba*, of which the fruit is worthless as food. The insect can also support itself on lettuce, and some other juicy plants ; but the silk is said in such case to be much inferior.

The Cocoon enclosing the chrysalis is egg-shaped, and is composed of the much-coveted silk, varying in colour from pure white to golden yellow ; occasionally it assumes an apple green tint. Leunis, the learned author of the *Synopsis der Thierreich*, tells us, that blue cocoons can be obtained by sprinkling the food with indigo ; and that a pink hue is communicated, if the powdered leaves of a South American plant, *Bignonia chica*, are employed.

The threads issue from two glands situated near the mouth, aggluminated together and covered with a glossy varnish—each thread measuring about the 2,000th of an inch in diameter.

A cocoon contains from 700 to 1,100 feet of thread ; and it takes some 2,000 of these indefatigable spinners to procure one lb. weight of the raw material.

The outer covering of the cocoon is made up of loose broken fibres, well-known as Floss or Bourre, which is carded and spun like cotton.

Besides the Floss, three forms of raw silk are recognised in commerce.

1. Singles : Formed of a single thread to give it firmness.
2. Train : Formed of two or more threads slightly twisted together. It is generally used for the shoot or weft.
3. Organzine, which is, in fact, Thrown Silk, is made up of several threads twisted firmly together in a direction contrary to that of the individual threads. It serves for the warp of the best stuffs.

I may mention, in passing, that the Throwing machine has been so much improved of late years that the extraordinary speed of 5000 revolutions per minute is given to the spindles.

Silk-worms, owing no doubt to their purely artificial condition, are subject to various diseases, many of which are as destructive to them, as are cholera or yellow fever to their owners. Among them are conspicuous muscardine, pebrine, jaunisse, and others much dreaded by the silk-farmers of Italy and France. The devastation caused by these epidemics has interfered seriously with the supply of silk ; as the infected "grains" or eggs have been transported from one country to another, and have spread disease far and wide. Even China, the cradle of silk culture, has not been spared. It is principally from Japan, that growers are now supplied with grain, as that country has hitherto escaped the plagues that have devastated other lands. At the same time, this immunity will be of short duration, if, as reported, the Japanese, with short-sighted policy, are actually importing infected eggs for the purpose of adulterating healthy ova for the foreign market.

Under these adverse circumstances efforts have been made from time to time to domesticate other species of silk-producing moths, and utilise their cocoons. Among those, which have been experimented on of late years, the Ailanthus worm (*Attacus cynthia*) must be placed at the head. It is a native of Japan, and has its common name in consequence of its feeding on a hardy tree, named *Ailanthus glandulosus*. Japan also supplies us with another valuable worm, *Antheraea yama-mai*, which in its native country subsists on the leaves of two kinds of oak, *Quercus dentata* and *serrata*.

India and its immediate neighbourhood are rich in silk producers. The most important is the Tusseh worm (*Antheraea paphia*), which feeds on various species of Bombax, Terminalia, and some other trees. The cocoon is as large as a hen's egg, and the silk, which is remarkably strong, has been manufactured for centuries and supplies clothing to multitudes of the natives under the name of Tusseh cloth. The head-quarters of Paphia are in Bengal; but efforts are being made to establish it in other Presidencies. Some months ago this Society received, through the Colonial Secretary's office, a despatch dated from Poona, Bombay, the writer of which, Capt. G. Coussmaker, details the various methods he employed to introduce the Tusseh worm (or "Tasar silk worm," as he names it) into that neighbourhood. Nearly allied to paphia is the Bughy worm (*Antheraea mylitta*) indeed by some authors the two species are held to be identical. Its cocoon, as is the case with some others, is attached to a twig by a long stiff stalk composed of a gummy matter, which is in fact immature silk.\* This gives me the opportunity of stating, that even immature silk is not altogether worthless; for from it is made the "gut," so indispensable to the fisherman, combining, as it does in the highest degree, the qualities of flexibility, toughness, and indestructibility in water. The best is said to be imported from China and Spain, where it is made by soaking the caterpillar in strong acid, then pulling the body asunder, and winding the gummy matter, exposed to view, round pins placed some distance apart on a board. This substance is the embryo silk utilised before it has been exposed to the air."†

The Bughy worm feeds on the castor oil plant. The same plant supports the Eria or Arrindy worm (*Attacus ricini*), which produces a coarse but very durable material much in favour with the poorer classes of India. On the other hand the silk of the Joree worm (*Saturnia religiosa*) is exceedingly fine and lustrous; it chooses the Pipul (*Ficus indica*) as its food plant. Assam is the native home of the Joree worm, as it is also of the Moongha (*Antheraea assamensis*). It is found on *Zizyphus jujuba*, and produces a cocoon which is sometimes fawn coloured, at others nearly white; the latter is considered the most valuable variety. Another moth of the same family and country is *Antheraea roylü*, which supports itself on the leaves of some species of oak.

Towards the close of 1864 the discovery was made in Senegal on the coast of Africa, of a moth, to which M. Guérin Meneville gave the name of *Faidherbia bauthinæ* in honour of General Faidherbe, whose name afterwards became prominent in the Franco-German War. Like the whole of those already mentioned,

\* Linnean Soc. Trans. Vol. VII.

† American Naturalist, 1870.

*Faidherbia* belongs to the Bombycid Division of the moths. It is partial to the species of *Zizyphus*, especially the Siddeem (*Zizyphus orthacantha*); and it is thought, that it will be exceedingly valuable, when established in Algeria, as the silk, though of a bad colour, a pale grey, winds off with ease, and is produced in very large quantities. Whereas the mean weight of a single cocoon of the common silk-worm is 290 millegrammes, and of an *Ailantus* worm 255, that of *Faidherbia* attains to no less than 633 millegrammes.\*

North America possesses numerous large Bombycid moths, more than one of which might probably be domesticated with profit.

The pretty pale green *Tropœa luna* chooses the sycamore and the oak for its food plants. *Callosamia promethea* supports itself on two species of the bay, *Saurus sassafras* and *benzoin*. *Callosamia cecropia* occurs on the wild plum (*Prunus pennsylvanica*).† The cocoon of the last-named insect is of a yellowish brown and larger than a pigeon's egg; the silk has been carded and converted into stockings. Another species of *Callosamia*, named *Angulifera*, is partial to the cherry, whilst *Telea polyphemus*, the larvæ of which feeds on the oak and elm, may some day prove of economic value. It has been reared on a large scale at Boston, by a Mr. Troubelet, who speaks highly of the quality of the silk produced by the "Polyphemus Worm." ‡

It will be observed that the foregoing moths belong without exception to the same subdivision of the order *Lepidoptera*—that of the *Bombycids*; in fact, the members of this group appear to enjoy a monopoly of the art of spinning a serviceable silk.

The only moths outside this subdivision, whose threads have been put under contribution—and that only on a limited scale—are the *Ermines*, as they are named, from the fact of their snowy wings being studded with velvety black spots. They constitute the genus *Hyponomeuta*, of the sub-order *Tineids*.

Though individually small these insects are capable of producing a large amount of silk, and (it may be added) of working an enormous amount of mischief; because the larvæ are gregarious in their habits; in other words, the caterpillars, on leaving the eggs, instead of separating and going each its own way, all keep together, and spin, in common, a large silken web, wherein they congregate, when not feeding.

In Great Britain, and in most of the temperate parts of Europe, they infest orchards, and in years when they are abundant, often commit sad havoc, not merely by devouring the leaves, but by enveloping the branches in a silken covering, thus excluding the air and spoiling the fruit. In the year 1841, they appeared in vast numbers in the heart of London; in many of the squares not a hawthorn tree was to be seen, whose branches were not enveloped in a web, giving the tree the appearance of being covered by a fine cloth. § A year or two previously the cider makers of Normandy—and this title includes nearly every family in that fertile province of France—were almost driven to despair by the ravages of one of these Ermine-moths, *Hyponomeuta cognatella*. It was hopeless to attempt to destroy them, and the unfortunate

\* Comptes Rendus, 1865.

‡ American Naturalist, 1870.

† Duncan. Nat. Library, xxxvii.

§ E. Lankester. Entomologist, 1841.

farmers could only gaze with folded arms on the tiny persecutors, as they hung suspended from their boughs in silken bags, many of which were more than three feet long and nearly as wide. Not unfrequently, too, the trunks themselves were enveloped in the thick silky tissue woven by these never-tiring grubs. That the British Ermine can work as heartily as his French relative is clear, from the fact, that webs of this species were exhibited at a meeting of the Entomological Society in February, 1871, which measured "over a yard long."

With such wonderful silk-producing power constantly in view, it is scarcely a matter of surprise, that persons have endeavoured to take advantage of the little animal's instinct, and turn it to some practical purpose. With this object, frames or models have been constructed, upon which the caterpillars were compelled to work. So long ago as 1815, a certain Lieutenant Hebenstreit, living in the vicinity of Munich, produced in this way a number of bags of remarkably fine tissue. And the French zoologist Auton Desmarest states that a material has been obtained by the labour of the common ermine (*Hyponomeuta padella*) so strong and light as to have been actually worn as a lady's neckerchief. However, the manufacture was more curious than useful, and the experiments have ceased to be carried on.

From time to time attempts have been made to supplement the produce of the silkworm by that of other insects. Some persons were sanguine enough to hope, that something might be done with the spider's web, more especially that of the common house spider of Europe (*Tegenaria domestica*). Stockings and gloves have in consequence been manufactured from the silken bags, within which the female spider encloses its ova. But the difficulty of collecting these egg-bags, and the still greater difficulty, or rather impossibility, of inducing the fierce little spinners to live together in harmony, soon put a stop to all efforts in that direction.

Attention has also been turned to the thread (technically termed *Byssus*), by which many of the *Mollusca*, or shellfish, moor themselves to the rocks. This is especially the habit of the family *Heteromya*, to which the mussels belong. Two of these (*Pinna squamosa* and *Pinna nobilis*), inhabiting the Mediterranean Sea, develop threads from 9 inches to a foot long, and from these threads purses, gloves, and such things have long been woven.

About the middle of the last century, "A pair of gloves of this silk was presented to the then Pope, Benedict XIV."\* A pair of gloves of the same material is also deposited in the Oxford Museum.

Until lately there was a regular manufactory at Naples, where the *Byssus* was worked up into articles of dress and ornament, which were presented on state occasions by the King of the two Sicilies to those whom His Majesty desired to honour. I believe, however, that the manufactory has come to an end since the expulsion of the Bourbons.

Indeed, in spite of all attempts in other directions, the silkworm interest has shown itself to be too strong to be materially

\* Gibbon Decline, etc., 4.

interfered with, and still is (and is likely long to remain) master of the situation.

Whether any of the silk producers, whose names I have brought before you, will ever be introduced with profit into this colony, is a question, which cannot at present be answered. There is certainly nothing in the geographical position of the island or in its climatic relations, to prevent the attempt from being made with prospect of success, when the proper time arrives. The North American, if not the Indian, moths are perfectly hardy, and would undoubtedly thrive in this dry and sunny climate. Indeed there is no reason why the true silkworm should not do well here. Dr. A. Wallace, no mean authority on the subject, has given his opinion that it might be cultivated with success in Great Britain.\* And if it would do well in the damp foggy climate of the old country, we may safely predicate that it would prosper in our more favoured zone.

Of course, at present skilled labour commands too high a price to hope for commercial success from sericulture. But the day may come, I have little doubt, when, if the popular energies are turned in that direction, Tasmanian silk or Tasmanian Tusseh cloths will be able to compete with the fabrics of Japan and China.

\* Entom. Annual, 1871.

## PRESENT STAGE OF THE SALMON EXPERIMENT.

By MORTON ALLPORT, F.L.S., F.Z.S., &amp;c.

[*Read November 12th, 1877.*]

Though grilse weighing from 3lbs. to 7lbs. have during the last four years been taken in the Derwent, how is it that no mature salmon, that is, fish weighing from 15lbs. to 30lbs., have been captured? This is a question frequently asked both here and in the neighbouring colonies, but it will be necessary before attempting to answer it to refer to what is known of the early life history of the salmon in Europe and Tasmania.

It has been calculated by able British authorities that in specially good salmon rivers, such as the Tay in Scotland, not more than one egg in every 1,500 deposited ever becomes a salmon, the diminution in number taking place chiefly during the earlier stages of life, and especially during the journey of the smolt to the sea, and the first few weeks of their residence there, though even the grilse appear liable to have their numbers considerably decreased by the attacks of marine enemies before their return as veritable salmon.

The limited number of mature salmon we can yet have in the Derwent might therefore alone account for their non-capture, but we must add to that disadvantage the want of adequate appliances to ensnare large sized fish. The chance of taking one with the rod is infinitesimal while the fish are scarce, the fishermen scarcer, food very abundant, and the difficulties with which the angler in the Upper Derwent has to contend great. The one or two fine meshed seine nets worked down the river, though well adapted to scrape out smolts, are quite unfitted for the capture of salmon, as they are shot so as to leave a considerable space between the net and the shore, and take so long to haul that the wary old salmon would, before the ends of the net reached the land, pass round one or the other, and so escape.

The majority of the 18 or 20 grilse caught have been taken in an ordinary grab-all net, having a mesh of such a size that only the fish of from 3lbs. to 5lbs. weight can mesh themselves, and no larger salmon is at all likely to be taken by the same net, as in this method of fishing it is essential that the fish should be able to get the gill covers through the mesh or by backing it can at once free itself. If a grab-all net, having a mesh of two and a half inches from knot to knot, was used, the chance of catching a mature salmon would be largely increased, provided only such mature salmon are there to be caught, which has yet to be proved.

We know that in our own waters the capture of sea-going

salmonoids was at first, that is in the year 1869, confined to a few smolts only, and these were taken in the small meshed seines after strong freshes had come down the Derwent in the end of October and the beginning of November. In subsequent years, and always in the same months, many of these fish came to the hands of the Salmon Commissioners till the river was very properly closed to the seine nets above Hobart Town, and many more of the same fish were doubtless taken of which the Commissioners knew nothing. The capture of these smolts was in several seasons followed by the taking in December, January and February of salmonoids intermediate in size between smolts and grilse, that is, weighing from three-quarters of a pound to one pound and a half, and it was one of these fish taken in December, 1869, of which Dr. Gunther wrote that it presented all the characteristics usually found in the true salmon (*Salmo salar*).

Time passed on and one grilse was taken in December 1873, followed by two or three others in subsequent years, and in the beginning of January, 1876, between two or three hundred of the salmonoids, intermediate between smolts and grilse, were taken at a few hauls of the seine nets on the open sea beaches some distance below Hobart Town, since which the river has been wisely closed still lower down.

Eight of the last-mentioned fish taken at random were carefully examined and dissected, and of these eight six proved to be unmistakably true salmon (*Salmo salar*) while the remaining two exhibited characteristics common to both the true salmon and the salmon trout (*Salmo trutta*), so that their species could not be positively determined. We next come to the comparatively frequent capture of grilse this season in one place, and by one small net, ill-suited for the purpose. And, so far, therefore the sequence of events has been marvellously regular, and exactly what was to be expected if all went well. Yet it is not absolutely certain that this regular sequence will be followed by the crowning triumph in the shape of the capture of a thirty-pound salmon, though the probabilities are greatly in favour of such a capture being soon made, if proper means are used to effect it.

It is certain, from the life history of our salmonoids, as already detailed, that the smolts descending the Derwent find ample food and sufficiently salt water in the estuary immediately below Hobart Town to carry them on to the stage referred to as intermediate between smolts and grilse, after which stage we altogether lose sight of these fish for a time, during which they probably go with the floods of autumn and farther out on to the open coast, for when we next see them it is as grilse in early spring (Autumn and September), and they then appear to be working their way up the Derwent estuary, and

following the myraids of indigenous small fry, which are then constantly hatching out. As the female of these grilse taken in early autumn invariably exhibit the ova considerably more matured than when taken in the spring there can be no doubt that they are finding their way to the freshwater spawning beds, and would reach them in the early floods of winter, though amongst the wealth of suitable streams running through scores of miles of uninhabited, mountainous, and inhospitable country we have never yet (except, perhaps, in one instance) been able to ascertain the exact locality of such spawning beds.

It is quite possible that the grilse after spawning, and on its return with the last of the winter floods to salt water, requires some greater change and a longer journey seawards than when it was passing from the smolt to the grilse stage. And if so, it may have to encounter more formidable marine enemies than on its first journey, or some unfavourable physical features of our coast of which we, as yet, know nothing. Unfortunately, the most scientific Ichthyologists and the most practical fishermen are still equally ignorant of the precise habits of the mature salmon when at sea and experience can alone prove whether the final stage is to be successfully reached, and if so, when?

During the last few years, and since the commencement of the salmon experiment, large numbers of specimens of our coast fish have been forwarded to and examined by Dr. Albert Gunther, of the British Museum, whose determination of the species proves that many of our fish are not merely representatives but identical with British forms, such for instance as the John Dory (*Zeus fäber*), the horse-mackerel (*Trachurus trachurus*), the dog-fish (*Acanthias vulgaris*), the sprat (*Clupea sprattus*), and the Conger (*Conger vulgaris*). And this fact goes far to show that there can be no vast difference between the physical features of the Tasmanian and British coasts.

If, therefore, there is any truth in the doctrine of natural selection and survival of the fittest, we may rest assured that as the grilse are rapidly increasing in number, some few out of the thousands sent time after time to sea will be able to adapt themselves to their altered circumstances, escape their foes, and find their way back as salmon. After the second migration is accomplished, the increased speed and cunning of the fish will materially improve its chance of successfully overcoming the dangers of all subsequent journeys.

For each of the grilse which have been taken in one minute spot of the wide estuary of the Derwent, by a net ill-suited for the purpose, there must be hundreds, and more probably thousands, passing of which we hear and see nothing; and if this is true of the grilse after the manifold risks to which

they have been exposed on our coasts, what must be the number of smolts that have passed down the Derwent, and what the still greater number of fry in the earlier parr stage on the gravelly rapids of some tributary or tributaries of the Upper Derwent? Can we set such numbers down at less than hundreds of thousands? And yet marvellous to relate, not one single parr has yet been seen (so far as the Salmon Commissioners are aware) in the fresh waters of the Derwent, or any of its tributaries. And this is the more amazing, because these fish take the worm or artificial fly with the greatest readiness, and would have been almost certain to make their presence known to any angler in their immediate neighbourhood.

A writer in Queensland, a few months ago, also referred to this extraordinary absence of the parrs, and used it as a powerful argument against there being any salmon in Tasmania—but he went rather too far, and used the same argument to prove that the migratory salmonoids, which he admitted were taken in the lower Derwent, were only salmon trout, ignoring the fact that the parrs of the salmon trout (identical in appearance and habits with those of the salmon) were equally remarkable for their apparent absence.

If amongst the dozens of suitable tributaries of the Upper Derwent, we are unable to find a trace of these hundreds of thousands of salmon parrs, which it is impossible to doubt must be there, we need scarcely be surprised at our inability to light upon the mere handful of mature salmon, which we are yet likely to have in the wide waters of the deep Derwent estuary. Some day an errant fisherman on one of the small streams about or beyond the lakes, such as the Clarence, the Pine, the Nive, or the Cuvier, where nobody ever thinks of fishing now, will probably drop on such myriads of these parrs as will enlighten us as to the supply of grilse below,—and the knowledge so gained may lead to the obtaining fresh supplies of ova for the stocking of our Northern and Western rivers, because the parrs never move far from the original spawning place before assuming the smolt dress; and their detection would enable us in the following winter to watch for and take the parent fish on their certain return to the same spawning beds.

Before concluding it may be as well to refer to the one instance in which it is just possible we have hit upon the spawning bed of a true salmon. In the early part of the past winter a pair of large fish were observed spawning in the Plenty, and were netted by the Bailiff in charge at the Ponds after the bulk of the ova were deposited.

The female after having parted with the greater part of her ova weighed more than twenty pounds, and the male weighed nearly nineteen pounds. Mr. Read, one of the Salmon Com-

missioners, examined these fish carefully, and both he and the Bailiff are of opinion from the external appearance of the fish that they were true salmon, or at any rate belonged to one of the two migratory species.

After stripping the remaining ova (almost one thousand in number) from the female, and applying the artificial process of impregnation, both fish were returned to the river.

Subsequently a few of the naturally deposited ova were with judicious forethought taken from the rid, placed in one of our hatching boxes mentioned, and then kept carefully separated from other ova. The artificially impregnated ova failed, but that so prudently taken from the rid has hatched out; and an examination of both the eggs and the newly hatched fry has very materially strengthened the impression in my mind that these fish were salmon, for the eggs were not only larger than any we have yet taken in the colony, but had exactly the pink tinge which characterised the salmon eggs received from England. The umbilical sac attached to the newly hatched fry is longer in proportion to the width than that of the trout, and this was a marked peculiarity in the fry hatched from the imported salmon eggs. It is quite true that there is considerable diversity both in the size and colour of the eggs of the brown trout (*Salmo fario*), but the size of the eggs in that species by no means depends upon the size of the fish, as large eggs are often found in small fish; and no cause can yet be assigned for this diversity in size, but the difference in colour clearly depends on the quality of the fish—the red-fleshed fish invariably producing red eggs, and the white-fleshed fish the pale straw-coloured eggs. As an actual fact, none of the originally imported salmon trout or trout eggs approached in size either these eggs taken from the rid in the Plenty or the imported salmon eggs; and very great interest will therefore attach to the subsequent stages of the fry now hatched, because if they are true emigrants that fact must be made manifest when the deciduous, silvery scales which first hide the parr marks are put on, and the young fish assume the smolt stage, though it may even then (as long since pointed out) be difficult, if not impossible, to determine accurately to which of the two migratory species the smolts may belong.

A few days after the foregoing was written—namely, on the 15th day of October last—a strong fresh came down the Plenty, during which a school of about a dozen salmonoids found their way into the water-course which supplies the ponds, being evidently bound seawards. Mr. Read was so much struck with the difference between these fish and trout fry of the same size, that he preserved two of them in spirits,

and forwarded them to me for examination. Externally both fish presented the characteristics of true salmon, and upon dissection the number of pyloric appendages was found to be 62 in one and 65 in the other, numbers which prove these specimens to have been salmon and not salmon-trout. This capture, therefore, lends additional force to the presumption that the twenty-pound fish taken in the Plenty was a salmon.

CONTRIBUTIONS TO THE PHYTOGRAPHY OF  
TASMANIA.By BARON FERD. VON MUELLER, C.M.G., M.D.,  
F.R.S., &c. &c.

(November, 1877).

A few years ago I had the honour of submitting to the Royal Society of Tasmania a census of the flowering plants and ferns, then known, from the main island and its dependencies. The issue of this index in the Society's volume of 1874 has rendered it accessible to collectors of Tasmanian plants; and as some there have arranged their botanic specimens according to the census list, I may feel justified in adding now a few more plants to the previous enumeration, and may also be allowed to effect a few changes in the names and arrangement first adopted, furnishing simultaneously a few other notes supplemental to my former communications.

*Claytonia calyptata*.—Swanport, Dr. Story.

*Drosera spatulata*.—Southport, C. A.; Arthur's Riv., F.v.M.

*Polycnemum pentandrum*.—

The *Hemichroa pentandra* with its congeners can be placed in *Polycnemum* (L. gen. edit. sec. 21) as indicated first by Moquin.

*Cenarrhenes nitida*.—Mount Bishop, Bell.

*Bellis graminea*.—

It was suggested long ago in the frag. phytogr. Austr., that all the *Brachycomes* ought to be rendered again to *Bellis*.

*Helichrysum Gravesii*.—

The Rev. W. W. Spicer has recently ascertained that this *Helichrysum* has its native localities in Kent's group. From the zealous investigation of Tasmanian plants by the reverend gentleman, many additions to the localities, recorded for various species may be expected.

*Helichrysum lucidum*.—

This includes, as an Alpine variety *H. Milligani*.

*Plantago varia*.—

This and its ordinal plants find best their place near *Primulaceæ* and particularly *Loganiaceæ* as shown by the writer in Trimen's Journal for 1877. In the same periodical he has given some of the reasons for the transfer of the *Plumbagineæ* to the vicinity of *Frankeniaceæ* and *Caryophylleæ* in the class of *Amylifiræ*. It may here be added incidentally that the discoveries of late years render the ordinal separation of *Araliaceæ* from *Umbelliferæ* not longer possible.

*Nageia alpina*.—F.v.M., *Introduct. to Bot. Teachings*, p. 38.  
Gaertner's name *Nageia* should be restored for *Podocarpus*, as pointed out in my *Papuan plants*, p. 93.

*Milligania stylosa*.—F.v.M. in *Benth. flor. Austr.* VII. 27.

The venerable Bentham has adopted the suggestion made in the *Society's* issue of 1876, p. 11, that *Astelia stylosa* should be drawn to *Milligania*.

*Milligania Johnstoni*.—F.v.M. l. c.

The dwarf hyacinth-scented asteli-aceous plant has been raised to specific position.

*Bartlingia sessiliflora*.—

Mr. Bentham has proved from inspection of authentic specimens that the real *Laxmannia minor*, so very briefly defined by R. Brown, is a species peculiar to West Australia, and that the Tasmanian plant is identical with *L. sessiliflora* (Decaisne herb, Timor, *descript.*, 35 t. 16.)

*Wurmbsea dioica*.—

*Anguillaria australis*, our lovely little harbinger of the spring, is transferable to the genus *Wurmbsea*, established by Thunberg as early as 1781, which was mentioned already in the *fragm. phytogr. Austr.* VII. 76. As the distinction is of frequent though not universal occurrence in this species, and is exceptional among allied plants, it may be preferable to return to that specific appellations by which the plant is best known.

*Arthropodium minus*.—

Bentham recognises this as a species. It needs still further enquiry to point out reliable differences between this and *A. paniculatum*. On those meadows where *A. minus* grows, usually also *Brachycome graminea* becomes dwarfed.

*Chlorophytum alpinum*.—

J. G. Baker (*Journal of the Linn. Soc.* XV. 329) has removed *Caesia alpina* to *Chlorophytum* of Ker, thus adding a new genus to the Tasmanian flora.

*Triglochin centrocarpa*.—Hook. *icon. pl.* 728.

To this *T. nana* is reduced by Bentham as a variety; but the normal form does not occur in Tasmania.

*Typha angustifolia*.—L. *sp. pl.* 971.

Bentham (*flor. Austr.* VII. 159) is not inclined to admit the validity of the two Tasmanian species, advanced by the late Dr. Rohrbach.

*Juncus pauciflorus*.—R. Br. *prodc.* 259.

As well as *T. pallidus*, R. Br. l. c. and *J. capillaceus*, J. Hook. *fl. Tasm.* II. 65, are passed as species by Bentham (*fl. Austral.* VII. 129, 130, 132). The special study of these plants is recommendable to local observers.

*Lepyrodia Muelleri*.—Benth. fl. Austral. VII. 216.

It is ascertained now, that R. Brown's *Lepyrodia stricta* is exclusively West Australian, as the inspection of the original specimens has confirmed.

*Calorophus fastigiatus*.—

Bentham (l. c. 237-240) proposes the union of the genera *Hypolaena* and *Calostrophus*, giving preference to the name of the former. In justice, however, to Labillardiere, who even illustrated *Calostrophus* with a good figure four years before the publication of *Hypolaena*, the name given by him should embrace the united genera, the Greek *Calostrophus* being also significant towards *Restio*.

*Centrolepis strigosa*.—R. and S. syst., I. 43.

Includes *Desvauxia tenuior* of R. Brown, and seems distinct from *C. fascicularis*.

*Centrolepis monogyna*.—Benth. flor. Austral., VII. 205.

This, the *Alepyrum monogynum*, J. Hook, fl. Tasm. II. 77, t. 138, is also admitted as a species by Bentham.

*Heleocharis acuta*.—R. Br., pr. 224.

Bentham refers to this as distinct from *H. palustris*, not admitting the latter as Tasmanian or even Australian. Baeckehr (in *Linnaea*, XXXVI. 460) records distinctly also as Australian, indeed almost as cosmopolitan, the *H. palustris*.

*Isolepis crassiuscula*.—J. Hook, fl. Tasm. II. 86, t. 143; *Scirpus crassiusculus*, J. Hook, in Benth. flor. Austral. VII. 326.

All workers on Cyperaceae concur that the genus *Isolepis* is as artificially separated from *Scirpus* as *Chaetospora* from *Schenus*, and I gave expression to the same effect in the *Fragm. phytogr. Austr.* IX. 38. It remains therefore quite optional whether *Isolepis* and *Chaetospora* should be adopted as full genera or merely as subgenera, although on the presence or absence of hypogynous bristles, as a rule, is laid much stress in defining the numerous other cyperaceous genera; as a sequence it almost becomes imperative to attach within the same natural order on equal importance to the generic value of an organ such as the hypogynous setae. There seems thus no reason to change the nomenclature adopted for the Tasmanian census.

*Cladium trifidum*.—*Gahnia trifida*, Labill. Non. Hall. plant, specimen. I. 89, t. 116.

This plant proves that the disjunction of *Gahnia* from *Cladium* is not advantageous, for so similar is this species to *C. filum*, that most observers failed to recognise any specific (much less generic) differences between them. Both species stand on record from the Derwent and

Swanport. *Cladium melanocarpum*, accepted on the authority of R. Brown's *Prodromus* as a Tasmanian plant, seems not to occur in the island.

*Cladium tetraquetrum*.—J. Hook, fl. Tasm., II. 95, t. 149.

To this is referable *Lepidosperma tetragonum*.

*Lepidosperma concavum*.—R. Br., pr. 234.

This described with extreme briefness by Rob. Brown, includes *L. Sieberi*.

*Lepidosperma laterale*.—R. Br., pr. 234, and *L. Oldfieldii*, J. Hook, fl. Tasm. II. 91. t. 146 A, are both admitted by Bentham (fl. Austral. VII. 389 et 393) unless the former should prove referable to *L. globosum* (Labill. I. 16 t. 14).

*Carex acicularis*.—Booth, in J. Hook, flor. Nov. Zealand, I. 280, t. 63,

Bentham regards this distinct from *C. Pyrenaica* of the Northern Hemisphere.

*Carex paniculata*.—L. sp. pl. edit., sec. 1383.

As shown already in my vegetation of the Chatham Islands, p. 57 (1864) *C. appressa* is merely a form of the European *C. paniculata*.

*Carex flava*.—L. sp. pl. 975.

Includes *C. cataractæ* of R. Brown, the great similarity of both being also noticed in the fragm. (viii. 251.)

*Carex Bichenoviana*.—Booth, in J. Hook, fl. Tasm., II. 101.

Acknowledged by Bentham (fl. Austr. VII. 446) as a peculiar Tasmanian species only as yet known from Woolnorth.

*Ehrharta juncea*, Spreng. syst. II, 114

An older appellation for *E. tenacissima* of Heudel. It may here be observed that the true *Stipa micrantha* from South East Australia appears not to extend to Tasmania.

*Agrostis scabra*, Willd. spec plant I. 370

This name was given already in 1797, as shown by General Munro (in Benth. fl. Austral. VII. 576) to an American grass, now found to be identical with R. Brown's *A. parviflora*.

*Hierochloe Fraseri*, J. Hook, flor. antarctic I. 93.

According to Bentham's views this is the Tasmanian species recorded as *H. alpina*, and probably distinct from that of the northern hemisphere.

*Hemarthria compressa*, R. Br. pr. 207.

The *H. uncinata* proves, as long suggested by the writer, a mere variety.

*Conferva bombycina*, Ag. syst. alg. 83.

In water reservoirs near Hobart Town. Rev. W. Spicer.  
A large variety, allied to *C. Sandvicensis* of Gaudichaud.

## ADDITIONAL NOTES.

*Agrostis frigida*, F.v.M., first general report, 1853, p. 20.

New Norfolk, Gunn, (according to Benth. flor. Austr. VII. 583.

*Agrostis Gunniana*

*Deyeuxia Gunniana*, Benth. l. c. 584. Sent by Mr. Gunn along with *A. scabra*

*Distichlis maritima*, Rafinesque in Journ. de Physique, LXXXIX. 104.

It escaped notice until it was pointed by Mr. Bentham that the *Festuca distichophylla* of Sir Jas. Hooker (and seemingly also of Michaux and Pursch) constitutes a separate genus, established already in 1819, and remarkable for unisexual spikelets on distinct plants (as mentioned before by Asa Gray) and further singular for the spongy testa noticed previously by Kunth. Thus the Tasmanian grass is identical with an American seashore species of great frequency.

*Poa Billardieri*, Hendel glumac, I. 262.

Restricted to the coast. Regarded by Bentham as distinct from *P. caespitosa* on account of the inner upper bract adnate to the seed. The celebrated phytographer above mentioned, acknowledges several other glumaceae as specifically distinct, which to me appear mere varieties of species, already enumerated in the census.

[NOTE.—While the foregoing paper was passing through the press the following note was received from the Author:—]

Among several Tasmanian phanerogamic plants, of which their generic position remained uncertain, is *Pultenaea diffusa* of Sir Joseph Hooker; that leading phytographer gave the first record of this rare plant in his celebrated *Flora Tasmania* I, 91, and Mr. Fitch added t. 14, an excellent lithographic illustration. As, however, the fruit remained unknown, the place of this plant in the genus *Pultenaea* continued doubtful. To myself the plant appeared exceptional as a *Pultenaea*, its stipules being mostly suppressed, while the bractiole are almost foliaceous and thus do not share in the scariosus consistence of those typical for *Pultenaea*. These reasons induced me to assign to this plant a place in the genus *Phyllota*, one not otherwise represented in the Tasmanian flora. Thus the plant appeared as *Phyllota diffusa* fully 20 years ago in my *Fragmenta Phytographiæ Australiæ* I, p. 8. Mr. Bentham, the most experienced of all writers on leguminous plants since the last forty years, when issuing under my co-operation the second volume of the *Flora*

Australiensis in 1864, preferred to follow Sir Joseph Hooker's indications of the generic position of the plant, vol. ii., p. 119. Having directed the attention of my kind Tasmanian correspondents to the desirability, to set this question at rest by a search for the fruit, I was glad to receive from Mr. Simson, quite recently, well-matured fruit specimens. These have the pods about 2 lines long, ovate; its valves inside finely downy; the seeds, of which only one matured in each pod, are about one line long, oval, greenish-brown, with black spots and devoid of any strophiole. This last mentioned note is decisive for *Phyllota* and excludes our plant from the genus *Pultenaea*. Unless, therefore, *Phyllota* is given altogether up as a genus, it must include now finally; *Pultenaea diffusa*, although certainly the great value of the presence or absence of a strophiole for generic discrimination in *Podalyriaceae* loses its importance exceptionally in *Oxylobium*; but *Phyllota* is irrespectively reported by the structure of its bractioles and to some extent by the want of stipules, which latter characteristic however, is not absolute.

There is another *Pultenaea*, the West Australian *P. urodon* of Bentham, which needs removal to the genus *Phyllota*. I find the pod about 2 lines long, roundish or rhomboid, ovate, inside glabrous, outside as well as the lower portion of the style soft-hairy. The seeds are dark brown, but seen by me only in a half-ripe state, then very much incurved, and exhibiting no trace of a strophiole.

Turozaninow in defining originally the genus *Urodon* (subsequently reduced by Bentham to *Pultenaea*.) alluded only to *Phyllota* as allied and not to any other genus.

## ON SOME NEW TASMANIAN MARINE SHELLS.

BY REV. J. E. TENISON-WOODS, F.G.S., etc. Corresponding Member Royal Society, Tasmania; of Victoria; of Linn. Society, N.S.W. Hon. Member Royal Society, N.S.W., etc.

[Read 12th November, 1877.]

The following shells were placed in my hands for description by Mr. W. Legrand, the eminent conchologist of Hobart. They were obtained by the careful researches of Mr. W. F. Petterd, from dredging operations principally in Blackman's Bay. They are (with the exception of a *Turbo* from King's Island) all small, but of much interest, including a beautiful new species of *Crossea*. Their general facies is in keeping with the conchology of Tasmania as hitherto known.

TURBO ( ) CUCULLATA. *T. turbinato consolidata, opaca, sordide albida badia vel atra plus minusve maculata vel ustulata; anfr. 4½, rugosis, vix convexis crebre spiraliter liratis, magis et minoribus alternantibus, tota testa conspicue creberrime oblique squamato-striata; liris majoribus in ult. anfr. fere. 12, distanter granosis vel squamis elevatis cucullatis insignitis, sutura impressa, tenuiter canaliculata apertura orbiculari, integra conspicue marginata, infra. marginem, margaritacea argentea, columella et margine porcellana; basi convexa, lirata. Long. 24, lat. 18 mil. Habit. King's Island, Bass Straits. W. Legrand.*

A small turbo with large irregular scorched patches on a dirty white ground. It is spirally closely keeled, with small round alternating keels, on the larger of which there are small tubercles or small raised hooded scales. The whole shell is obliquely closely imbricately striate. The mouth is round without any tubercle, and has an outside margin within which there is a very clearly defined line of silvery nacre which lines the throat. It is very rare, and has more relations with the New Zealand or tropical forms than any Tasmanian congener.

LIOTIA ANNULATA. *Testa minuta, discoidea, superne planata et depressa, alba, opaca, anfr. 3, circularibus, regulariter subdistanter lamellose annulatis, interstitiis levibus; apertura integra, orbiculari, antice producta varicifera; umbilico omnino aperto. Maj. diam. 1½ mil. Hab. Blackman's Bay. W. F. Petterd.*

Shell minute, discoid, flattened and depressed above, white, opaque; whorls 3, circular, regularly and somewhat distantly ringed with lamellæ, interstices smooth, aperture entire, orbicular, anteriorly produced, and bearing a varix round the mouth like one of the rings of the spire, umbilicus entirely open.

I have been long acquainted with this minute shell, but hesitated to describe it until I could find perfect specimens with a true *Liotia* mouth. I think that even now its generic

position is doubtful, for the aperture has hardly that thickening which we observe generally in the genus. Its appearance is not unlike some species of *Ammonites*.

*CROSSEA CANCELLATA*. n.s. *T. minuta, alba, nitente, turbinata*; anfr. 3, carinis parvis crebris et striis obliquis tenuissimis pulcherrime cancellata, apice laevi, pelucido, apertura circulari, antice et postice conspicue canaliculata, labio simplice, basi duobus sulcis unolato altero angusto et in medio eorum costu spirali prope columellam insignita.

A minute white shining turbinated shell of three whorls which are beautifully cancellated by close spiral ribs and distinct oblique striæ. The apex is smooth. The aperture is circular and channelled above and below. Behind the inner lip there is a narrow groove forming a false umbilicus, then a rounded spiral rib, and then a broad regularly striate groove on the base. Diam. scarcely  $1\frac{1}{2}$  mil. Blackman's Bay. W. F. Petterd.

This minute and very beautiful species adds a fifth to the genus whose synopsis is as follows:—

Shell, varicose. *C. miranda*. Japan.

—, outer lip, thin. *bellulus*. Japan.

—, small, whorls shining and punctate. *concinna*.  
Port Jackson.

—, somewhat smaller, outer lip fimbriate. *labiata*.  
Long Bay, Tasmania.

—, minute, shell cancellate. *cancellata*. Blackman's  
Bay, Tasmania.

*MARGINELLA CYPREOIDES*. *T. parva, ovata, cypræformi, alba, opaca levi, spira omnino occulta, labro nivea marginato incrassato, postice producto; apertura regulariter arcuata, angusta, columella nivea encausta, ad basim crebre 4 plicata*. Long. 6, lat. 4 mil. Blackman's Bay. W. F. Petterd.

Tasmania is already rich in this genus, but this species differs from all in being quite smooth and having the spire quite hidden by the produced and thickened outer lip. From above it appears like a *Cyprea*. It comes nearest to *Marginella volutiformis*, but is much smaller and destitute of plaits.

*RISSOA ANGELI* (*mihi*) vide *Proc.* 1876. I find that this shell varies considerably. Sometimes the ribs are very prominent and variciform, and sometimes they are fine and close and scarcely pass to the last whorl, the spiral line, which are beautifully delicate, the rounded aperture and umbilicus are constant features. Some authors would place the species in the genus *Cyclostrema*. It is very minute. Blackman's Bay. W. F. Petterd.

*RISSOINA MINUTISSIMA*. *T. minuta, pyramidata, polita, luteo albida, apice livida, basi pallidissime lutea fasciata; anfr. 5 omnino levibus, et politis, tenue convexis; labro acuto, producto, labio reflexo; apertura late elliptica antice et postice canaliculata; apice obtuso*. Long.  $1\frac{1}{2}$ ; lat.  $\frac{3}{4}$  mil.

A minute *Rissoina* destitute of ornament of any kind and

highly polished. It is yellowish white, and the apical whorls are livid. Blackman's Bay, Tasmania. W. F. Petterd.

**RISSOINA UNILIRATA.** *T. minuta, pyramidata, alba nitente, opaca vel subpellucida, anfr. 5, in spira conspicue carinatis, ultimo anfr. generatim levi, aliquando unicarinato, semper autem ad labrum late inflatoque; apice obtuso, nucleo  $1\frac{1}{2}$  anfr.; apertura circulari, labro producto, labio reflexo, sutura profunda, unilirata et marginata.* Long.  $1\frac{1}{2}$ ;  $2\frac{1}{2}$  mil.; lat.  $\frac{1}{2}$ , circiter longitud. Blackman's Bay. W. F. Petterd.

A minute white shell with a conspicuous inflation on the outer lip, and a fine thread which forms a single or double keel on the upper whorls. The last whorl is generally, but not always destitute of these threads, or has only one. The suture has also a thread and is margined. One larger specimen has only one angle in the whorls, which is the result of the one thread-like line proceeding from the last whorl. The shell appears to be variable.

**BITTIUM MINIMUM.** *T. minuta, tumide-pyramidata, badia saturata; nitente; anfr. 7, planatis, regulariter crebre costatis, costis granosis et lineis tribus granorum spiraliter cinctis; costis ex serie granorum confectis; sutura acute impressa; apice decollato, apertura late elliptica, canali brevi obliquo, basi striata tantum, labro simplici, columella incrassata tortuoso.* Long. vix. 3 mil.; lat. 1. Blackman's Bay. W. F. Petterd.

This little shell is exactly like *Bittium granarium*, only that it is a full grown shell and is most minute. The upper whorls seem as if they were margined with a very dark brown line. It is very remarkable that *B. granarium* varies very much in size, and though I never saw any so small as the present species, still intermediate sizes may yet be found. The ordinary size of that shell is over an inch in length.



# METEOROLOGY FOR JANUARY 1877.

PRIVATE OBSERVATORY, HOBART TOWN.

Latitude 42° 25' 13" S.; Longitude 9h. 49m. 29.-2s. E.

(Registered for the Royal Society of Tasmania.)

| Day of Month. | Bar. corrected for instrumental error and to mean sea level. |           | Thermometers (Reading.) |                       | Thermometer (Self-Registering.) |                           | Relative Humidity.          |                            | Clouds.   |                 |            | Wind.                    |                | Rain in Inches. |                       |                                | Spon. Evap.           |                                | Ozone.    | Chron. 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. |           |
|               | Per cent                                                     |           |                         |                       |                                 |                           |                             |                            |           |                 |            |                          |                |                 |                       |                                |                       |                                |           |               |           |           |
| 1             | 29 710                                                       | 29 710    | 17.5                    | 53.5                  | 58.0                            | 102.0                     | 78.0                        | 40.5                       | 67        | 100             | KN         | 10 0 N                   | 10 0 N         |                 | .26                   | S                              | 2.60                  | .40                            |           |               | 4.0       |           |
| 2             | 29 910                                                       | 29 821    | 18.5                    | 51.0                  | 55.5                            | 79.5                      | 72.0                        | 37.0                       | 74        | 70              | KN         | 8 5 N                    | 9 0 W          |                 | .52                   | E                              | .26                   | .05                            |           |               | 6.0       |           |
| 3             | 29 932                                                       | 29 907    | 12.0                    | 54.0                  | 61.0                            | 85.5                      | 68.5                        | 40.0                       | 53        | 82              | KN         | 10 0 K                   | 10 0 W         |                 | .0                    | E                              | .26                   | .02                            |           |               | 8.5       |           |
| 4             | 29 838                                                       | 29 705    | 14.0                    | 58.0                  | 66.0                            | 98.5                      | 75.0                        | 42.5                       | 81        | 73              | K          | 6 0 K                    | 4 0 W          |                 | .26                   | W                              | 2.60                  |                                |           |               | 4.0       |           |
| 5             | 29 527                                                       | 29 438    | 11.0                    | 56.0                  | 76.0                            | 103.0                     | 77.5                        | 40.0                       | 81        | 52              | K          | 10 0 KS                  | 6 0 W          |                 | .0                    | W                              | 2.60                  | .03                            |           |               | 4.0       |           |
| 6             | 29 265                                                       | 29 271    | 17.5                    | 64.0                  | 64.0                            | 97.0                      | 76.0                        | 44.5                       | 59        | 67              | KS         | 9 0 KS                   | 7 0 W          |                 | 5.21                  | W                              | .26                   | .17                            |           |               | 3.5       |           |
| 7             | 29 740                                                       | 29 844    | 12.5                    | 55.0                  | 73.0                            | 110.5                     | 73.0                        | 40.0                       | 70        | 53              | K          | 9 0 K                    | 2 0 NW         |                 | .26                   | W                              | 2.60                  |                                |           |               | 4.0       |           |
| 8             | 29 729                                                       | 29 604    | 13.5                    | 57.0                  | 67.5                            | 99.5                      | 73.0                        | 42.0                       | 61        | 49              | KS         | 9 0 K                    | 6 0 N          |                 | 5.21                  | S                              | .52                   | .01                            |           |               | 5.0       |           |
| 9             | 29 832                                                       | 29 807    | 11.5                    | 53.0                  | 64.0                            | 84.5                      | 68.5                        | 38.5                       | 69        | 55              | K          | 5 0 K                    | 9 0 N          |                 | .52                   | W                              | .52                   |                                |           |               | 5.0       |           |
| 10            | 29 840                                                       | 29 548    | 10.5                    | 51.0                  | 65.0                            | 99.0                      | 72.0                        | 37.0                       | 74        | 72              | K          | 9 0 N                    | 10 0 NW        |                 | .0                    | W                              | 2.60                  | .12                            | 1.80      |               | 6.0       |           |
| 11            | 29 412                                                       | 29 454    | 13.5                    | 57.5                  | 65.0                            | 96.0                      | 72.0                        | 40.5                       | 61        | 51              | K          | 3.5 K                    | 4 0 W          |                 | 5.21                  | SW                             | 2.60                  | .02                            |           |               | 6.0       |           |
| 12            | 29 782                                                       | 29 905    | 11.5                    | 53.0                  | 62.5                            | 87.5                      | 69.0                        | 47.0                       | 69        | 55              | K          | 6 0 K                    | 7.5 W          |                 | .0                    | S                              | .0                    | .01                            |           |               | 3.0       |           |
| 13            | 29 964                                                       | 29 847    | 9.0                     | 48.5                  | 70.5                            | 95.0                      | 73.5                        | 39.5                       | 79        | 61              | 0          | -0 K                     | 4 0 W          |                 | .0                    | SE                             | .52                   |                                |           |               | 4.5       |           |
| 14            | 29 913                                                       | 29 972    | 16.0                    | 61.0                  | 67.0                            | 100.5                     | 77.0                        | 42.0                       | 58        | 64              | K          | 3 0 0                    | 0 S            |                 | .52                   | SE                             | .52                   |                                |           |               | 3.0       |           |
| 15            | 30 044                                                       | 29 841    | 11.5                    | 53.0                  | 73.0                            | 109.0                     | 76.0                        | 39.5                       | 57        | 61              | 0          | -0 KS                    | 3 0 N          |                 | .0                    | SE                             | 2.60                  |                                |           |               | 3.0       |           |
| 16            | 29 564                                                       | 29 485    | 16.5                    | 62.0                  | 68.5                            | 85.0                      | 83.0                        | 42.0                       | 72        | 73              | K          | 9 0 K                    | 10 0 W         |                 | 2.60                  | SE                             | .52                   |                                |           |               | 4.0       |           |
| 17            | 29 724                                                       | 29 704    | 15.0                    | 59.0                  | 63.0                            | 88.5                      | 74.0                        | 40.0                       | 58        | 63              | K          | 4 0 KN                   | 7 0 SW         |                 | .26                   | SE                             | .52                   |                                |           |               | 3.5       |           |
| 18            | 29 771                                                       | 29 665    | 13.0                    | 56.0                  | 72.5                            | 119.0                     | 83.5                        | 38.5                       | 75        | 61              | 0          | -0 K                     | 7.5 NW         |                 | .26                   | W                              | .26                   |                                |           |               | 2.5       |           |
| 19            | 29 874                                                       | 29 752    | 12.5                    | 55.0                  | 65.0                            | 96.5                      | 74.0                        | 40.0                       | 65        | 55              | K          | 4 0 K                    | 5 0 W          |                 | .26                   | W                              | 2.60                  |                                | 1.98      |               | 4.0       |           |
| 20            | 29 779                                                       | 29 618    | 12.0                    | 54.0                  | 63.0                            | 82.0                      | 69.0                        | 40.0                       | 65        | 63              | K          | 5.5 KN                   | 7.5 W          |                 | 2.60                  | W                              | .26                   |                                |           |               | 3.0       |           |
| 21            | 29 703                                                       | 29 702    | 12.0                    | 54.0                  | 69.0                            | 90.0                      | 69.0                        | 40.0                       | 65        | 52              | K          | 7.5 K                    | 7 0 N          |                 | .52                   | SW                             | .26                   |                                |           |               | 3.0       |           |
| 22            | 29 625                                                       | 29 750    | 14.0                    | 57.5                  | 60.0                            | 85.5                      | 70.0                        | 42.5                       | 66        | 71              | K          | 10 0 KN                  | 8 0 W          |                 | .0                    | NW                             | 2.60                  | .13                            |           |               | 3.5       |           |
| 23            | 29 876                                                       | 29 864    | 14.0                    | 57.5                  | 70.0                            | 83.0                      | 71.5                        | 42.0                       | 71        | 56              | K          | 5 0 KS                   | 7 0 W          |                 | 2.60                  | SW                             | .52                   |                                |           |               | 5.0       |           |
| 24            | 29 876                                                       | 29 786    | 14.0                    | 58.0                  | 69.0                            | 90.0                      | 73.0                        | 41.5                       | 61        | 56              | K          | 10 0 KS                  | 10 0 N         |                 | 2.60                  | W                              | 2.60                  |                                |           |               | 3.0       |           |
| 25            | 29 794                                                       | 29 690    | 13.0                    | 56.0                  | 66.5                            | 107.0                     | 72.0                        | 39.5                       | 57        | 52              | K          | 6 0 K                    | 7.5 N          |                 | .52                   | W                              | 2.60                  |                                |           |               | 3.0       |           |
| 26            | 29 585                                                       | 29 672    | 12.0                    | 54.0                  | 58.0                            | 88.5                      | 63.0                        | 38.0                       | 59        | 57              | K          | 3 0 K                    | 4 0 SW         |                 | 5.21                  | SW                             | 2.60                  |                                |           |               | 4.0       |           |
| 27            | 29 945                                                       | 30 058    | 10.0                    | 59.0                  | 59.0                            | 99.0                      | 63.0                        | 34.0                       | 68        | 61              | K          | 7 0 KN                   | 8 0 W          |                 | .52                   | SE                             | .52                   | .06                            |           |               | 6.5       |           |
| 28            | 30 065                                                       | 30 033    | 10.5                    | 51.0                  | 67.0                            | 97.5                      | 73.0                        | 40.0                       | 69        | 60              | K          | 3 0 KS                   | 1 0 N          |                 | .52                   | SE                             | 2.60                  | .03                            |           |               | 4.0       |           |
| 29            | 29 834                                                       | 29 644    | 11.5                    | 52.5                  | 67.5                            | 98.5                      | 83.0                        | 41.5                       | 75        | 52              | 0          | -0 K                     | 3.5 W          |                 | .26                   | N                              | .26                   |                                |           |               | 3.5       |           |
| 30            | 29 672                                                       | 29 736    | 16.0                    | 61.0                  | 72.0                            | 97.5                      | 80.5                        | 46.0                       | 58        | 50              | K          | 3.5 K                    | 7 0 N          |                 | 2.60                  | S                              | .52                   |                                |           |               | 5.5       |           |
| 31            | 29 718                                                       | 29 533    | 16.5                    | 62.0                  | 77.0                            | 107.0                     | 80.0                        | 46.5                       | 62        | 40              | K          | 7 0 K                    | 5.5 N          |                 | .52                   | NW                             | 2.60                  |                                |           | 2.22          |           |           |
| Mean          |                                                              | Mean      |                         | Mean                  |                                 | Mean                      |                             | Mean                       |           | Mean for Month. |            |                          | Mean Force ... |                 | 1.33 lbs.             |                                |                       | Tl.                            | Tl.       | Tl.           |           |           |
| 29 747        |                                                              | 13 37     |                         | 61 03                 |                                 | 91 83                     |                             | 73 82                      |           | 41 00           |            | 64                       |                | 6 9             |                       |                                | Greatest Force 5.21 " |                                |           | 1 05          | 6 00      | 120 00    |
| Greatest do.  |                                                              | Max.      |                         | ...                   |                                 | Max.                      |                             | Max.                       |           | ...             |            | Prevailing Character, K. |                |                 | Least Force....       |                                | 0 "                   |                                |           | ..            | ..        | Mean 4 16 |
| Least do.     |                                                              | Min.      |                         | ...                   |                                 | Min.                      |                             | Min.                       |           | ...             |            | ...                      |                |                 | Prevailing Direction. |                                | W. and S.W.           |                                |           | ..            | ..        | ..        |

The Meteorology 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, 1877.

- 12th. *Veronica angustifolia* in flower.
- 12th. First ripe Apricot gathered (Royal).
- 13th. *Grevillea robusta* in full flower.
- 15th. Jargonell Pear ripe.
- 20th. Black Mulberry commencing to ripen.

F. ABBOTT, JUN., Superintendent.



# METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH JAN., 1877, 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 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. |        |    |                   |                        |
|               |                                                            |             |      |                |                                |                    |         |            | °      | °  |                   |                        |
| 1             | 29·730                                                     | 68·0        | 20·0 | 82             | N                              | ·0                 | 4·0     | K          | ·0     | In | ·0                | Moonlight              |
| 2             | 29·910                                                     | 63·0        | 17·0 | 94             | SE                             | 2·60               | 10·0    | N          | ·40    |    |                   | Cloudy                 |
| 3             | 29·830                                                     | 67·0        | 19·0 | 100            | —                              | ·0                 | 10·0    | N          | ·05    |    |                   | Dark and raining       |
| 4             | 29·540                                                     | 71·0        | 21·5 | 88             | S                              | ·26                | 7·5     | K          | ·02    |    |                   | Stars faint            |
| 5             | 29·330                                                     | 70·0        | 21·0 | 94             | —                              | ·0                 | 10·0    | N          | 0      |    |                   | Cloudy sky covered     |
| 6             | 29·325                                                     | 66·0        | 19·0 | 94             | W                              | 2·60               | 4·0     | K          | ·03    |    |                   | Wind abated            |
| 7             | 29·800                                                     | 66·5        | 19·0 | 94             | S                              | ·0                 | ·0      | ·0         | ·17    |    |                   | Starlight, brilliant   |
| 8             | 29·740                                                     | 67·5        | 19·5 | 94             | NW                             | ·52                | 4·0     | K          | ·0     |    |                   | Clouds and stars       |
| 9             | 29·800                                                     | 65·0        | 18·5 | 94             | S                              | ·0                 | ·0      | ·0         | ·0     |    |                   | Starlight, sky covered |
| 10            | 29·310                                                     | 69·0        | 20·5 | 100            | W                              | 2·60               | 10·0    | N          | ·0     |    |                   | Dark and raining       |
| 11            | 29·510                                                     | 67·0        | 19·5 | 94             | W                              | ·52                | 4·0     | K          | ·12    |    |                   | Starlight              |
| 12            | 29·930                                                     | 65·0        | 18·0 | 94             | S                              | ·0                 | ·0      | ·0         | ·03    |    |                   | Not a cloud            |
| 13            | 29·740                                                     | 70·0        | 21·0 | 94             | S                              | ·26                | ·0      | ·0         | ·01    |    |                   | Starlight, brilliant   |
| 14            | 30·026                                                     | 69·0        | 20·5 | 94             | S                              | ·0                 | ·0      | ·0         | ·0     |    |                   | Ditto ditto            |
| 15            | 29·700                                                     | 72·0        | 22·0 | 100            | S                              | ·0                 | ·0      | ·0         | ·0     |    |                   | Calm, 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.



Results of observations taken at New Norfolk for January, 1877, in accordance with new forms, at 7.30 a.m., and 4.30 p.m. :—

Barometer, mean of two daily registers, corrected and reduced, 29.798 inches.

Thermometer, mean of ditto, 60.87 deg.

Ditto, mean of maximum and minimum in shade, 60.04 deg.; highest, 87 deg., on 29th.

Dew point, mean of two ditto, 48.60 deg.

Elastic force of vapour, mean of two ditto, .346.

Humidity, mean of two ditto, .67.

Solar intensity, mean of maximum temperature, 129.83 deg.; highest, 143 deg., on 3rd and 16th.

Terrestrial radiation, mean of minimum temperature, 40.80 deg.; lowest, 28 deg., on 13th.

Rainfall, 1.01 inches.

Evaporation, 8.52 inches; in excess of rainfall, 7.51 inches.

Clouds, mean amount of two daily registers, 5.09.

Ozone, mean of two ditto, 7.94.

Wind, force in lbs. per square foot, total of two ditto, 119.71 lbs.

Ditto, horizontal movement, 3,595 miles.

Electricity, 60 observations, 26 negative, 20 positive, 14 nil.

W. E. SHOORBRIDGE, Valleyfield.

#### JANUARY—WEATHER.

The warm morning of New Years' Day soon turned to steady S.W. rain, bringing on cold stormy weather, which, with little intermission, has been the general character of the month, the mean temperature being 60.04 deg. against 64.16 deg. last January, and the movement of the wind 3,595 miles against 2,527 miles of same month last year. On the 8th, 10th, and 29th, the lowest temperature on grass was at, and below, freezing, while on 13th it reached the unprecedented cold for January of 28 deg., with a white frost, which lasted till nearly 7 o'clock. The amount of cloud was rather below the average, and therefore the solar intensity was about the same as last year. Rain fell on 9 days to the total of 1.01 inches, but as .36 inches of this was on 1st the rest was made up of light squally showers from W. and S.W. that dried almost as fast as they fell; in January, 1876, there was 1.66 inches; in 1875, 1.57 inches; and in 1874, 1.25 inches. As a consequence of the continuous high wind and hot sun, the evaporation was excessive, 8.52 inches; while in 1876 it was only 4.73 inches; in 1875, 6.90 inches; and in 1874, 7.51 inches.



**METEOROLOGY FOR FEBRUARY 1877.**  
**PRIVATE OBSERVATORY, HOBART TOWN.**  
 Latitude 42° 25' 13" S.; Longitude 9h. 40m. 29.2s. E.  
 (Registered for the Royal Society of Tasmania.)

| Day of Month. | Bar. corrected for instrumental error and to mean sea level. |           | Thermometers (Reading.) |                       |                       | Thermometer (Self-Registering.) |                             |                            | Relative Humidity (Percent) |           | Clouds.    |         | Wind.      |         | Rain in Inches. | Spou. Evap.                    | Ozone. 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                                                            | 29.680    | 29.651                  | 12.0                  | 54.0                  | 65.0                            | 98.0                        | 76.0                       | 41.0                        | 70        | 51         | K       | 6.0        | K       | 8.5             | W                              | .26             | S                              | .52       | .15       |           |
| 2             | 29.934                                                       | 30.165    | 10.0                    | 50.0                  | 60.0                  | 78.5                            | 68.0                        | 30.0                       | 74                          | 62        | K          | 4.0     | KN         | 7.0     | SW              | .52                            | S               | .52                            |           |           | 6.5       |
| 3             | 30.320                                                       | 30.326    | 11.0                    | 52.0                  | 60.5                  | 78.0                            | 66.0                        | 40.0                       | 69                          | 76        | K          | 10.0    | K          | 7.5     | W               | .0                             | S               | .26                            | .01       |           | 4.0       |
| 4             | 30.289                                                       | 30.202    | 13.0                    | 56.0                  | 62.5                  | 94.5                            | 68.0                        | 42.5                       | 75                          | 67        | K          | 8.5     | K          | 4.0     | S               | .26                            | SE              | .52                            |           |           | 3.5       |
| 5             | 30.289                                                       | 30.202    | 12.0                    | 54.0                  | 68.0                  | 95.0                            | 72.0                        | 41.0                       | 81                          | 60        | KN         | 10.0    | 0          | 0       | S               | .0                             | E               | .52                            |           |           | 4.0       |
| 6             | 30.233                                                       | 30.144    | 12.0                    | 54.0                  | 68.0                  | 98.0                            | 76.5                        | 41.5                       | 81                          | 78        | K          | 7.0     | K          | 7.5     | W               | .52                            | SE              | .52                            |           |           | 3.5       |
| 7             | 30.214                                                       | 30.147    | 16.0                    | 61.0                  | 68.0                  | 97.5                            | 75.0                        | 44.0                       | 82                          | 73        | K          | 10.0    | K          | 7.5     | S               | .0                             | SE              | .52                            |           |           | 4.5       |
| 8             | 30.068                                                       | 29.917    | 15.0                    | 59.0                  | 80.0                  | 110.5                           | 80.0                        | 42.0                       | 82                          | 50        | K          | 10.0    | K          | 8.0     | N               | .52                            | N               | .26                            |           |           | 4.0       |
| 9             | 29.857                                                       | 29.878    | 17.0                    | 63.0                  | 82.0                  | 112.0                           | 82.0                        | 45.0                       | 63                          | 41        | K          | 10.0    | K          | 8.0     | N               | .52                            | N               | .26                            |           |           | 4.5       |
| 10            | 29.979                                                       | 29.978    | 15.0                    | 60.0                  | 76.0                  | 114.5                           | 83.0                        | 42.0                       | 82                          | 50        | K          | 10.0    | KN         | 10.0    | NW              | .0                             | W               | .0                             | .02       |           | 6.0       |
| 11            | 29.919                                                       | 29.820    | 19.0                    | 67.0                  | 79.0                  | 90.0                            | 85.0                        | 45.5                       | 78                          | 53        | KN         | 10.0    | KN         | 10.0    | SE              | .52                            | SE              | .26                            |           |           | 6.0       |
| 12            | 29.902                                                       | 29.963    | 16.0                    | 62.0                  | 59.5                  | 85.0                            | 83.0                        | 43.0                       | 94                          | 71        | N          | 10.0    | K          | 3.0     | W               | .0                             | SE              | .52                            | .01       |           | 3.5       |
| 13            | 29.919                                                       | 29.824    | 13.5                    | 57.0                  | 72.0                  | 105.0                           | 77.0                        | 42.5                       | 76                          | 57        | 0          | 0       | 0          | 0       | W               | .0                             | SE              | .52                            |           |           | 5.0       |
| 14            | 29.930                                                       | 29.939    | 11.5                    | 53.0                  | 70.0                  | 105.0                           | 81.5                        | 40.0                       | 70                          | 60        | 0          | 0       | 0          | 0       | W               | .0                             | SE              | .52                            |           |           | 3.5       |
| 15            | 29.816                                                       | 29.507    | 17.0                    | 63.0                  | 85.0                  | 116.5                           | 90.0                        | 46.5                       | 67                          | 45        | K          | 6.0     | KS         | 7.5     | NW              | .26                            | N               | 5.26                           |           |           | 5.0       |
| 16            | 29.702                                                       | 29.514    | 17.5                    | 63.5                  | 81.0                  | 120.0                           | 89.0                        | 46.0                       | 63                          | 37        | KS         | 10.0    | K          | 9.5     | N               | .26                            | NW              | 2.60                           |           |           | 3.5       |
| 17            | 29.878                                                       | 29.791    | 11.5                    | 53.0                  | 87.0                  | 112.5                           | 82.0                        | 40.0                       | 70                          | 47        | K          | 9.0     | K          | 9.0     | NW              | .0                             | W               | 2.60                           | .04       |           | 4.0       |
| 18            | 29.572                                                       | 29.585    | 17.0                    | 63.0                  | 73.0                  | 107.0                           | 77.0                        | 45.5                       | 63                          | 45        | K          | 5.0     | K          | 5.5     | W               | 5.21                           | W               | 2.60                           | .03       | 2.07      | 5.0       |
| 19            | 29.356                                                       | 29.612    | 18.0                    | 65.0                  | 68.0                  | 95.5                            | 75.5                        | 47.0                       | 64                          | 52        | KN         | 10.0    | KN         | 10.0    | N               | .26                            | W               | .52                            |           |           | 4.0       |
| 20            | 29.876                                                       | 29.824    | 12.5                    | 54.5                  | 67.0                  | 96.0                            | 70.0                        | 40.0                       | 60                          | 59        | K          | 6.0     | KN         | 10.0    | N               | .0                             | SE              | .52                            | .02       |           | 5.0       |
| 21            | 29.956                                                       | 30.036    | 12.5                    | 54.5                  | 64.0                  | 98.5                            | 72.0                        | 40.0                       | 65                          | 54        | KN         | 6.5     | K          | 2.5     | W               | .0                             | NW              | .52                            |           |           | 4.5       |
| 22            | 29.732                                                       | 29.543    | 10.0                    | 50.0                  | 69.0                  | 96.5                            | 73.0                        | 38.5                       | 80                          | 44        | KS         | 9.0     | K          | 4.0     | SW              | .0                             | NW              | .52                            |           |           | 4.0       |
| 23            | 29.597                                                       | 29.735    | 9.0                     | 48.0                  | 50.0                  | 90.0                            | 71.0                        | 37.0                       | 67                          | 86        | K          | 4.0     | KN         | 5.0     | W               | 2.60                           | W               | 2.60                           | .01       |           | 4.0       |
| 24            | 29.918                                                       | 29.890    | 10.0                    | 50.0                  | 52.0                  | 88.5                            | 63.5                        | 40.0                       | 68                          | 62        | KN         | 8.0     | KN         | 8.0     | NW              | .0                             | W               | .52                            | .01       |           | 5.0       |
| 25            | 29.868                                                       | 29.836    | 14.0                    | 50.0                  | 74.0                  | 105.0                           | 75.0                        | 42.5                       | 66                          | 48        | K          | 2.0     | 0          | 0       | NW              | 5.21                           | N               | .52                            |           |           | 3.5       |
| 26            | 29.738                                                       | 29.711    | 15.0                    | 59.5                  | 68.0                  | 103.5                           | 82.0                        | 44.0                       | 66                          | 64        | 0          | 0       | K          | 7.0     | N               | .26                            | SE              | .0                             | .27       |           | 4.0       |
| 27            | 29.919                                                       | 29.957    | 12.5                    | 55.0                  | 62.0                  | 91.0                            | 72.5                        | 40.0                       | 93                          | 77        | N          | 10.0    | KN         | 10.0    | SE              | .0                             | SE              | .0                             |           |           | 2.7       |
| 28            | 29.771                                                       | 29.634    | 14.0                    | 58.0                  | 61.0                  | 70.5                            | 63.0                        | 41.5                       | 87                          | 88        | N          | 10.0    | N          | 10.0    | N               | .0                             | N               | .26                            | .01       | 0.65      | 5.5       |

| Mean Press.  | Mean M'n. Tem. | Mean Mean | Mean  | Mean  | Mean  | Mean | Mean for Month.              | Mean Force ...        | 83 lbs.     | TL. | TL.  | TL.       |
|--------------|----------------|-----------|-------|-------|-------|------|------------------------------|-----------------------|-------------|-----|------|-----------|
| 29.889       | 13.71          | 62.70     | 98.30 | 76.03 | 42.11 | .67  | 6.79                         | Greatest Force 5.21   | "           | .83 | 4.43 | 125.50    |
| Greatest do. | Max.           | ...       | Max.  | Max.  | Max.  | ...  | Prevailing Character, K & KN | Least Force...        | 0 "         | "   | "    | Mean 4.50 |
| Least do.    | Min.           | ...       | Min.  | Min.  | Min.  | ..   | ...                          | Prevailing Direction. | W. and S.E. | "   | "    | "         |
| 29.356       | 9.00           | ...       | 70.50 | 63.00 | 37.00 | ..   | ...                          |                       |             |     |      |           |

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 readings, 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.**

24th. Common Ash commencing to shed seed.  
 27th. Common Sycamore ditto ditto.  
 F. ABBOTT, JUN., Superintendent.

Results of observations taken at New Norfolk for February, 1877, in accordance with new forms, and registered at 7.30 a.m. and 4.30 p.m. :-

Barometer, mean of 2 daily readings, corrected and reduced, 30.111in.

Thermometer, mean of 2 ditto, 62.55deg.

Ditto, mean of maximum and minimum in shade, 63.10deg.; highest, 91deg. on 10th; lowest, 40deg. on 22nd.

Dew point, mean of 2 daily readings, 51.30deg.

Elastic force of vapour, mean of 2 ditto, .378.

Humidity, mean of 2 ditto, .67.

Solar intensity, mean of maximum temperature, 128.03deg.; highest, 143deg. on 15th.

Terrestrial radiation, mean of minimum temperature, 43.75deg.; lowest, 31deg. on 22nd.

Rainfall, 1.71in.

Evaporation, 6.71in.; in excess of rainfall, 5.00in.

Clouds, mean amount of 2 daily registers, 5.75.

Ozone, mean of 2 daily observations, 7.26.

Wind, force in lbs. per square foot, total of 2 daily observations, 63.55lbs.

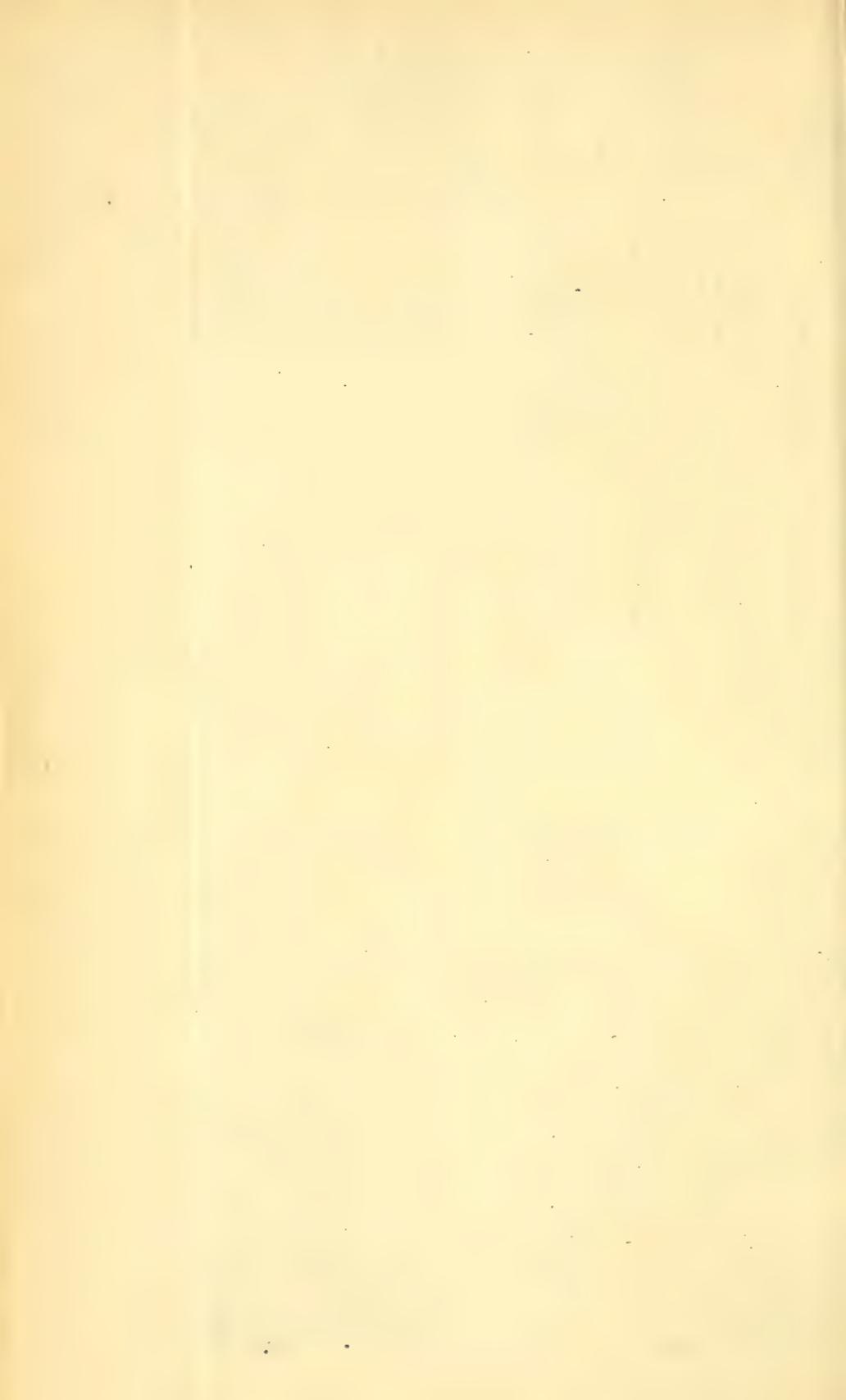
Horizontal movement, 3,855 miles.

Electricity, 56 observations, 24 negative, 15 positive, 17 nil.

**W. E. SHOBRIDGE, Valleyfield.**

Time of leafing, flowering and fruiting of a few standard plants in the Royal Society's Gardens during the month of February, 1877.

5th. Kerry Pippin Apple commencing to ripen.  
 7th. Windsor Pear ditto.  
 9th. Bon Chretien Pear ditto.  
 12th. Greengage ditto.  
 16th. Poplar leaves turning yellow.



## METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH FEB., 1877, 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 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. |        |                        |                   |          |
|               |                                                            |             |      |                |                                |                    |         |            |        |                        |                   |          |
| 1             | 29.625                                                     | 68.5        | 20.5 | 83             | NW                             | .0                 | 3.0     | K          | .0     | Calm, and cloudy       |                   |          |
| 2             | 30.240                                                     | 63.0        | 17.0 | 82             | S                              | .0                 | 7.5     | K          | .15    | Ditto ditto            |                   |          |
| 3             | 30.340                                                     | 65.0        | 18.0 | 83             | S                              | .20                | 10.0    | KN         | .01    | Cloudy sky covered     |                   |          |
| 4             | 30.310                                                     | 67.0        | 19.0 | 94             | S                              | .0                 | 10.0    | N          | .0     | Ditto ditto ditto      |                   |          |
| 5             | 30.210                                                     | 69.0        | 20.5 | 88             | SE                             | .0                 | 5.0     | KN         | .0     | Cloudy stars faint     |                   |          |
| 6             | 30.140                                                     | 70.5        | 21.5 | 94             | S                              | .0                 | 10.0    | KN         | .0     | Ditto sky covered      |                   |          |
| 7             | 30.045                                                     | 71.5        | 21.5 | 88             | NE                             | .26                | 4.0     | K          | .0     | Stars in the zenith    |                   |          |
| 8             | 29.825                                                     | 77.0        | 25.0 | 94             | N                              | .52                | 4.0     | K          | .0     | Hazy in the horizon    |                   |          |
| 9             | 29.830                                                     | 75.0        | 23.0 | 79             | NE                             | .0                 | 6.5     | K          | .0     | Ditto ditto and sultry |                   |          |
| 10            | 29.910                                                     | 77.0        | 25.0 | 70             | SE                             | .0                 | .0      | .0         | .0     | Starlight              |                   |          |
| 11            | 29.710                                                     | 80.0        | 26.5 | 84             | NW                             | .26                | 8.0     | KN         | .0     | Sultry and cloudy      |                   |          |
| 12            | 30.000                                                     | 68.0        | 20.0 | 94             | SW                             | .0                 | 10.0    | N          | .02    | Drizzling rain         |                   |          |
| 13            | 29.900                                                     | 71.5        | 21.5 | 83             | —                              | .0                 | 10.0    | N          | .02    | Cloudy not a star      |                   |          |
| 14            | 29.845                                                     | 72.0        | 21.0 | 88             | S                              | .0                 | .0      | .0         | .0     | Starlight              |                   |          |
| 15            | 29.515                                                     | 80.0        | 26.5 | 75             | NW                             | .26                | .0      | .0         | .0     | Stars 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 THE 16TH TO THE 28TH FEB., 1877, 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 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. |                   |                       |
| 16            | 29.525                                                     | 75.0         | 24.0        | 83                 | N              | .23                            | 7.0     | N          | .0                | Cloud and stars       |
| 17            | 29.610                                                     | 71.0         | 21.5        | 68                 | NW             | .52                            | 10.0    | KN         | .04               | Cloudy sky covered    |
| 18            | 29.410                                                     | 72.0         | 22.0        | 73                 | W              | .52                            | 3.0     | K          | .0                | Starlight             |
| 19            | 29.730                                                     | 69.0         | 20.5        | 73                 | W              | .52                            | 3.0     | K          | .03               | Starlight             |
| 20            | 29.725                                                     | 69.0         | 20.5        | 78                 | NW             | .26                            | 6.0     | KN         | .0                | Stars in the zenith   |
| 21            | 29.810                                                     | 67.0         | 19.5        | 88                 | S              | .0                             | 10.0    | KN         | .02               | Sky hazy              |
| 22            | 29.510                                                     | 68.0         | 20.0        | 82                 | W              | .0                             | 10.0    | KN         | .0                | Drizzling rain        |
| 23            | 29.835                                                     | 61.0         | 16.0        | 87                 | NW             | .0                             | 5.0     | K          | .01               | Star, moon, and cloud |
| 24            | 29.800                                                     | 64.0         | 18.0        | 94                 | N              | .52                            | 10.0    | KN         | .25               | Light rain            |
| 25            | 29.720                                                     | 70.0         | 21.0        | 88                 | N              | .0                             | 4.5     | K          | .0                | Moonlight             |
| 26            | 29.700                                                     | 71.0         | 21.5        | 88                 | S              | .0                             | 10.0    | N          | .0                | Small rain            |
| 27            | 29.845                                                     | 63.0         | 20.5        | 88                 | SE             | .25                            | 10.0    | N          | .27               | Hazy clouds           |
| 28            | 29.525                                                     | 71.0         | 21.5        | 94                 | NW             | .0                             | 10.0    | KN         | .01               | 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.



**METEOROLOGY FOR MARCH, 1877.**  
**PRIVATE OBSERVATORY, HOBART TOWN.**  
 Latitude 42° 25' 13" S.; Longitude 9h. 49m. 29.2s. E.  
 (Registered for the Royal Society of Tasmania.)

| Day of Month. | Bar. corrected for instrumental error and to mean sea level. |           | Thermometers (Reading.) |                       | Thermometer (Self-Registering.) |                             | Relative Humidity (Per cent) |           | Clouds.   |            | Wind.   |            | Rain in Inches. |                 |                                |                 |                                |           |           |                     |      |     |
|---------------|--------------------------------------------------------------|-----------|-------------------------|-----------------------|---------------------------------|-----------------------------|------------------------------|-----------|-----------|------------|---------|------------|-----------------|-----------------|--------------------------------|-----------------|--------------------------------|-----------|-----------|---------------------|------|-----|
|               | 7 30 a.m.                                                    | 4 30 p.m. | Centigrade, 7 30 a.m.   | Fahrenheit, 7 30 a.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. | Ozone Chron. State. |      |     |
|               | 7 30 a.m.                                                    | 4 30 p.m. | Centigrade, 7 30 a.m.   | Fahrenheit, 7 30 a.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. | Ozone Chron. State. |      |     |
| 1             | 29.672                                                       | 29.700    | 12.0                    | 54.0                  | 70.5                            | 104.5                       | 76.0                         | 45.0      | 81        | 52         | 0       | 0          | K               | 4.0             | W                              | .26             | N                              | .52       | .25       | 5                   | 5.5  |     |
| 2             | 29.662                                                       | 29.713    | 12.5                    | 55.0                  | 55.0                            | 95.0                        | 75.0                         | 44.5      | 81        | 81         | KS      | 8.0        | K               | 5.0             | W                              | .0              | SW                             | .0        | .0        |                     | 4.0  |     |
| 3             | 29.020                                                       | 30.018    | 8.0                     | 47.0                  | 58.0                            | 75.5                        | 68.0                         | 39.5      | 86        | 94         | K       | 8.5        | KN              | 7.5             | NW                             | .0              | NW                             | 2.60      | .20       |                     | 3.5  |     |
| 4             | 29.979                                                       | 29.997    | 13.0                    | 56.0                  | 68.0                            | 95.0                        | 75.0                         | 42.0      | 70        | 52         | N       | 7.0        | K               | 3.0             | W                              | 2.60            | NW                             | .0        | .01       |                     | 4.0  |     |
| 5             | 30.037                                                       | 30.001    | 11.0                    | 52.0                  | 61.5                            | 90.5                        | 68.5                         | 40.0      | 69        | 77         | K       | 7.5        | KN              | 7.0             | NW                             | .52             | NW                             | 2.60      | .00       |                     | 3.5  |     |
| 6             | 30.195                                                       | 30.192    | 7.5                     | 46.0                  | 65.0                            | 98.5                        | 73.0                         | 37.0      | 79        | 54         | K       | 5.0        | K               | 3.5             | W                              | .0              | SE                             | .52       | .02       |                     | 4.5  |     |
| 7             | 30.291                                                       | 30.192    | 8.0                     | 47.0                  | 68.0                            | 102.0                       | 78.0                         | 38.0      | 86        | 64         | KS      | 4.5        | K               | 2.0             | W                              | .26             | SE                             | .0        | .01       |                     | 3.5  |     |
| 8             | 30.079                                                       | 29.933    | 12.5                    | 54.5                  | 72.0                            | 100.5                       | 75.0                         | 40.5      | 87        | 74         | KS      | 4.5        | K               | 7.0             | NW                             | .26             | S                              | .26       | .0        |                     | 4.0  |     |
| 9             | 30.151                                                       | 30.192    | 13.5                    | 57.0                  | 67.0                            | 107.0                       | 72.5                         | 42.0      | 76        | 64         | N       | 10.0       | K               | 5.5             | SE                             | .0              | SE                             | .52       | .0        |                     | 5.0  |     |
| 10            | 29.918                                                       | 29.889    | 16.0                    | 61.0                  | 64.0                            | 105.5                       | 77.0                         | 45.5      | 88        | 77         | K       | 7.0        | K               | 8.0             | SE                             | .0              | SE                             | .52       | .0        |                     | 5.0  |     |
| 11            | 29.851                                                       | 29.839    | 13.5                    | 57.0                  | 71.0                            | 97.0                        | 77.0                         | 42.0      | 81        | 51         | K       | 4.0        | K               | 7.0             | W                              | .26             | W                              | .26       | .05       | 1.54                | 4.5  |     |
| 12            | 30.074                                                       | 30.187    | 12.0                    | 54.0                  | 69.0                            | 105.0                       | 70.0                         | 40.0      | 70        | 54         | K       | 5.0        | K               | 2.0             | W                              | .52             | SE                             | .52       | .02       |                     | 5.0  |     |
| 13            | 30.242                                                       | 30.198    | 10.0                    | 50.9                  | 65.0                            | 97.5                        | 76.0                         | 43.0      | 86        | 73         | K       | 9.0        | K               | 7.0             | SW                             | .0              | SE                             | .0        | .0        |                     | 4.0  |     |
| 14            | 30.054                                                       | 29.874    | 11.0                    | 52.0                  | 70.0                            | 98.0                        | 73.0                         | 44.0      | 80        | 57         | KS      | 6.5        | K               | 9.0             | NW                             | .0              | NW                             | .52       | .0        |                     | 3.5  |     |
| 15            | 29.924                                                       | 29.997    | 11.5                    | 53.0                  | 59.0                            | 95.5                        | 71.0                         | 42.5      | 86        | 71         | KN      | 10.0       | K               | 6.5             | S                              | .0              | S                              | .52       | .01       |                     | 5.0  |     |
| 16            | 30.080                                                       | 30.220    | 10.0                    | 50.0                  | 57.0                            | 76.0                        | 64.0                         | 40.0      | 8         | 66         | K       | 10.0       | K               | 9.0             | W                              | .0              | S                              | .26       | .0        |                     | 4.0  |     |
| 17            | 30.366                                                       | 30.350    | 10.5                    | 51.0                  | 65.0                            | 100.0                       | 72.0                         | 40.5      | 86        | 63         | K       | 4.0        | 0               | .0              | S                              | .0              | SE                             | .0        | .0        |                     | 5.0  |     |
| 18            | 30.369                                                       | 30.364    | 9.0                     | 49.0                  | 66.0                            | 98.0                        | 73.0                         | 39.0      | 80        | 50         | 0       | 0          | KS              | 6.0             | W                              | .0              | SE                             | .0        | .0        |                     | 5.0  |     |
| 19            | 30.268                                                       | 30.160    | 13.5                    | 57.5                  | 67.0                            | 83.5                        | 68.5                         | 44.0      | 83        | 68         | N       | 10.0       | K               | 7.5             | S                              | .0              | N                              | .0        | .01       |                     | 5.0  |     |
| 20            | 30.269                                                       | 30.245    | 13.0                    | 56.0                  | 62.0                            | 100.0                       | 76.0                         | 43.5      | 87        | 82         | K       | 4.0        | K               | 9.0             | NW                             | .26             | SE                             | .52       | .0        | 1.00                | 4.0  |     |
| 21            | 30.328                                                       | 30.303    | 12.0                    | 54.0                  | 61.0                            | 88.5                        | 68.0                         | 42.0      | 87        | 72         | KN      | 10.0       | 0               | .0              | S                              | .0              | SE                             | .26       | .0        |                     | 5.0  |     |
| 22            | 30.292                                                       | 30.207    | 8.0                     | 47.0                  | 61.0                            | 91.0                        | 68.0                         | 36.0      | 93        | 77         | K       | 10.0       | 0               | .0              | SW                             | .0              | S                              | .52       | .0        |                     | 5.5  |     |
| 23            | 30.174                                                       | 30.086    | 13.5                    | 56.5                  | 70.0                            | 110.0                       | 81.5                         | 41.5      | 87        | 61         | 0       | 0          | 0               | .0              | NW                             | .26             | S                              | .52       | .0        |                     | 4.5  |     |
| 24            | 30.129                                                       | 30.125    | 11.5                    | 53.0                  | 63.0                            | 100.0                       | 73.0                         | 39.5      | 87        | 82         | 0       | 0          | K               | 7.0             | SW                             | .0              | SE                             | .26       | .0        |                     | 2.0  |     |
| 25            | 30.021                                                       | 29.817    | 13.5                    | 56.5                  | 77.0                            | 98.5                        | 84.0                         | 42.0      | 87        | 71         | 0       | 0          | KS              | 10.0            | NW                             | .26             | S                              | .52       | .0        | 6.0                 |      |     |
| 26            | 29.836                                                       | 29.799    | 11.0                    | 59.5                  | 70.0                            | 97.0                        | 80.0                         | 44.5      | 82        | 65         | K       | 7.5        | K               | 10.0            | SE                             | .0              | S                              | .52       | .0        |                     | 3.5  |     |
| 27            | 29.787                                                       | 29.640    | 16.5                    | 62.0                  | 77.5                            | 116.0                       | 84.5                         | 46.0      | 94        | 47         | KN      | 9.0        | K               | 3.0             | SE                             | .0              | W                              | .0        | .05       |                     | 5.0  |     |
| 28            | 29.707                                                       | 29.855    | 14.5                    | 58.5                  | 61.0                            | 100.0                       | 78.0                         | 40.0      | 94        | 82         | K       | 3.0        | K               | 7.0             | S                              | .0              | SE                             | .0        | .0        |                     | 4.0  |     |
| 29            | 29.992                                                       | 29.739    | 8.0                     | 47.0                  | 68.0                            | 90.5                        | 71.0                         | 38.5      | 86        | 56         | KS      | 7.0        | K               | 7.5             | NW                             | .0              | W                              | 2.60      | .02       |                     | 5.0  |     |
| 30            | 29.924                                                       | 30.083    | 14.0                    | 56.0                  | 56.0                            | 85.0                        | 68.0                         | 41.0      | 70        | 70         | K       | 8.0        | K               | 6.0             | NW                             | .52             | W                              | .26       | .0        |                     | 4.5  |     |
| 31            | 30.302                                                       | 30.297    | 6.0                     | 43.0                  | 59.0                            | 95.0                        | 68.0                         | 34.0      | 84        | 51         | KS      | 6.0        | K               | 2.0             | NW                             | .52             | SE                             | .52       | .0        |                     | 1.17 | 5.0 |

The Meteorological form brought into use at the beginning of 1876 differs in some respects from the former one. It has been adapted 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, 1877.

- 5th. Tips of Hornbeam turning yellow.
- Coe's Golden Drop Plum ripe.
- 7th. Seckle Pear commencing to ripen.
- 16th. Horse Chestnut leaves turning yellow.
- 20th. Ash leaves commencing to fall.
- 25th. Oak leaves commencing to fall.

F. ABBOTT, JUN., Superintendent.

Results of observations taken at New Norfolk for March, 1877, in accordance with new forms, and registered at 7 30 a.m. and 4 30 p.m. :-

Barometer, mean of 2 daily readings, corrected and reduced, 30.102in.

Thermometer, mean of 2 ditto, 60.69deg.

Ditto, mean of maximum and minimum in shade, 61.01deg.

Dew point, mean of 2 daily readings, 51.25deg.

Elastic force of vapour, mean of 2 ditto, .378.

Humidity, mean of 2 ditto, .72.

Solar intensity, mean of maximum temperature, 130.74deg.

Terrestrial radiation, mean of minimum temperature, 40.87deg.

Rainfall, .34in.

Evaporation, 5.86in. : in excess of rainfall, 5.52in.

Clouds, mean amount of 2 daily registers, 5.17.

Ozone, mean of 2 daily registers, 7.43.

Wind, force in lbs. per square foot, total of 2 daily observations, 43.42lbs.

Horizontal movement, 3,030 miles.

Electricity, 62 observations, 37 positive, 8 negative, 17 nil.

W. E. SHOBRIDGE, Valleyfield.

Rainfall at Hill Station, 1,550ft. above sea level, .76in.

March began, like January and February, with cold stormy weather, the heaviest fall of rain .09 inch, being on the 2nd. For a week it was windy and drying, and then it set in with the usual dry warm March weather, occasionally threatening rain, but passing off in very light showers and light thunderstorms in surrounding districts. On 27th a heavy thunderstorm passed across to the Huon district without affecting the Derwent Valley.

Rain fell on six days to the amount of .34 inch, being the smallest amount registered in any month during the last four years, making up 3.06 inch this year to 3.02 inch to same time in 1876, 4.12 inch in 1875, and 3.91 inch in 1874.

The mean temperature 61° 01', was slightly higher than last year, the solar intensity 130° 74, 1 degree higher, but more even, the highest maximum being 144° on 26th, and the lowest 105° on 19th.

The terrestrial radiation was 2 degrees lower than last March, with white frosts on 7th, 18th, and 31st.

W. E. SHOBRIDGE.

New Norfolk,  
2nd April, 1877.



## METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH MARCH, 1877, 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 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. |                   |                        |
| 1             | 29·645                                                     | 72·0         | 22·0        | 88                 | W              | ·0                             | 5·5     | K          | ·27               | Moonlight              |
| 2             | 29·840                                                     | 64·5         | 18·0        | 82                 | NW             | ·23                            | 7·5     | K          |                   | Moon and cloud         |
| 3             | 30·000                                                     | 65·0         | 18·5        | 83                 | NW             | ·52                            | 7·0     | K          | ·20               | Moon and cloud         |
| 4             | 30·000                                                     | 66·0         | 19·0        | 88                 | N              | ·0                             | ·0      | ·0         | ·01               | Moon and starlight     |
| 5             | 31·010                                                     | 66·0         | 19·0        | 82                 | W              | ·0                             | 4·0     | K          |                   | Moon, cloud and stars  |
| 6             | 30·045                                                     | 66·0         | 19·0        | 88                 | S              | ·0                             | ·0      | ·0         | ·02               | Starlight, sky covered |
| 7             | 30·050                                                     | 68·0         | 20·0        | 88                 | S              | ·0                             | ·0      | ·0         | ·01               | Starlight and calm     |
| 8             | 30·000                                                     | 72·0         | 22·0        | 88                 | —              | ·0                             | 10·0    | N          |                   | Very dark              |
| 9             | 29·945                                                     | 70·0         | 21·0        | 88                 | S              | ·0                             | ·0      | ·0         |                   | Starlight brilliant    |
| 10            | 29·835                                                     | 70·0         | 21·0        | 88                 | S              | ·0                             | ·0      | ·0         |                   | Starlight, sky covered |
| 11            | 29·820                                                     | 70·0         | 21·0        | 73                 | —              | ·0                             | 10·0    | N          | ·05               | Calm and cloudy        |
| 12            | 33·000                                                     | 65·0         | 18·0        | 77                 | S              | ·0                             | 4·0     | K          | ·02               | Starlight              |
| 13            | 30·120                                                     | 70·0         | 21·0        | 88                 | S              | ·0                             | ·0      | ·0         |                   | Starlight              |
| 14            | 29·830                                                     | 72·0         | 22·0        | 73                 | W              | ·0                             | ·0      | ·0         |                   | Starlight              |
| 15            | 29·935                                                     | 67·0         | 19·0        | 82                 | S              | ·0                             | ·0      | ·0         | ·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 THE 15TH TO THE 31ST MARCH, 1877, 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 Index Error and to Mean Sea Level. |      | Thermonometers |             |                    | Wind.          |                                | Cloud.  |            | Rain in 24 hours. | Weather.               |
|---------------|------------------------------------------------------------|------|----------------|-------------|--------------------|----------------|--------------------------------|---------|------------|-------------------|------------------------|
|               |                                                            |      | Fahrenheit.    | Centigrade. | Relative Humidity. | Direction from | Force in lbs. per square foot. | Amount. | Character. |                   |                        |
|               |                                                            |      |                |             |                    |                |                                |         |            |                   |                        |
| 16            | 30.325                                                     | 62.0 | 16.5           | 88          | —                  | 0              | 10.0                           | N       |            |                   | Cloudy, sky covered    |
| 17            | 30.330                                                     | 65.0 | 18.0           | 88          | —                  | 0              | 0                              | 0       |            |                   | Starlight, sky covered |
| 18            | 30.245                                                     | 67.5 | 19.5           | 88          | —                  | 0              | 10.0                           | N       |            |                   | Cloudy, sky covered    |
| 19            | 30.215                                                     | 70.5 | 21.5           | 88          | —                  | 0              | 10.0                           | KN      | .01        |                   | Cloudy sky, covered    |
| 20            | 30.325                                                     | 69.0 | 20.5           | 88          | —                  | 0              | 10.0                           | N       |            |                   | Cloudy sky, covered    |
| 21            | 30.245                                                     | 65.0 | 18.0           | 88          | S                  | 0              | 0                              | 0       |            |                   | Starlight brilliant    |
| 22            | 30.220                                                     | 65.0 | 18.0           | 88          | —                  | 0              | 10.0                           | N       |            |                   | Cloud, sky covered     |
| 23            | 30.105                                                     | 68.0 | 20.0           | 73          | S                  | 0              | 5.0                            | K       |            |                   | Stars faint            |
| 24            | 30.045                                                     | 69.0 | 20.5           | 78          | E                  | 0              | 10.0                           | K       |            |                   | Cloudy and hazy        |
| 25            | 29.730                                                     | 75.0 | 24.0           | 84          | E                  | 0              | 10.0                           | KN      |            |                   | Cloudy and hazy        |
| 26            | 29.720                                                     | 74.0 | 23.0           | 84          | S                  | 0              | 10.0                           | KN      | .05        |                   | Sky cloudy             |
| 27            | 29.620                                                     | 74.0 | 23.0           | 89          | S                  | 0              | 10.0                           | K       |            |                   | Moonlight              |
| 28            | 29.935                                                     | 69.0 | 20.5           | 78          | NW                 | 0              | 5.0                            | K       |            |                   | Moon, cloud and star   |
| 29            | 29.810                                                     | 68.0 | 20.0           | 83          | W                  | 2.60           | 10.0                           | K       | .02        |                   | K., of dif. density    |
| 30            | 30.210                                                     | 63.0 | 17.0           | 82          | W                  | 0              | 0.0                            | 0       |            |                   | Moon and star          |
| 31            | 30.340                                                     | 60.0 | 15.5           | 81          | S                  | 0              | 0.0                            | 0       |            |                   | Moonlight sky          |

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.



# METEOROLOGY FOR APRIL, 1877.

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 instrumental error and to mean sea level. |           | Thermometers (Reading.) |                       | Thermometers (Self-Registering.) |                           |                             | Relative Humidity.         |                          | 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.  |         | 4 30 p.m.                  |                        | 7 30 a.m. | 4 30 p.m. | Force in lbs. per square foot. | Direction from. | Force in lbs. per square foot. | Direction from. |             |                      | 7 30 a.m. | 7 30 a.m. | 7 30 a.m. |
|                     |                                                              |           |                         |                       |                                  |                           |                             |                            |                          |                      | Character. | Amount. | Character.                 | Amount.                |           |           |                                |                 |                                |                 |             |                      |           |           |           |
| 1 30-302            | 29.994                                                       | 7.0       | 45.0                    | 71.0                  | 92.0                             | 72.0                      | 35.0                        | 79                         | 51                       | KS                   | 6.0        | K       | 5.0                        | NW                     | .52       | NW        | 2.60                           |                 |                                |                 |             |                      |           |           |           |
| 2 30-932            | 30.234                                                       | 10.5      | 51.0                    | 55.0                  | 90.0                             | 70.0                      | 39.0                        | 74                         | 65                       | K                    | 7.5        | K       | 2.0                        | S                      | .0        | SE        | .52                            |                 |                                |                 |             |                      |           | 3.5       |           |
| 3 30-203            | 29.903                                                       | 5.5       | 41.5                    | 67.0                  | 95.0                             | 69.0                      | 38.0                        | 84                         | 56                       | K                    | 4.0        | KS      | 10.0                       | W                      | .52       | N         | .26                            |                 |                                |                 |             |                      |           | 4.0       |           |
| 4 29-684            | 29.459                                                       | 12.0      | 54.0                    | 62.0                  | 82.0                             | 68.0                      | 42.5                        | 75                         | 62                       | K                    | 7.5        | K       | 8.5                        | NW                     | .0        | NW        | 5.21                           |                 |                                |                 |             |                      |           | 2.5       |           |
| 5 29-662            | 29.234                                                       | 6.5       | 43.5                    | 49.0                  | 75.5                             | 63.0                      | 32.5                        | 92                         | 86                       | KN                   | 7.5        | KN      | 6.0                        | N                      | .52       | W         | 5.21                           | .57             |                                |                 |             |                      |           | 6.0       |           |
| 6 29-033            | 30.055                                                       | 13.0      | 56.0                    | 62.0                  | 85.0                             | 63.0                      | 41.0                        | 76                         | 59                       | K                    | 7.5        | K       | 4.0                        | W                      | .0        | W         | .0                             |                 |                                |                 |             |                      |           | 3.5       |           |
| 7 30-252            | 30.291                                                       | 5.0       | 42.0                    | 56.0                  | 95.0                             | 66.0                      | 34.0                        | 84                         | 76                       | .0                   | .0         | K       | 3.0                        | W                      | .0        | SE        | .0                             |                 |                                |                 |             | .09                  |           | 6.0       |           |
| 8 30-008            | 29.807                                                       | 9.0       | 48.0                    | 65.5                  | 89.5                             | 72.0                      | 38.5                        | 86                         | 72                       | KS                   | 6.0        | K       | 7.5                        | NW                     | 2.60      | SE        | .0                             |                 |                                |                 |             |                      |           | 4.0       |           |
| 9 29-394            | 29.785                                                       | 11.5      | 53.0                    | 64.0                  | 90.0                             | 72.0                      | 40.0                        | 86                         | 67                       | K                    | 3.0        | KS      | 5.0                        | NW                     | .0        | N         | 2.60                           |                 |                                |                 |             |                      |           | 4.5       |           |
| 10 29-712           | 29.929                                                       | 8.0       | 47.0                    | 50.0                  | 90.0                             | 63.5                      | 35.0                        | 79                         | 74                       | K                    | 6.0        | KN      | 7.0                        | NW                     | .52       | W         | 2.60                           | .05             | 1.21                           |                 |             |                      |           | 4.0       |           |
| 11 30-007           | 29.963                                                       | 12.5      | 55.0                    | 61.0                  | 72.5                             | 65.0                      | 40.0                        | 75                         | 72                       | K                    | 8.5        | K       | 7.5                        | NW                     | 2.60      | NW        | .26                            |                 |                                |                 |             |                      |           | 4.0       |           |
| 12 30-029           | 30.085                                                       | 12.0      | 54.0                    | 66.0                  | 100.5                            | 73.0                      | 39.5                        | 81                         | 64                       | K                    | 6.5        | K       | 4.0                        | N                      | .0        | NW        | .0                             |                 |                                |                 |             |                      |           | 3.5       |           |
| 13 30-242           | 30.260                                                       | 10.0      | 50.0                    | 60.0                  | 103.5                            | 74.5                      | 37.0                        | 93                         | 88                       | KS                   | 5.5        | KS      | 7.5                        | NW                     | .0        | S         | .52                            |                 |                                |                 |             |                      |           | 3.5       |           |
| 14 30-354           | 30.358                                                       | 10.0      | 50.5                    | 61.0                  | 100.5                            | 72.0                      | 37.0                        | 93                         | 82                       | .0                   | .0         | K       | 3.0                        | NW                     | .26       | S         | .52                            |                 |                                |                 |             |                      |           | 4.0       |           |
| 15 30-433           | 30.398                                                       | 10.5      | 51.0                    | 66.0                  | 109.5                            | 75.5                      | 37.5                        | 80                         | 73                       | K                    | 3.0        | .0      | .0                         | N                      | .0        | SE        | .52                            |                 |                                |                 |             |                      |           | 4.5       |           |
| 16 30-389           | 30.327                                                       | 10.5      | 51.0                    | 70.0                  | 110.0                            | 80.0                      | 37.0                        | 86                         | 73                       | K                    | 3.5        | .0      | .0                         | NW                     | .52       | SE        | .0                             |                 |                                |                 |             |                      |           | 4.0       |           |
| 17 30-302           | 30.139                                                       | 18.5      | 65.5                    | 71.5                  | 108.5                            | 78.9                      | 37.5                        | 60                         | 47                       | .0                   | .0         | .0      | .0                         | NW                     | .52       | N         | .0                             |                 |                                |                 |             |                      |           | 2.5       |           |
| 18 30-084           | 29.889                                                       | 13.0      | 56.0                    | 72.0                  | 101.0                            | 73.5                      | 34.5                        | 61                         | 51                       | KS                   | 7.0        | K       | 6.0                        | NW                     | .26       | N         | .52                            |                 |                                |                 |             |                      |           | 5.0       |           |
| 19 30-010           | 30.057                                                       | 16.5      | 62.0                    | 62.0                  | 100.0                            | 75.5                      | 37.5                        | 67                         | 77                       | K                    | 10.0       | K       | 10.0                       | NW                     | .0        | SE        | .52                            |                 |                                |                 |             |                      |           | 4.0       |           |
| 20 30-079           | 29.902                                                       | 12.5      | 55.0                    | 65.0                  | 105.0                            | 77.0                      | 35.0                        | 70                         | 68                       | KS                   | 5.5        | K       | 5.0                        | NW                     | .52       | NE        | .0                             |                 |                                |                 |             | .26                  |           | 5.5       |           |
| 21 29-685           | 29.480                                                       | 11.5      | 53.0                    | 54.0                  | 68.0                             | 68.0                      | 34.0                        | 86                         | 93                       | K                    | 10.0       | N       | 10.0                       | NW                     | .0        | N         | .0                             |                 |                                |                 |             | .79                  |           | 5.0       |           |
| 22 29-633           | 29.648                                                       | 12.0      | 54.0                    | 49.0                  | 75.5                             | 62.0                      | 35.0                        | 83                         | 73                       | K                    | 2.0        | KN      | 10.0                       | N                      | .52       | W         | 2.60                           | .16             |                                |                 |             |                      |           | 5.0       |           |
| 23 29-953           | 30.048                                                       | 6.5       | 44.0                    | 47.0                  | 68.0                             | 56.5                      | 31.5                        | 73                         | 79                       | K                    | 4.0        | KN      | 7.0                        | S                      | .0        | W         | .0                             |                 |                                |                 |             |                      |           | 8.5       |           |
| 24 29-958           | 29.950                                                       | 3.0       | 38.0                    | 40.0                  | 58.5                             | 51.0                      | 30.0                        | 92                         | 79                       | KN                   | 7.5        | K       | 10.0                       | W                      | .0        | NW        | .0                             |                 |                                |                 |             |                      |           | 8.0       |           |
| 25 29-816           | 29.792                                                       | 5.0       | 41.5                    | 50.0                  | 72.0                             | 56.0                      | 34.0                        | 84                         | 79                       | K                    | 7.5        | K       | 3.5                        | NW                     | .26       | SE        | .0                             |                 |                                |                 |             |                      |           | 8.5       |           |
| 26 30-002           | 29.846                                                       | 5.0       | 41.5                    | 48.0                  | 65.5                             | 58.0                      | 34.0                        | 92                         | 93                       | K                    | 6.0        | KN      | 6.0                        | N                      | .0        | W         | .0                             |                 |                                |                 |             |                      |           | 6.0       |           |
| 27 30-043           | 30.087                                                       | 8.5       | 47.5                    | 50.0                  | 57.0                             | 55.0                      | 38.5                        | 100                        | 93                       | N                    | 10.0       | N       | 9.0                        | S                      | .26       | SW        | .0                             |                 |                                |                 |             |                      |           | 6.0       |           |
| 28 30-255           | 30.250                                                       | 8.5       | 47.5                    | 51.0                  | 58.0                             | 56.0                      | 38.5                        | 86                         | 86                       | N                    | 10.0       | KN      | 10.0                       | S                      | .0        | S         | .0                             |                 |                                |                 |             |                      |           | 4.0       |           |
| 29 30-339           | 30.345                                                       | 12.0      | 54.0                    | 54.5                  | 64.5                             | 58.0                      | 40.0                        | 87                         | 81                       | N                    | 10.0       | KN      | 7.0                        | S                      | .26       | S         | 2.60                           | .03             |                                |                 |             |                      |           | 6.0       |           |
| 30 30-369           | 30.330                                                       | 10.5      | 51.0                    | 52.5                  | 59.0                             | 57.5                      | 38.0                        | 86                         | 93                       | KN                   | 10.0       | N       | 10.0                       | S                      | .26       | S         | .26                            | .92             |                                |                 |             |                      |           | 5.5       |           |
| Mean Press. 30.035  |                                                              | 9.88      | M'n. Tem. 54.38         |                       | 54.62                            | 66.85                     | 36.72                       | Mean. 77                   |                          | Mean for Month. 6.10 |            |         |                            | Mean Force ... 63 lbs. |           |           |                                | TI. 2.45        | TI. 2.92                       | TI. 142.00      |             |                      |           |           |           |
| Greatest do. 30.433 |                                                              | 18.50     | Max. 110.00             |                       | Max. 80.00                       | Max. 42.50                | ...                         |                            | Prev. Character, K & KN. |                      |            |         | Greatest Force 5.21 "      |                        |           |           | ..                             | ..              | Mean 4.73                      |                 |             |                      |           |           |           |
| Least do. 29.459    |                                                              | 3.00      | Min. 57.00              |                       | Min. 51.00                       | Min. 30.00                | ..                          |                            | ...                      |                      |            |         | Prevailing Direction. N.W. |                        |           |           | ..                             | ..              | ..                             |                 |             |                      |           |           |           |

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 April, 1877.

1st. Coe's late Red Plum commencing to ripen.

4th. Elm leaves commencing to fall.

16th. Chinese Chrysanthemums commencing to flower.

20th. *Pyrus aucuparia* leaves commencing to fall.

25th. Leaves of Black Mulberry commencing to fall.

26th. Seeds of Hornbeam ripe.

F. ABBOTT, JUN., Superintendent.

Results of observations taken at New Norfolk for April, 1877, in accordance with new forms, and registered at 7 30 a.m. and 4 30 p.m. —

Barometer, mean of 2 daily readings, corrected and reduced, 30.032in.

Thermometer, mean of 2 ditto, 51.78deg.

Ditto, mean of maximum and minimum in shade, 53.91deg.

Dew point, mean position of 2 daily readings, 45.75deg.

Humidity, mean of 2 ditto, .80.

Elastic force of vapour, mean of 2 ditto, .315.

Solar intensity, mean of maximum temperature, 115.86deg.

Terrestrial radiation, mean of minimum temperature, 35.50deg.

Rainfall, 2.22in.

Evaporation, 3.30in. : in excess of rainfall, 1.08in.

Clouds, mean amount of 2 daily registers, 5.23.

Ozone, mean of 2 daily registers, 7.83.

Wind, force in lbs. per square foot, total of 2 daily observations, — lbs.

Ditto Horizontal movement, 2,550 miles.

W. E. SHOOBRIDGE, Valleyfield.

Rainfall at Hill Station, 1,550ft. above sea level, 2.43in.



### APRIL WEATHER.

The warm weather at the commencement of the month soon came to an end, it set in wet and stormy on 4th and 5th, and then cold mornings and bright warm days till 12th and 13th, when it changed to windy and stormy showers from W. with snow on hills, that turned again on 14th to warm E. and S.E. weather, very high barometer, reaching to 30·52 on 15th, light fogs in early morning and clear bright sunny days. On 21st a rapid fall of ·59 inch to 29·49 was followed by steady rain that brought winter suddenly on in very cold storms from S.W. Snow on the ranges that lasted several days, causing a very low temperature on 24th, the highest reading in the shade of the self-registering maximum thermometer was 49°; and although on 26th a rising barometer ushered in wet E. weather, it still continued dull and cold till the end of the month with a promise, however, in the continuous height of the barometer of a spell of brighter weather as soon as the dull easterly clouds disperse. The highest shade temperature 82° on 16th, and the lowest 32° on 26th, and the lowest on grass the same morning was 26°.

There were several heavy rains during the month, ·69 inch on 5th, ·32 inch on 10th, ·33 inch on 21st, and ·30 inch on 23rd. Altogether 2·22 inches for the month, being more than in any April in the last four years, making up 5·28 inches this year against 5·02 inches to the same time in 1876, 6·00 inches in 1875, and 5·32 inches in 1874.

Although the end of the month has been so cold, yet it was warmer than last April, the mean temperature being 53° 91' to 52° 43' in 1876. The movement of the wind was 2,550 miles to 3,030 last month, and 1,772 miles in April 1876.

1st May, 1877.

W. E. SHOOBRIDGE,  
Valleyfield.



## METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH APRIL, 1877, 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 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. |                   |                             |
|               |                                                            |      |              |             |                    |                |                                |         |            |                   |                             |
| 1             | 29.840                                                     | 67.0 | 19.5         | 82          | W                  | .52            | 6.0                            | K       |            |                   | Cloud, star and moon        |
| 2             | 30.240                                                     | 68.0 | 17.0         | 82          | S                  | .0             | .0                             | .0      |            |                   | Moon and star light         |
| 3             | 29.725                                                     | 65.5 | 18.5         | 83          | W                  | .0             | 5.0                            | K       |            |                   | Moon, cloud, and star       |
| 4             | 29.420                                                     | 65.0 | 18.0         | 94          | W                  | .52            | 10.0                           | N       |            |                   | Rain, showery               |
| 5             | 29.910                                                     | 61.0 | 16.0         | 93          | NW                 | 2.60           | 7.5                            | N       | .57        |                   | Day squally throughout      |
| 6             | 30.145                                                     | 64.0 | 17.5         | 88          | W                  | .0             | .0                             | .0      | .09        |                   | Starlight brilliant         |
| 7             | 30.145                                                     | 62.0 | 16.5         | 82          | —                  | .0             | .0                             | .0      |            |                   | Ditto ditto                 |
| 8             | 29.840                                                     | 64.5 | 18.0         | 82          | —                  | .0             | .0                             | .0      |            |                   | Stars, sky covered          |
| 9             | 29.640                                                     | 67.0 | 19.0         | 82          | —                  | .0             | 7.0                            | K       |            |                   | Stars and clouds            |
| 10            | 29.940                                                     | 63.0 | 17.0         | 82          | NW                 | .52            | 5.0                            | K       | .05        |                   | Clouds and stars            |
| 11            | 29.940                                                     | 65.0 | 18.5         | 82          | NW                 | .52            | 7.0                            | K       | .03        |                   | Ditto ditto                 |
| 12            | 31.900                                                     | 70.0 | 21.0         | 88          | —                  | .0             | .0                             | .0      |            |                   | Starlight, sky covered      |
| 13            | 30.315                                                     | 68.0 | 20.0         | 88          | —                  | .0             | 10.0                           | N       |            |                   | Dark, sky covered           |
| 14            | 30.430                                                     | 69.0 | 20.5         | 88          | —                  | .0             | 10.0                           | N       |            |                   | Calm and cloudy             |
| 15            | 30.410                                                     | 68.0 | 19.5         | 88          | —                  | .0             | 10.0<br>h'zy                   | KN      |            |                   | Calm, stars, faint and hazy |

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, 1877, 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 Index Error and to Mean Sea Level. |             |                    | Thermometers.  |                                |         | Wind.      |     | Cloud. |                           | Rain in 24 hours. | Weather. |
|---------------|------------------------------------------------------------|-------------|--------------------|----------------|--------------------------------|---------|------------|-----|--------|---------------------------|-------------------|----------|
|               | Fahrenheit.                                                | Centigrade. | Relative Humidity. | Direction from | Force in lbs. per square foot. | Amount. | Character. | In. |        |                           |                   |          |
|               |                                                            |             |                    |                |                                |         |            |     | %      |                           |                   |          |
| 16            | 30.245                                                     | 68.0        | 20.0               | 83             | —                              | .0      | .0         | .0  | In.    | Starlight, sky covered    |                   |          |
| 17            | 30.100                                                     | 70.0        | 21.0               | 73             | —                              | .0      | .0         | .0  |        | Ditto ditto ditto         |                   |          |
| 18            | 29.803                                                     | 73.0        | 22.5               | 78             | —                              | .0      | 8.0        | K   |        | Dark sky, few stars faint |                   |          |
| 19            | 30.100                                                     | 71.0        | 21.5               | 83             | —                              | .0      | 10.0       | KN  |        | Cloudy sky covered        |                   |          |
| 20            | 29.840                                                     | 70.0        | 21.0               | 73             | —                              | .0      | 4.0        | K   |        | Stars and clouds faint    |                   |          |
| 21            | 29.410                                                     | 67.0        | 19.5               | 88             | —                              | .0      | 10.0       | N   |        | Rain all day              |                   |          |
| 22            | 29.710                                                     | 62.0        | 16.5               | 87             | W                              | 2.60    | 7.5        | KN  | .36    | Cloud, moon and star      |                   |          |
| 23            | 30.045                                                     | 60.0        | 15.5               | 87             | —                              | .0      | 7.0        | KN  | .12    | Moon and stars faint      |                   |          |
| 24            | 29.810                                                     | 61.0        | 16.0               | 87             | NW                             | .23     | 10.0       | K   | .16    | Moon on cloudsky          |                   |          |
| 25            | 29.820                                                     | 60.0        | 15.5               | 86             | —                              | .52     | 7.5        | K   | .01    | Moon and cloud            |                   |          |
| 26            | 29.930                                                     | 61.0        | 16.0               | 93             | —                              | .26     | 10.0       | N   | .04    | Heavy rain                |                   |          |
| 27            | 30.140                                                     | 60.0        | 15.5               | 93             | S                              | .52     | 10.0       | N   | .91    | Drizzlingrain             |                   |          |
| 28            | 30.315                                                     | 60.0        | 15.5               | 87             | S                              | .0      | 10.0       | N   | .08    | Ditto and cloudy          |                   |          |
| 29            | 30.400                                                     | 61.0        | 16.0               | 88             | S                              | 2.60    | 7.5        | KN  | .03    | Moon and stars faint      |                   |          |
| 30            | 30.340                                                     | 62.0        | 16.5               | 88             | S                              | .26     | 10.0       | N   |        | Cloudy and hazy           |                   |          |

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.



# METEOROLOGY FOR MAY, 1877.

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 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.      | 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 20 321 30 380                                              | 9.5       | 49.0                    | 52.0                  | 60.0                  | 56.0                             | 40.0                        | 93                         | 93                          | KN                    | 9.0            | K         | 8.5        | S       | 0          | SE      | 0               | .05                            | 7.0             |                                |           |                     |           |  |
| 2 30 341 30 308  | 9.5                                                          | 49.0      | 55.0                    | 61.0                  | 56.0                  | 40.0                             | 86                          | 81                         | K                           | 10.0                  | K              | 10.0      | S          | 0       | SE         | .26     | .01             | 6.0                            |                 |                                |           |                     |           |  |
| 3 30 240 30 179  | 10.5                                                         | 51.0      | 55.0                    | 65.5                  | 58.5                  | 45.5                             | 86                          | 87                         | K                           | 10.0                  | KN             | 10.0      | S          | 0       | SE         | 0       | 0               | 4.5                            |                 |                                |           |                     |           |  |
| 4 30 191 30 106  | 10.0                                                         | 50.0      | 54.0                    | 62.0                  | 56.0                  | 44.0                             | 86                          | 93                         | K                           | 10.0                  | KN             | 10.0      | S          | 0       | E          | 0       | 0               | 4.5                            |                 |                                |           |                     |           |  |
| 5 30 013 29 834  | 7.5                                                          | 46.0      | 53.0                    | 62.0                  | 56.0                  | 38.5                             | 93                          | 86                         | K                           | 7.5                   | N              | 10.0      | N          | 0       | N          | 0       | 0               | 4.0                            |                 |                                |           |                     |           |  |
| 6 29 718 29 543  | 6.5                                                          | 44.5      | 53.0                    | 62.5                  | 56.0                  | 36.0                             | 86                          | 80                         | N                           | 10.0                  | KN             | 10.0      | N          | 0       | NW         | 0       | 0               | 6.0                            |                 |                                |           |                     |           |  |
| 7 29 454 29 548  | 6.0                                                          | 43.0      | 48.0                    | 64.5                  | 54.5                  | 34.0                             | 92                          | 67                         | N                           | 10.0                  | KN             | 7.0       | SW         | 0       | W          | 2.60    | 0               | 5.0                            |                 |                                |           |                     |           |  |
| 8 29 708 29 726  | 7.0                                                          | 45.0      | 57.0                    | 74.0                  | 60.0                  | 35.5                             | 78                          | 65                         | K                           | 7.0                   | K              | 7.0       | SW         | 0       | N          | 0       | .05             | 4.0                            |                 |                                |           |                     |           |  |
| 9 29 795 29 776  | 9.0                                                          | 49.0      | 55.0                    | 90.0                  | 63.0                  | 37.0                             | 86                          | 75                         | K                           | 7.0                   | K              | 8.5       | NW         | .26     | NW         | .52     | 0               | 4.5                            |                 |                                |           |                     |           |  |
| 10 30 085 30 066 | 5.5                                                          | 42.0      | 47.0                    | 74.0                  | 59.0                  | 35.5                             | 92                          | 79                         | K                           | 8.5                   | K              | 10.0      | SW         | 0       | S          | .26     | .04             | 5.0                            |                 |                                |           |                     |           |  |
| 11 30 080 30 042 | 2.0                                                          | 36.0      | 49.0                    | 87.5                  | 59.0                  | 32.0                             | 91                          | 86                         | 0                           | 0                     | 0              | 0         | W          | .26     | S          | 0       | 0               | 3.0                            |                 |                                |           |                     |           |  |
| 12 30 084 30 045 | 2.5                                                          | 36.5      | 50.0                    | 81.0                  | 58.0                  | 32.0                             | 69                          | 93                         | 0                           | 0                     | 0              | NW        | 0          | SE      | 0          | 0       | 4.0             |                                |                 |                                |           |                     |           |  |
| 13 30 008 29 945 | 7.0                                                          | 45.0      | 52.0                    | 67.5                  | 56.0                  | 35.5                             | 93                          | 74                         | K                           | 10.0                  | K              | 4.5       | NW         | 0       | NE         | .52     | 0               | 4.5                            |                 |                                |           |                     |           |  |
| 14 29 818 29 985 | 7.0                                                          | 45.0      | 55.0                    | 59.5                  | 57.0                  | 35.5                             | 93                          | 100                        | K                           | 10.0                  | KN             | 10.0      | NW         | 0       | N          | 0       | 0               | 3.0                            |                 |                                |           |                     |           |  |
| 15 29 792 29 733 | 10.5                                                         | 51.0      | 63.0                    | 90.0                  | 68.0                  | 38.0                             | 80                          | 72                         | 0                           | 0                     | K              | 2.0       | N          | 0       | N          | .52     | 0               | 4.0                            |                 |                                |           |                     |           |  |
| 16 29 753 29 657 | 11.0                                                         | 62.0      | 64.0                    | 92.5                  | 70.0                  | 38.5                             | 74                          | 51                         | 0                           | 0                     | KS             | 4.0       | N          | .26     | N          | 2.60    | 0               | 3.5                            |                 |                                |           |                     |           |  |
| 17 29 656 29 565 | 9.0                                                          | 46.0      | 57.0                    | 77.5                  | 65.0                  | 36.0                             | 100                         | 87                         | KN                          | 9.0                   | K              | 2.0       | NW         | .26     | N          | 0       | .30             | 6.5                            |                 |                                |           |                     |           |  |
| 18 29 479 29 403 | 5.5                                                          | 42.0      | 57.0                    | 78.0                  | 62.0                  | 32.5                             | 93                          | 66                         | K                           | 4.5                   | K              | 5.0       | NW         | 0       | N          | 0       | .01             | 4.0                            |                 |                                |           |                     |           |  |
| 19 29 293 29 165 | 12.5                                                         | 55.5      | 52.0                    | 90.0                  | 64.0                  | 40.0                             | 70                          | 86                         | K                           | 7.0                   | KN             | 10.0      | N          | 0       | NW         | 0       | 0               | 3.0                            |                 |                                |           |                     |           |  |
| 20 29 403 29 488 | 8.5                                                          | 48.0      | 50.0                    | 87.0                  | 59.0                  | 36.0                             | 86                          | 74                         | K                           | 7.0                   | K              | 5.0       | NW         | 5.21    | N          | 0       | .08             | 4.0                            |                 |                                |           |                     |           |  |
| 21 29 450 29 383 | 5.5                                                          | 42.0      | 52.0                    | 69.5                  | 57.5                  | 33.0                             | 84                          | 86                         | KS                          | 10.0                  | KN             | 10.0      | NW         | 0       | NW         | .26     | 0               | 4.5                            |                 |                                |           |                     |           |  |
| 22 29 296 29 463 | 10.0                                                         | 50.0      | 49.0                    | 66.0                  | 55.0                  | 39.5                             | 74                          | 86                         | K                           | 4.0                   | K              | 4.0       | W          | 5.21    | W          | 0       | .08             | 3.5                            |                 |                                |           |                     |           |  |
| 23 29 588 29 556 | 4.5                                                          | 40.0      | 42.0                    | 68.0                  | 54.0                  | 31.0                             | 78                          | 92                         | K                           | 6.0                   | KN             | 9.0       | NW         | 0       | S          | .26     | 0               | 5.0                            |                 |                                |           |                     |           |  |
| 24 29 715 29 778 | 3.0                                                          | 38.0      | 41.0                    | 66.5                  | 51.0                  | 30.0                             | 92                          | 84                         | KN                          | 9.0                   | KN             | 5.0       | S          | 0       | SW         | 0       | .17             | 6.0                            |                 |                                |           |                     |           |  |
| 25 29 778 29 870 | 2.0                                                          | 35.5      | 41.0                    | 65.5                  | 51.5                  | 28.5                             | 91                          | 93                         | KN                          | 10.0                  | KN             | 7.0       | W          | 0       | SW         | .52     | .05             | 6.0                            |                 |                                |           |                     |           |  |
| 26 29 830 29 710 | 3.5                                                          | 35.0      | 54.0                    | 67.0                  | 52.0                  | 30.0                             | 91                          | 86                         | K                           | 6.5                   | K              | 7.5       | NW         | .52     | SW         | .26     | .01             | 4.5                            |                 |                                |           |                     |           |  |
| 27 29 530 29 510 | 11.0                                                         | 52.0      | 55.0                    | 68.0                  | 56.5                  | 35.0                             | 86                          | 93                         | K                           | 7.5                   | KS             | 10.0      | W          | 0       | S          | .52     | 0               | 3.0                            |                 |                                |           |                     |           |  |
| 28 29 910 30 025 | 10.0                                                         | 50.0      | 52.0                    | 66.5                  | 54.5                  | 32.0                             | 93                          | 86                         | N                           | 10.0                  | N              | 10.0      | S          | 2.60    | SW         | .52     | .22             | 6.5                            |                 |                                |           |                     |           |  |
| 29 30 140 30 220 | 12.0                                                         | 54.0      | 59.0                    | 76.5                  | 58.0                  | 34.5                             | 92                          | 81                         | K                           | 3.0                   | K              | 9.0       | N          | .26     | S          | 0       | .02             | 4.0                            |                 |                                |           |                     |           |  |
| 30 30 325 30 320 | 13.5                                                         | 56.5      | 61.0                    | 82.0                  | 60.0                  | 34.5                             | 87                          | 87                         | K                           | 5.0                   | KS             | 7.0       | S          | .26     | S          | .26     | 0               | 3.5                            |                 |                                |           |                     |           |  |
| 31 30 310 30 140 | 13.5                                                         | 56.5      | 59.5                    | 78.5                  | 61.0                  | 34.0                             | 87                          | 87                         | KS                          | 9.0                   | KS             | 10.0      | W          | 0       | NW         | .52     | 0               | 3.0                            |                 |                                |           |                     |           |  |
| Mean Press.      | Mean                                                         | M'n. Tem. | Mean.                   | Mean                  | Mean                  | Mean                             | Mean.                       | Mean.                      | Mean.                       | Mean for Month.       | Mean Force ... | 41 lbs.   | Tl.        | Tl.     | Tl.        | 1.45    | 1.38            | 139.0                          |                 |                                |           |                     |           |  |
| 29 831           | 7.90                                                         | 49.45     | 72.90                   | 58.20                 | 35.58                 | 84                               | 5.55                        | Prev. Character,           | Greatest Force 5.21 "       | Least Force....       | 0 "            | Mean      | 4.50       |         |            |         |                 |                                |                 |                                |           |                     |           |  |
| 30 330           | Max.                                                         | 13.50     | Max.                    | Max.                  | Max.                  | 45.50                            | ...                         | K & KN.                    | ...                         | Prevailing Direction. | N. W., S. N.   | ...       | ...        | ...     | ...        | ...     | ...             | ...                            | ...             | ...                            | ...       | ...                 | ...       |  |
| Least do.        | Min.                                                         | 2.00      | ...                     | Min.                  | Min.                  | 28.50                            | ...                         | ...                        | ...                         | ...                   | ...            | ...       | ...        | ...     | ...        | ...     | ...             | ...                            | ...             | ...                            | ...       | ...                 | ...       |  |

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 May, 1877.

- 8th. First Medlar ripe.
- 20th. *Achenalia rosea* commencing to flower.
- 21st. *Photinia serrulata* commencing to flower.
- 25th. *Hardenbergia Lindlyana* in flower.
- 28th. *Ailanthus* leaves all fallen.

F. ABBOTT, JUN., Superintendent.



### MAY WEATHER.

The fine weather promised at the end of last month was but of short duration. Dull easterly weather again set in on the 2nd till the 5th, when a fall in the barometer was followed by a steady west rain, and a still further fall on the 6th to 29.55 inches ushered in the cold strong showers with snow on the hills, for which the rest of the month was distinguished. There was fine bright sunny weather and high barometer on 11th, 12th, and 13th, when a light easterly mizzle was driven back by strong north westerly winds, that on the night of the 16th culminated in a heavy downpour of 74 inches, and then a lower fall of the barometer on 19th to 29.27 inches, was followed by intensely cold south west snow storms, that lasted with little intermission till the end of the month, and reminded us that we have a frigid zone in the south. On the 25th there were some slight traces of snow in the valley, the hills around being white, and on the morning of the 26th the terrestrial radiation thermometer registered the extreme cold for May of 18 degrees, the mean for the month 31°.19 was the coldest May for the last 4 years, the mean temperature 46°.80 was also the lowest during that period.

The rainfall was moderate, 1.60 inches against .88 last May, making up 6.88 inches for this year, to 5.84 inches to same time in 1876, 8.48 inches in 1875, and 7.12 inches in 1874.

The movement of the wind was more than last year, being 2350 miles to 2012 miles,

The ozone 8.32, of scale 1.13, was remarkably high, while the electrical disturbance as registered by the gold leaf electrometer was almost nil.

W. E. SHOBRIDGE,

5th June, 1877.

Valleyfield.



### METEOROLOGICAL.

Results of observations taken at New Norfolk for May, 1877, in accordance with new forms, and registered at 7.30 a.m., and 4.30 p.m. :—

Barometer mean of 2 daily readings, corrected and reduced, 29.850in.

Thermometer, mean of 2 ditto, 45.62deg.

Ditto, mean of maximum and minimum in shade, 46.80deg.

Dew point, mean position of 2 daily readings, 42.20deg.

Elastic force of vapour, mean of 2 ditto, .270.

Humidity, mean of 2 ditto, .89.

Solar intensity, mean of maximum temperature, 104.41deg.

Terrestrial radiation, mean of minimum temperature, 31.19deg.

Rainfall, 1.60ins. : in excess of evaporation, .16in.

Evaporation, 1.44in.

Clouds, mean amount of 2 daily observations, 6.75.

Ozone, mean of 2 daily observations, 8.32.

Wind, force in lbs. per square foot, total of 2 daily observations, 38.29lbs.

Ditto Horizontal movement, 2,350 miles.

W. E. SHOEBRIDGE, Valleyfield

Rainfall at Hill Station, 1,550ft. above sea level, 1.97in.



## METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH MAY, 1877, 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 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. |                        |          |
| 1             | 31·320                                                     | 62·0 | 16·5         | 93          | S                  | ·0             | 10·0                           | N       | ·05        | Cloud, sky covered     |          |
| 2             | 30·220                                                     | 62·0 | 16·5         | 81          | SE                 | 0·25           | 10·0                           | K       | ·01        | Clouds, dif. density   |          |
| 3             | 30·130                                                     | 65·0 | 18·5         | 94          | —                  | ·0             | 10·0                           | N       |            | Ditto, sky covered     |          |
| 4             | 31·105                                                     | 61·5 | 17·5         | 88          | —                  | ·0             | 3·5                            | K       |            | Stars, hazy            |          |
| 5             | 29·735                                                     | 62·0 | 16·5         | 94          | —                  | ·0             | 10·0                           | N       |            | Cloudy with rain       |          |
| 6             | 29·349                                                     | 61·0 | 13·0         | 88          | NW                 | ·0             | 10·0                           | K N     | ·29        | Ditto, sky covered     |          |
| 7             | 29·610                                                     | 55·5 | 13·0         | 93          | W                  | 2·60           | 7·0                            | K N     | ·12        | Few stars, faint       |          |
| 8             | 29·725                                                     | 60·0 | 15·5         | 71          | NW                 | ·52            | 4·0                            | K       | ·05        | Stars and clouds       |          |
| 9             | 29·820                                                     | 63·0 | 17·0         | 82          | NW                 | ·52            | 10·0                           | N       |            | Cloudy and dark        |          |
| 10            | 31·045                                                     | 58·0 | 14·5         | 86          | —                  | ·0             | 10·0                           | N       | ·04        | Ditto ditto            |          |
| 11            | 30·110                                                     | 56·5 | 13·5         | 86          | —                  | ·26            | 10·0                           | K N     |            | Ditto ditto            |          |
| 12            | 30·010                                                     | 57·0 | 14·0         | 93          | —                  | ·26            | 4·0                            | K       |            | Stars and cloud        |          |
| 13            | 29·815                                                     | 61·0 | 15·5         | 81          | —                  | ·0             | 4·0                            | K       |            | Ditto ditto            |          |
| 14            | 29·635                                                     | 62·0 | 16·5         | 94          | —                  | ·0             | 10·0                           | N       |            | Very dark              |          |
| 15            | 29·720                                                     | 66·0 | 19·0         | 68          | —                  | ·25            | 4·0                            | KS      |            | Stars faint, and 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 15TH TO THE 31ST MAY, 1877, 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 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. |                   |                          |
|               |                                                            |              |             |                    |                |                                |         |            |                   |                          |
| 16            | 29.640                                                     | 63.0         | 20.0        | 94                 | —              | .52                            | 10.0    | N          | In.               | Steady rain              |
| 17            | 29.425                                                     | 66.0         | 18.5        | 88                 | —              | .26                            | 9.0     | K N        | .30               | Dark and cloudy          |
| 18            | 29.311                                                     | 62.5         | 17.5        | 82                 | —              | .52                            | 5.5     | K          | .04               | Alternate star and cloud |
| 19            | 29.140                                                     | 64.0         | 17.5        | 88                 | N              | .52                            | 7.0     | K N        |                   | Ditto ditto              |
| 20            | 29.510                                                     | 60.0         | 15.5        | 81                 | N              | .52                            | 5.5     | K          | .08               | Alt. cloud and star      |
| 21            | 29.121                                                     | 61.0         | 16.0        | 87                 | N              | .52                            | 3.0     | K          |                   | Moon, star, and cloud    |
| 22            | 29.525                                                     | 60.0         | 15.5        | 81                 | W              | .23                            | 9.0     | K          | .04               | Moon and cloud           |
| 23            | 29.630                                                     | 55.0         | 13.0        | 93                 | —              | .23                            | 10.0    | N          |                   | Raining                  |
| 24            | 29.735                                                     | 55.0         | 13.0        | 93                 | S              | .52                            | 7.5     | K N        | .17               | Moon and cloud           |
| 25            | 29.710                                                     | 52.0         | 11.0        | 87                 | NW             | .52                            | 8.0     | K N        | .01               | Cold and hazy            |
| 26            | 29.645                                                     | 52.0         | 11.0        | 84                 | SW             | .26                            | 7.5     | KS         |                   | Alternate cloud          |
| 27            | 29.610                                                     | 57.0         | 14.0        | 93                 | —              | .0                             | 10.0    | K N        |                   | Thick and rainy          |
| 28            | 30.140                                                     | 56.0         | 12.5        | 93                 | —              | .0                             | 10.0    | K          | .22               | Dense K                  |
| 29            | 30.310                                                     | 55.0         | 13.0        | 87                 | S              | .0                             | 10.0    | KS         | .02               | Cloudy, sky covered      |
| 30            | 30.330                                                     | 61.0         | 15.5        | 76                 | S              | .23                            | 3.0     | K          |                   | Moon and starlight       |
| 31            | 30.130                                                     | 56.0         | 12.5        | 82                 | —              | .0                             | 7.0     | K          |                   | Moonlight                |

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.



# METEOROLOGY FOR JUNE, 1877.

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 instrumental error and to mean sea level. |           | Thermometers (Reading.) |                       | Thermometers (Self-Registering.) |                           | Relative Humidity. Percent  |                            | Clouds.   |           |            | Wind.   |            |         | Rain in Inches. | Spon. Evap.                    | Ozone. 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 20-120                                                     | 30-133    | 13.0                    | 56.0                  | 50.5                             | 68.5                      | 60.0                        | 34.0                       | 87        | 86        | N          | 10.0    | K          | 7.0     | SE              | .52                            | W               | .0                             | .08       |           |           |
| 2 30-210      | 30-140                                                       | 13.5      | 56.0                    | 52.0                  | 70.0                             | 58.0                      | 35.5                        | 87                         | 86        | K         | 7.0        | KS      | 8.5        | W       | .26             | NW                             | .0              | .06                            |           |           | 6.0       |
| 3 30-235      | 30-210                                                       | 9.0       | 48.0                    | 51.0                  | 57.5                             | 54.0                      | 36.0                        | 97                         | 86        | KS        | 10.0       | KN      | 10.0       | NW      | .0              | W                              | .0              | .0                             |           |           | 3.5       |
| 4 30-330      | 30-320                                                       | 9.0       | 48.0                    | 57.0                  | 87.0                             | 62.0                      | 33.0                        | 70                         | 76        | KT        | 6.0        | K       | 3.5        | N       | .0              | NW                             | .0              | .0                             |           |           | 3.0       |
| 5 30-335      | 30-235                                                       | 5.0       | 41.0                    | 53.5                  | 75.5                             | 58.0                      | 33.5                        | 84                         | 80        | K         | 5.0        | 0       | 0          | NW      | .0              | NW                             | .26             | .0                             |           |           | 3.0       |
| 6 30-225      | 30-200                                                       | 7.0       | 44.0                    | 54.0                  | 58.0                             | 55.0                      | 31.5                        | 86                         | 87        | K         | 10.0       | K       | 9.0        | NW      | .52             | NW                             | .26             | .0                             |           |           | 3.5       |
| 7 30-145      | 30-030                                                       | 10.0      | 50.0                    | 60.0                  | 74.5                             | 60.0                      | 34.5                        | 86                         | 82        | K         | 10.0       | K       | 7.5        | NW      | .0              | NW                             | .0              | .0                             | .03       |           | 3.0       |
| 8 20-810      | 20-740                                                       | 9.0       | 49.0                    | 61.0                  | 74.0                             | 66.0                      | 37.0                        | 93                         | 77        | K         | 7.5        | K       | 4.0        | NW      | .0              | W                              | .0              | .0                             |           |           | 3.5       |
| 9 30-040      | 30-020                                                       | 12.5      | 55.0                    | 50.0                  | 54.5                             | 54.5                      | 35.0                        | 93                         | 100       | N         | 10.0       | N       | 10.0       | S       | .52             | S                              | .26             | .60                            |           |           | 5.0       |
| 10 30-000     | 20-045                                                       | 7.5       | 46.0                    | 49.5                  | 56.0                             | 53.0                      | 32.5                        | 93                         | 80        | K         | 4.0        | KN      | 10.0       | S       | .0              | S                              | .0              | .44                            | .31       |           | 7.5       |
| 11 30-110     | 30-015                                                       | 6.5       | 44.0                    | 49.0                  | 85.0                             | 56.0                      | 31.0                        | 73                         | 79        | KS        | 4.0        | K       | 3.0        | W       | .0              | SW                             | .0              | .01                            |           |           | 4.0       |
| 12 30-040     | 20-040                                                       | 2.0       | 35.0                    | 47.0                  | 65.5                             | 55.0                      | 36.5                        | 91                         | 79        | KN        | 10.0       | KN      | 7.0        | NW      | .26             | W                              | .52             | .0                             |           |           | 4.5       |
| 13 20-920     | 20-840                                                       | 2.5       | 37.0                    | 45.0                  | 61.0                             | 50.0                      | 31.0                        | 84                         | 73        | K         | 4.0        | KN      | 10.0       | W       | .26             | NW                             | .52             | .02                            |           |           | 3.0       |
| 14 20-500     | 20-025                                                       | 7.5       | 46.0                    | 47.0                  | 59.5                             | 50.0                      | 34.5                        | 79                         | 93        | KS        | 9.0        | K       | 7.5        | NW      | .0              | S                              | .0              | .0                             |           |           | 4.0       |
| 15 20-335     | 20-025                                                       | 8.5       | 47.5                    | 47.0                  | 49.5                             | 48.5                      | 31.5                        | 93                         | 83        | N         | 16.0       | N       | 10.0       | W       | 2.60            | W                              | .26             | .02                            |           |           | 6.0       |
| 16 20-920     | 20-015                                                       | 6.5       | 43.5                    | 44.0                  | 49.0                             | 48.0                      | 30.0                        | 77                         | 85        | KN        | 9.0        | K       | 7.0        | SW      | 5.21            | W                              | .26             | .30                            |           |           | 8.0       |
| 17 20-945     | 30-115                                                       | 12.0      | 54.0                    | 54.0                  | 70.5                             | 54.0                      | 34.0                        | 70                         | 70        | K         | 7.0        | K       | 7.0        | N       | .26             | N                              | 2.60            | .0                             |           |           | 4.5       |
| 18 30-340     | 30-330                                                       | 8.5       | 47.5                    | 56.0                  | 67.0                             | 56.0                      | 31.5                        | 79                         | 85        | K         | 5.0        | K       | 6.0        | W       | 2.60            | NW                             | .0              | .01                            |           |           | 3.0       |
| 19 30-210     | 30-010                                                       | 12.0      | 54.0                    | 60.0                  | 84.0                             | 64.0                      | 33.5                        | 70                         | 62        | K         | 7.5        | KS      | 6.0        | N       | 2.60            | NW                             | 2.60            | .0                             |           |           | 4.0       |
| 20 20-330     | 20-910                                                       | 10.0      | 50.0                    | 54.0                  | 85.0                             | 61.0                      | 31.0                        | 93                         | 80        | K         | 7.5        | K       | 5.5        | SE      | .0              | NW                             | .0              | .13                            | .45       |           | 6.0       |
| 21 20-410     | 20-330                                                       | 11.5      | 54.5                    | 48.0                  | 80.0                             | 60.0                      | 33.5                        | 87                         | 100       | K         | 7.0        | K       | 10.0       | NW      | 2.60            | NW                             | 2.60            | .0                             |           |           | 3.5       |
| 22 20-310     | 20-825                                                       | 6.5       | 44.0                    | 54.0                  | 65.5                             | 58.0                      | 30.0                        | 84                         | 85        | K         | 6.0        | K       | 5.0        | NW      | .52             | NW                             | .52             | .60                            |           |           | 6.5       |
| 23 20-940     | 20-920                                                       | 9.0       | 49.0                    | 54.0                  | 66.0                             | 60.0                      | 33.5                        | 74                         | 70        | K         | 7.5        | K       | 7.5        | N       | .26             | N                              | .0              | .02                            |           |           | 3.0       |
| 24 20-935     | 30-030                                                       | 11.0      | 52.0                    | 58.0                  | 87.0                             | 58.5                      | 36.0                        | 69                         | 61        | K         | 7.0        | K       | 8.0        | S       | .26             | W                              | .0              | .0                             |           |           | 2.5       |
| 25 30-120     | 30-025                                                       | 7.0       | 44.0                    | 58.0                  | 84.0                             | 60.0                      | 32.5                        | 92                         | 76        | K         | 7.5        | KS      | 4.5        | W       | .0              | N                              | .26             | .02                            |           |           | 4.0       |
| 26 20-735     | 20-510                                                       | 4.5       | 40.5                    | 54.0                  | 84.0                             | 50.0                      | 31.0                        | 85                         | 87        | K         | 5.0        | KS      | 7.0        | NW      | .0              | NW                             | .26             | .0                             |           |           | 3.0       |
| 27 20-440     | 20-620                                                       | 5.5       | 42.0                    | 47.5                  | 67.0                             | 55.5                      | 33.5                        | 86                         | 86        | K         | 5.5        | N       | 10.0       | NW      | .52             | SW                             | .52             | .02                            |           |           | 4.0       |
| 28 30-120     | 30-145                                                       | 4.0       | 40.0                    | 49.0                  | 80.0                             | 67.0                      | 30.0                        | 100                        | 80        | KS        | 7.0        | K       | 6.0        | W       | .0              | NW                             | .0              | .40                            |           |           | 6.0       |
| 29 30-235     | 30-310                                                       | 6.0       | 41.0                    | 54.0                  | 85.0                             | 72.0                      | 33.0                        | 92                         | 86        | K         | 10.0       | K       | 10.0       | W       | .0              | NW                             | .0              | .01                            |           |           | 3.5       |
| 30 30-310     | 30-510                                                       | 4.0       | 39.0                    | 45.0                  | 86.0                             | 71.0                      | 32.5                        | 78                         | 87        | KS        | 10.0       | K       | 7.5        | NW      | .0              | N                              | .0              | .0                             | .75       |           | 4.0       |

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.

- 20th. *Pyrus japonica* commencing to flower.
- 21. *Crocus vernus* ditto.
- 24th. *Calycanthus præcox* in full flower.
- 25th. Common Privet shedding leaves.

F. ABBOTT, JUN., Superintendent.

Results of observations taken at New Norfolk in June, 1877, in accordance with new forms, and registered at 7 30 a.m., and 4 30 p.m. :-

Barometer, mean of two daily readings, corrected and reduced, 30.026 in.

Thermometer, mean of 2 ditto, 45.83deg.

Ditto, mean of maximum and minimum in shade, 46.10deg.

Dew point, mean position of 2 daily readings, 42.46deg.

Elastic force of vapour, mean of 2 ditto, .278.

Humidity, mean of 2 ditto, .90.

Solar intensity, mean of maximum temperature, 99.23deg.

Terrestrial radiation, mean of minimum temperature, 32.80deg.

- Rainfall, 2.46ins. : in excess of evaporation, .72in.
- Evaporation, 1.74in.
- Clouds, mean of 2 daily registers, 6.36.
- Ozone, mean of 2 daily ditto, 8.16 ; scale, 0-10.
- Wind, horizontal movement, 2610 miles.

W. E. SHOOTBRIDGE, Valleyfield.

Time of leafing, flowering and fruiting of a few standard plants in the Royal Society's Gardens during the month of June, 1877.

- 14th. *Iris alata* commencing to flower.
- 18th. *Maclura aurantiaca* shedding leaves.



### JUNE WEATHER.

The 1st June set in damp and cold with light showers and high barometer, and was a fair index of the weather throughout the month. Foggy mornings and fine days prevailed till 6th and 7th when it was showery and changeable, from N.W. rain on night of 7th, to E. drizzle on 9th. The 10th and 11th were clear cold days, and on the morning of 12th terrestrial radiation fell to 22deg, and the barometer which with the exception of the 8th had stood above 30 inches steadily fell to 29.58 inches on the 14th and we had cold wet and stormy weather principally from S.W. till 16th.

A very decided Barometric wave commenced on 15th when the barometer from 29.56 inches gradually rose to 30.40 inches on 18th, and as steadily fell to 29.56 inches on 21st, during which time we had warm windy weather with severe squalls from S.W. and N.W. and rain on 20th and 21st that caused considerable freshets in the tributaries of the Derwent.

From 21st there was another Barometric wave that reached to 30.15 inches on 25th, accompanied by five still days and mild nights till 27th, when the barometer at 29.55 was followed by cold stormy showers and a great deal of snow on the hills, and again the barometer steadily rose to 30.45 inches on 30th with southerly weather.

Rain fell on 15 days to the amount of 2.46 inches, as against 2.39 inches in June last year, and .72 inches in excess of evaporation, making up 9.34 inches from commencement of the year to 8.23 inches in 1876, 10.05 inches in 1875, and 8.92 inches in 1874.

The mean terrestrial radiation 32deg. 86min., was 1deg. 67min. higher than in May, and 63min. higher than in June, 1876, while the mean of maximum and minimum in shade, 46deg. 11min. was 48min. higher, and mean solar intensity 99deg. 23min. was 1deg. 40min. higher than last June.

The ozone 8.16 of scale 0-10, as is usually the case in snowy weather as last month, was very high. And the wind movement, 2,610 miles, was 260 miles more than last June.

W. E. SHOBRIDGE,

3rd July, 1877.

Valleyfield.



## METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH JUNE, 1877, 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 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. |                     |          |
| 1             | 30·210                                                     | 50·0 | 10·0         | 87          | —                  | 0              | 10·0                           | N       | ·08        | Clouds, sky covered |          |
| 2             | 30·220                                                     | 50·0 | 10·0         | 87          | —                  | 0              | 10·0                           | N       | ·06        | Ditto, ditto        |          |
| 3             | 30·230                                                     | 51·0 | 10·5         | 86          | —                  | ·25            | 4·0                            | K       |            | Stars in the Zenith |          |
| 4             | 30·345                                                     | 48·0 | 9·0          | 76          | —                  | 0              | 4·5                            | K       |            | Ditto ditto         |          |
| 5             | 30·240                                                     | 41·0 | 5·0          | 80          | NW                 | ·26            | 6·0                            | K       |            | Ditto ditto         |          |
| 6             | 30·210                                                     | 54·0 | 12·0         | 93          | NW                 | ·26            | 9·0                            | KN      |            | Sky cloudy          |          |
| 7             | 30·010                                                     | 56·5 | 13·5         | 88          | NW                 | 0              | 7·5                            | K       |            | Ditto ditto         |          |
| 8             | 29·910                                                     | 58·0 | 14·5         | 88          | —                  | ·26            | 9·0                            | KN      | ·03        | Cloudy and dark     |          |
| 9             | 30·020                                                     | 56·0 | 13·5         | 94          | S                  | ·26            | 10·0                           | N       | ·60        | Rain all day        |          |
| 10            | 30·040                                                     | 54·0 | 12·0         | 87          | S                  | 0              | 10·0                           | N       |            | Cloud, sky covered  |          |
| 11            | 30·000                                                     | 45·0 | 7·5          | 86          | SW                 | 0              | 0                              | 0       | ·01        | Starlight           |          |
| 12            | 29·740                                                     | 47·0 | 8·5          | 86          | W                  | ·52            | 5·0                            | KN      |            | Stars and clouds    |          |
| 13            | 29·810                                                     | 49·0 | 9·5          | 86          | NW                 | ·52            | 5·0                            | K       | ·02        | Stars faint         |          |
| 14            | 29·545                                                     | 50·0 | 10·0         | 83          | S                  | ·26            | 5·5                            | K       |            | Stars in the Zenith |          |
| 15            | 29·720                                                     | 49·0 | 9·5          | 93          | W                  | 2·60           | 6·5                            | N       | ·62        | Ditto 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 JUNE, 1877, 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 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. |                        |          |
| 16            | 30.035                                                     | 49.0        | 9.5          | 93 | —                  | .26            | 10.0                           | KN      | .30        | Windabated             |          |
| 17            | 30.220                                                     | 54.0        | 12.0         | 86 | NW                 | .52            | 7.5                            | K       |            | Few stars faint        |          |
| 18            | 30.400                                                     | 55.0        | 13.0         | 88 | NW                 | .26            | 10.0                           | K       | .01        | Cloudy, heavy rain     |          |
| 19            | 29.840                                                     | 53.0        | 14.5         | 82 | NW                 | .52            | 10.0                           | K       |            | Cloudy, sky covered    |          |
| 20            | 29.931                                                     | 56.0        | 13.0         | 94 | NW                 | .26            | 10.0                           | KN      | .13        | Sky cloudy             |          |
| 21            | 29.621                                                     | 54.0        | 12.0         | 87 | NW                 | 2.30           | 9.0                            | KN      |            | Squally                |          |
| 22            | 29.910                                                     | 54.5        | 12.5         | 87 | W                  | .52            | 8.0                            | KN      | .60        | Moon and clouds        |          |
| 23            | 29.925                                                     | 54.5        | 12.5         | 88 | —                  | .0             | 7.5                            | K       | .02        | Ditto ditto            |          |
| 24            | 30.126                                                     | 57.0        | 14.0         | 94 | W                  | .0             | 10.0                           | K       |            | Cloudy, sky covered    |          |
| 25            | 31.001                                                     | 55.5        | 13.5         | 88 | N                  | .26            | 3.0                            | K       | .02        | Moonlight              |          |
| 26            | 29.425                                                     | 54.0        | 12.0         | 81 | NW                 | .52            | 7.5                            | K       |            | Moon and cloud         |          |
| 27            | 29.740                                                     | 48.0        | 11.0         | 93 | SW                 | 5.21           | 10.0                           | N       | .02        | Squally, wind and rain |          |
| 28            | 30.210                                                     | 47.0        | 8.5          | 86 | NW                 | .26            | 7.0                            | K       | .40        | Sky hazy               |          |
| 29            | 30.420                                                     | 52.5        | 11.5         | 81 | NW                 | .26            | 3.0                            | K       | .01        | Moon, star, and cloud  |          |
| 30            | 31.535                                                     | 51.5        | 10.5         | 87 | NW                 | .0             | 3.5                            | K       |            | Ditto 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.



# METEOROLOGY FOR JULY, 1877.

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 instrumental error and to mean sea level. |           | Thermometers (Reading.) |                       |                       |                           | Thermometers (Self-Registering.) |                            |           | Relative Humidity Per cent |            | Clouds. |            | Wind.   |                 | Rain in Inches. | Spon. Evap. | Ozone Chron. 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. |
| 1 20-530 30-510  | 5.0                                                          | 41.0      | 53.0                    | 82.0                  | 60.0                  | 30.0                      | 85                               | 80                         | 0         | 0                          | K          | 5.0     | NW         | 0       | N               | 0               | —           | —                   | 4.0                            |
| 2 30-510 30-430  | 4.5                                                          | 39.0      | 40.0                    | 82.5                  | 60.0                  | 29.0                      | 100                              | 80                         | KS        | 5.5                        | KS         | 3.5     | N          | 0       | NW              | .26             | —           | —                   | 5.0                            |
| 3 30-515 30-445  | 5.5                                                          | 40.5      | 48.0                    | 85.0                  | 65.0                  | 30.5                      | 92                               | 86                         | K         | 3.0                        | K          | 10.0    | N          | .26     | NW              | .26             | —           | —                   | 3.5                            |
| 4 30-535 30-500  | 3.5                                                          | 38.5      | 49.0                    | 75.0                  | 60.0                  | 31.0                      | 92                               | 86                         | KS        | 5.5                        | K          | 5.0     | NW         | 0       | NW              | 0               | —           | —                   | 6.0                            |
| 5 30-420 30-320  | 2.5                                                          | 36.5      | 49.0                    | 74.5                  | 55.0                  | 28.5                      | 91                               | 80                         | KS        | 7.0                        | K          | 7.0     | N          | .26     | NW              | 0               | —           | —                   | 5.5                            |
| 6 30-325 30-300  | 6.0                                                          | 43.0      | 54.0                    | 59.0                  | 54.5                  | 34.5                      | 85                               | 80                         | KN        | 10.0                       | K          | 10.0    | N          | 0       | NW              | 0               | —           | —                   | 4.0                            |
| 7 30-320 30-215  | 5.5                                                          | 42.0      | 55.0                    | 85.0                  | 68.0                  | 33.0                      | 92                               | 87                         | K         | 5.5                        | KS         | 6.5     | NW         | 0       | N               | 0               | .01         | —                   | 3.5                            |
| 8 30-035 29-825  | 5.0                                                          | 41.0      | 57.0                    | 78.0                  | 61.0                  | 32.5                      | 85                               | 87                         | K         | 7.0                        | K          | 10.0    | N          | .26     | NW              | .52             | —           | —                   | 4.0                            |
| 9 30-003 29-010  | 4.0                                                          | 40.0      | 53.0                    | 82.0                  | 58.0                  | 31.0                      | 92                               | 64                         | K         | 3.0                        | K          | 4.0     | NW         | .26     | N               | .26             | .01         | —                   | 5.0                            |
| 10 30-245 30-315 | 2.0                                                          | 36.0      | 52.0                    | 74.5                  | 52.0                  | 28.5                      | 83                               | 50                         | K         | 2.0                        | K          | 2.0     | S          | 0       | NW              | .26             | .02         | .47                 | 5.0                            |
| 11 30-425 30-415 | 4.0                                                          | 39.0      | 54.0                    | 75.0                  | 59.0                  | 30.0                      | 92                               | 74                         | K         | 6.5                        | K          | 4.0     | N          | 0       | NW              | 0               | —           | —                   | 3.0                            |
| 12 30-435 30-320 | 3.0                                                          | 38.0      | 52.0                    | 73.0                  | 59.0                  | 28.0                      | 84                               | 84                         | 0         | 0                          | KS         | 7.0     | SW         | 0       | NW              | 0               | —           | —                   | 4.0                            |
| 13 30-310 30-230 | 3.0                                                          | 37.0      | 53.0                    | 78.5                  | 64.0                  | 28.5                      | 84                               | 74                         | KS        | 7.0                        | K          | 6.0     | NW         | .26     | SW              | 0               | —           | —                   | 7.5                            |
| 14 30-480 30-430 | 2.5                                                          | 36.5      | 51.0                    | 83.0                  | 60.0                  | 27.5                      | 100                              | 86                         | K         | 5.5                        | 0          | 0       | NW         | .26     | SE              | 0               | .01         | —                   | 5.0                            |
| 15 30-510 30-410 | 2.0                                                          | 35.0      | 50.0                    | 75.5                  | 56.0                  | 27.0                      | 92                               | 80                         | K         | 5.0                        | KN         | 4.0     | NW         | .26     | N               | 0               | —           | —                   | 4.0                            |
| 16 30-325 30-205 | 4.0                                                          | 39.0      | 52.0                    | 65.5                  | 56.0                  | 29.0                      | 92                               | 80                         | K         | 7.5                        | N          | 10.0    | NW         | 0       | NE              | 0               | —           | —                   | 2.5                            |
| 17 29-940 29-910 | 8.0                                                          | 47.0      | 53.0                    | —                     | 57.0                  | 34.0                      | 93                               | 93                         | K         | 10.0                       | N          | 10.0    | NW         | 0       | S               | 0               | —           | —                   | 2.0                            |
| 18 29-609 29-520 | 13.0                                                         | 55.5      | 57.0                    | —                     | 57.0                  | 34.5                      | 100                              | 93                         | N         | 10.0                       | N          | 10.0    | S          | .52     | S               | .52             | 1.50        | —                   | 5.5                            |
| 19 29-815 29-910 | 10.0                                                         | 50.0      | 52.0                    | —                     | 55.0                  | 31.0                      | 100                              | 100                        | N         | 10.0                       | K          | 10.0    | S          | .26     | S               | .26             | .35         | —                   | 7.0                            |
| 20 30-140 30-140 | 7.5                                                          | 46.0      | 51.0                    | —                     | 53.0                  | 30.5                      | 85                               | 80                         | KS        | 6.0                        | K          | 10.0    | NW         | 0       | S               | 0               | .04         | —                   | 7.5                            |
| 21 30-225 30-120 | 3.5                                                          | 38.0      | 53.0                    | 65.0                  | 58.0                  | 29.0                      | 85                               | 74                         | K         | 2.0                        | 0          | 6.0     | N          | 0       | NW              | .26             | .01         | .94                 | 4.0                            |
| 22 30-310 30-230 | 3.0                                                          | 38.0      | 51.5                    | 87.5                  | 72.0                  | 31.0                      | 84                               | 74                         | K         | 3.0                        | K          | 0       | N          | .26     | SE              | 0               | —           | —                   | 5.5                            |
| 23 30-299 30-115 | 3.0                                                          | 37.0      | 52.0                    | 68.0                  | 57.0                  | 31.0                      | 91                               | 86                         | K         | 7.5                        | K          | 4.5     | S          | 0       | NW              | .26             | —           | —                   | 5.0                            |
| 24 30-110 30-020 | 4.0                                                          | 39.0      | 57.0                    | 83.0                  | 59.0                  | 34.0                      | 84                               | 61                         | K         | 10.0                       | K          | 3.0     | SW         | 0       | NW              | .26             | —           | —                   | 4.0                            |
| 25 30-110 30-000 | 6.5                                                          | 44.0      | 59.0                    | 87.0                  | 61.0                  | 36.0                      | 79                               | 61                         | KS        | 5.0                        | K          | 5.5     | N          | 0       | NW              | .26             | —           | —                   | 3.0                            |
| 26 29-910 29-740 | 4.5                                                          | 40.5      | 58.0                    | 78.0                  | 62.0                  | 34.0                      | 78                               | 66                         | K         | 6.0                        | K          | 7.5     | N          | .26     | NW              | .26             | —           | —                   | 3.5                            |
| 27 29-419 29-210 | 7.5                                                          | 45.0      | 55.0                    | 72.0                  | 58.0                  | 35.5                      | 86                               | 74                         | K         | 10.0                       | K          | 5.0     | SW         | 0       | N               | .52             | .01         | —                   | 5.5                            |
| 28 29-625 29-625 | 6.5                                                          | 44.0      | 60.0                    | 80.0                  | 65.0                  | 36.0                      | 84                               | 71                         | K         | 5.5                        | K          | 7.0     | NW         | .26     | W               | .26             | —           | —                   | 3.5                            |
| 29 29-830 29-845 | 9.0                                                          | 48.5      | 61.0                    | 87.5                  | 63.0                  | 37.5                      | 86                               | 62                         | K         | 9.0                        | K          | 7.0     | S          | 0       | W               | .52             | —           | —                   | 4.0                            |
| 30 29-130 30-040 | 10.5                                                         | 51.0      | 65.0                    | 95.0                  | 69.0                  | 38.0                      | 70                               | 59                         | K         | 1                          | K          | 1.0     | NW         | .26     | N               | 0               | —           | .70                 | 4.0                            |
| 31 29-940 29-810 | 5.0                                                          | 41.0      | 60.0                    | 85.0                  | 64.0                  | 33.0                      | 85                               | 66                         | 0         | 0                          | KS         | 6.0     | N          | 0       | N               | 0               | —           | —                   | 2.5                            |

| Mean Press.  | Mean Mn. Tem. | Mean Max. Tem. | Mean Max. Wind | Mean Rain  | Mean Rel. Hum. | Mean for Month. | Mean Force ...           | 13 lbs.                      | TL.  | TL.  | TL.       |
|--------------|---------------|----------------|----------------|------------|----------------|-----------------|--------------------------|------------------------------|------|------|-----------|
| 30.132       | 5.25          | 47.63          | 77.72          | 59.70      | 31.70          | 82              | 6.00                     | —                            | 1.96 | 2.11 | 137.0     |
| Greatest do. | Max. 13.00    | ...            | Max. 95.00     | Max. 72.00 | Max. 33.00     | ...             | Prev. Character, K & KS. | Greatest Force .52 "         | ...  | ...  | Mean 4.43 |
| Least do.    | Min. 29.210   | 2.00           | ...            | Min. 56.00 | Min. 53.00     | 27.00           | ...                      | Least Force.... 0 "          | ...  | ...  | ...       |
|              |               |                |                |            |                |                 |                          | Prevailing Direction. N. W., |      |      |           |

The Meteorological form brought into use at the beginning of 1870 differs in some respects from the former one. It has been adapted 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 July, 1877.

10th. *Arbutus unedo* commencing to flower.

16th. *Garrya elliptica* commencing to flower.

18th. *Pavia Californica* buds bursting.

18th. *White mulberry* commencing to leaf.

20th. *Yellow Crocus* in flower.

21st. *Almond* in full flower.

F. ABBOTT, JUN., Superintendent.

Results of observations taken at New Norfolk for July, 1877, in accordance with new forms, and registered at 7.30 a.m., and 4.30 p.m.:

Barometer, mean of two daily readings, corrected and reduced, 30.100 in.

Thermometer, mean of 2 ditto, 43.53deg.

Ditto, mean of maximum and minimum in shade, 44.46deg.

Dew point, mean position of 2 daily readings, 39.15deg.

Elastic force of vapour, mean of 2 ditto, .240.

Humidity of air, mean of 2 ditto, .84.

Solar intensity, mean of maximum temperature, 100.04deg.

Terrestrial radiation, mean of minimum temperature, 29.42deg.

Rainfall, 1.27ins. on five days.

Clouds, mean of 2 daily registers, 5.90.

Ozone, mean of 2 daily ditto, 7.62.

W. E. SHOOBRIDGE, Bushy Park.

NOTE.—On 16th the observatory was removed to Bushy Park, and the observations on four days, except the rainfall, were not registered, consequently the above means are from 27 days only. As it is in the same valley the removal is not expected to influence the results in any material degree.

W. E. S.



## JULY WEATHER.

We had a rather larger dose of "July fog" than usual this year, although only two lasted all day, and most days cleared bright and warm after the fogs cleared away, generally about 11 o'clock.

Foggy mornings and clear cold days, with high barometer, prevailed from the 1st to 9th, when a slight fall to 29·85in. was followed by a slight shower, and the glass again rose with cold frosty weather and thick fogs; that on 15th lasted all day. During this time the barometer stood almost continuously at 30·45 inches. On 16th a thick cloudy sky, and a falling barometer, ushered in a change, and on the 18th there was a steady, long, continued downpour. 1·14 inches of rain, out of a total of 1·27 inches for the month, fell in 30 hours. After this we had again clear, cold, and still weather, and a high barometer till 24th, when a very decided change, that seemed to bring us suddenly from winter to spring. Heavy masses of clouds were driven from N.W. by high and mild winds that occasionally descended to the earth's surface, and the barometer steadily fell to 29·21 inches on 27th, and two light showers fell from clouds that seemed to have parted with their surplus moisture before they reached our district.

An unsettled barometer and a disturbed sky till the end of the month appear to indicate that we shall have changeable stormy weather for some time to come.

There has been 10·61 inches of rain since the commencement of the year, to 9·87 inches to same time in 1876; 11·53 inches in 1875, and 10·69 inches in 1874.

The mean of terrestrial radiation was 29·42°. to 26·90° last year. Mean temperature in shade, 44·46° to 41·53°; Solar intensity, 100·04° to 94·96 of last July, prove how warm and bright this month has been.

The clouds, 5·90 this year to 5·37 last, was owing to fogs, of which we had 14 to 8 of last July.

The ozone was almost the same, 7·62 to 7·82.

Bushy Park, W. E. SHOOBRIDGE.

2nd August, 1877.



## METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH JULY, 1877, 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 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. |                   |                       |
| 1             | 30.520                                                     | 52.5  | 11.5         | $\frac{74}{74}$ | 0                  | 0              | 0                              | 0       | 0          | In.               | Stars in the zenith   |
| 2             | 30.440                                                     | 50.0  | 10.0         | 81              | NW                 | .26            | 3.5                            | KS      |            |                   | Stars to the zenith   |
| 3             | 30.506                                                     | 48.0  | 9.0          | 86              | NW                 | .26            | 4.0                            | K       |            |                   | Ditto ditto           |
| 4             | 30.445                                                     | 49.0  | 9.5          | 86              | NW                 | .0             | 3.5                            | K       |            |                   | Faint stars by plaxis |
| 5             | 30.330                                                     | 48.0  | 9.0          | 86              | N                  | .26            | .0                             | .0      |            |                   | Starlight             |
| 6             | 30.330                                                     | 53.0  | 12.5         | 93              | 0                  | .0             | 10.0                           | KN      |            |                   | Sky cloudy            |
| 7             | 30.200                                                     | 52.11 | 11.0         | 81              | N                  | .26            | 4.0                            | K       | .01        |                   | Starlight             |
| 8             | 29.845                                                     | 54.5  | 13.5         | 87              | NW                 | .52            | 10.0                           | N       |            |                   | Cloudy and dark       |
| 9             | 30.040                                                     | 51.0  | 10.5         | 87              | N                  | .26            | 10.0                           | N       | .01        |                   | Dark, with rain       |
| 10            | 30.400                                                     | 50.0  | 10.0         | 86              | NW                 | .26            | 4.0                            | K       | .02        |                   | Stars to the zenith   |
| 11            | 30.445                                                     | 49.5  | 9.5          | 87              | NW                 | .0             | 4.0                            | K       |            |                   | Stars to the zenith   |
| 12            | 30.320                                                     | 50.0  | 10.0         | 87              | NW                 | .26            | 3.5                            | K       |            |                   | Cloud in the horizon  |
| 13            | 30.325                                                     | 50.0  | 10.0         | 87              | SW                 | .0             | 4.5                            | K       |            |                   | Stars in the zenith   |
| 14            | 35.010                                                     | 49.0  | 9.5          | 87              | 0                  | .0             | 3.0                            | K       |            |                   | Starlight             |
| 15            | 30.430                                                     | 50.0  | 10.0         | 87              | —                  | .0             | 10.0                           | N       |            |                   | 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 JULY, 1877, 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 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. |        |      |                   |                     |
| 16            | 30.120                                                     | 52.0        | 11.0           | 93                             | —                  | 0       | 10.0       | KN     | In.  |                   | Cloudy, sky covered |
| 17            | 29.740                                                     | 55.0        | 13.0           | 93                             | 0                  | 0       | 10.0       | 0      |      |                   | Cloudy sky and rain |
| 18            | 29.625                                                     | 56.0        | 13.5           | 100                            | S                  | 0       | 10.0       | N      | 1.50 |                   | Rain throughout     |
| 19            | 30.020                                                     | 53.0        | 12.0           | 93                             | S                  | .26     | 10.0       | N      | .35  |                   | Rain and clouds     |
| 20            | 30.210                                                     | 41.5        | 5.5            | 93                             | —                  | 0       | 0          | 0      | .04  |                   | Moon and starlight  |
| 21            | 30.14                                                      | 47.5        | 8.5            | 93                             | S                  | .26     | 10.0       | N      | .01  |                   | Squally wind & rain |
| 22            | 30.310                                                     | 40.0        | 4.5            | 87                             | —                  | 0       | 0          | 0      |      |                   | Moon and starlight  |
| 23            | 30.110                                                     | 43.0        | 6.0            | 87                             | NW                 | .52     | 7.0        | K      |      |                   | Ditto ditto         |
| 24            | 30.030                                                     | 49.0        | 9.5            | 87                             | NW                 | .23     | 11.0       | K      |      |                   | Cloudy, sky covered |
| 25            | 30.000                                                     | 47.5        | 8.5            | 88                             | NW                 | 0       | 4.0        | K      |      |                   | Moonlight           |
| 26            | 29.715                                                     | 52.5        | 11.5           | 82                             | NW                 | .26     | 10.0       | K      |      |                   | Cloudy, sky covered |
| 27            | 29.345                                                     | 49.5        | 9.5            | 81                             | N                  | .52     | 9.0        | K      | .01  |                   | Large K clouds      |
| 28            | 29.745                                                     | 52.5        | 11.5           | 88                             | NW                 | .26     | 8.5        | K      |      |                   | Moon and Cloud      |
| 29            | 30.015                                                     | 51.0        | 10.5           | 82                             | NW                 | .26     | 7.0        | KS     |      |                   | Stars and clouds    |
| 30            | 30.040                                                     | 50.0        | 10.0           | 76                             | NW                 | .26     | 0          | 0      |      |                   | Starlight           |
| 31            | 29.745                                                     | 52.5        | 11.5           | 82                             | N                  | .26     | 4.0        | K      |      |                   | Starlight in 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.



# METEOROLOGY FOR AUGUST, 1877.

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.         |           | 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.  | 4-30 p.m. | 7-30 a.m.  | 4-30 p.m.       | 7-30 a.m.       | 7-30 a.m.                      | 7-30 a.m.       |                                |
|               | Per cent                                                                   |           | 7-30 a.m.               |                       | 4-30 p.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. |
| 1             | 29.715                                                                     | 29.725    | 9.0                     | 49.0                  | 56.0                             | 78.0                      | 61.0                        | 37.0                       | 93        | 75        | N          | 10        | K          | 7               | NW              | 26                             | S               | 0                              |
| 2             | 29.810                                                                     | 29.755    | 8.0                     | 47.0                  | 60.0                             | 85.5                      | 63.0                        | 34.5                       | 86        | 62        | N          | 10        | K          | 7.5             | NW              | 0                              | N               | 2.60                           |
| 3             | 29.735                                                                     | 29.810    | 10.5                    | 51.0                  | 52.0                             | 72.0                      | 60.0                        | 36.5                       | 86        | 86        | K          | 7.0       | KN         | 6.0             | NW              | 52                             | N               | 26                             |
| 4             | 29.920                                                                     | 29.610    | 5.5                     | 41.5                  | 46.0                             | 76.0                      | 50.5                        | 32.0                       | 77        | 93        | KN         | 8.5       | N          | 10.0            | NW              | 0                              | NW              | 26                             |
| 5             | 29.910                                                                     | 29.920    | 5.5                     | 42.0                  | 43.0                             | —                         | 50.0                        | 30.0                       | 85        | 86        | N          | 10.0      | N          | 10.0            | NW              | 2.60                           | 0               | 0                              |
| 6             | 29.810                                                                     | 29.625    | 10.0                    | 50.0                  | 55.0                             | 78.0                      | 55.5                        | 30.0                       | 60        | 79        | KN         | 9.0       | K          | 3.0             | NW              | 0                              | W               | 0                              |
| 7             | 29.230                                                                     | 29.310    | 3.0                     | 39.0                  | 50.0                             | 80.0                      | 64.0                        | 34.0                       | 72        | 53        | K          | 10.0      | K          | 2.0             | N               | 26                             | N               | 52                             |
| 8             | 29.040                                                                     | 29.820    | 6.5                     | 44.0                  | 60.0                             | 84.0                      | 60.0                        | 34.0                       | 93        | 61        | K          | 7.0       | K          | 4.5             | NW              | 2.60                           | NW              | 52                             |
| 9             | 29.725                                                                     | 29.810    | 8.0                     | 47.0                  | 58.0                             | 84.0                      | 63.0                        | 34.0                       | 70        | 74        | KN         | 10.0      | K          | 4.0             | NW              | 5.20                           | NW              | 52                             |
| 10            | 29.340                                                                     | 29.345    | 12.0                    | 55.0                  | 49.5                             | 68.0                      | 57.0                        | 35.5                       | 78        | 74        | KN         | 7.0       | K          | 7.0             | N               | 26                             | NW              | 52                             |
| 11            | 29.725                                                                     | 29.715    | 6.5                     | 43.5                  | 52.0                             | 85.0                      | 56.5                        | 35.5                       | 78        | 74        | KN         | 2.0       | N          | 10.0            | NW              | 10.42                          | S               | 26                             |
| 12            | 29.610                                                                     | 29.705    | 15.0                    | 60.0                  | 52.0                             | —                         | 64.0                        | 38.0                       | 53        | 100       | K          | 5.0       | K          | 6.0             | NW              | 26                             | N               | 26                             |
| 13            | 29.040                                                                     | 29.010    | 8.5                     | 48.0                  | 56.0                             | 88.0                      | 61.0                        | 34.5                       | 79        | 70        | K          | 2.0       | N          | 10.0            | NW              | 0                              | SW              | 52                             |
| 14            | 29.210                                                                     | 29.440    | 11.0                    | 52.0                  | 47.0                             | 85.0                      | 57.0                        | 37.0                       | 100       | 93        | KN         | 8.0       | KN         | 9.0             | NW              | 26                             | NW              | 26                             |
| 15            | 29.425                                                                     | 29.415    | 8.0                     | 47.0                  | 51.5                             | 80.0                      | 57.0                        | 34.0                       | 79        | 50        | KN         | 8.0       | KN         | 7.5             | W               | 0                              | NW              | 0                              |
| 16            | 29.010                                                                     | 29.110    | 6.0                     | 43.0                  | 52.0                             | 85.0                      | 60.0                        | 33.0                       | 67        | 80        | K          | 5.0       | K          | 3.5             | N               | 0                              | SE              | 0                              |
| 17            | 29.300                                                                     | 29.140    | 2.0                     | 36.0                  | 51.5                             | 86.0                      | 58.0                        | 30.0                       | 77        | 75        | 0          | 0         | KS         | 3.5             | N               | 0                              | SE              | 0                              |
| 18            | 29.040                                                                     | 29.930    | 5.5                     | 42.0                  | 52.0                             | 90.0                      | 61.0                        | 33.5                       | 79        | 62        | 0          | 0         | K          | 7.0             | NW              | 0                              | NW              | 26                             |
| 19            | 29.810                                                                     | 29.710    | 8.0                     | 42.0                  | 54.0                             | 84.0                      | 61.5                        | 34.0                       | 93        | 86        | KN         | 7.5       | KN         | 7.5             | N               | 0                              | NW              | 52                             |
| 20            | 29.985                                                                     | 29.910    | 7.5                     | 46.0                  | 48.0                             | —                         | 58.0                        | 33.5                       | 93        | 93        | KN         | 9.0       | K          | 5.0             | S               | 0                              | 0               | 0                              |
| 21            | 29.120                                                                     | 29.130    | 4.5                     | 40.0                  | 50.0                             | 75.0                      | 57.0                        | 31.5                       | 78        | 100       | K          | 9.0       | KN         | 9.0             | NW              | 0                              | S               | 0                              |
| 22            | 29.130                                                                     | 29.030    | 3.0                     | 38.0                  | 56.0                             | 82.0                      | 56.0                        | 31.0                       | 76        | 71        | K          | 4.0       | KS         | 3.5             | W               | 26                             | N               | 26                             |
| 23            | 29.525                                                                     | 29.415    | 6.0                     | 43.0                  | 60.0                             | 82.5                      | 62.5                        | 34.5                       | 92        | 66        | KN         | 10.0      | KN         | 8.0             | NW              | 26                             | NW              | 52                             |
| 24            | 29.510                                                                     | 29.515    | 9.0                     | 49.0                  | 55.0                             | 85.0                      | 59.0                        | 36.0                       | 68        | 75        | K          | 6.5       | K          | 7.0             | N               | 52                             | W               | 26                             |
| 25            | 29.315                                                                     | 29.420    | 7.0                     | 45.0                  | 55.0                             | 78.0                      | 58.0                        | 34.0                       | 93        | 65        | KN         | 10.0      | K          | 6.0             | NW              | 0                              | NW              | 26                             |
| 26            | 29.520                                                                     | 29.445    | 9.5                     | 49.5                  | 52.0                             | 75.0                      | 55.0                        | 33.0                       | 78        | 86        | N          | 10.0      | KN         | 7.5             | S               | 26                             | NW              | 5.21                           |
| 27            | 29.940                                                                     | 29.020    | 5.5                     | 42.0                  | 59.0                             | 75.0                      | 58.0                        | 35.0                       | 72        | 69        | K          | 7.0       | K          | 7.5             | S               | 26                             | S               | 26                             |
| 28            | 29.310                                                                     | 29.310    | 7.5                     | 46.0                  | 52.0                             | 68.0                      | 58.0                        | 35.0                       | 84        | 69        | K          | 9.0       | K          | 4.0             | NW              | 0                              | SE              | 26                             |
| 29            | 29.415                                                                     | 29.340    | 6.0                     | 43.0                  | 52.0                             | 86.0                      | 59.0                        | 33.0                       | 82        | 69        | K          | 7.5       | 0          | 0               | NW              | 0                              | SE              | 26                             |
| 30            | 29.410                                                                     | 29.240    | 5.0                     | 41.0                  | 53.0                             | 86.0                      | 58.0                        | 32.0                       | 78        | 85        | K          | 7.5       | 0          | 0               | NW              | 0                              | SE              | 26                             |
| 31            | 29.120                                                                     | 29.920    | 3.0                     | 38.0                  | 57.0                             | 90.0                      | 58.0                        | 30.5                       | 69        | 61        | 0          | 0         | K          | 7.0             | N               | 26                             | N               | 26                             |

NOTE.—Force and speed of wind on August 6th :—Force : From 16 to 20lbs. per square foot. Speed : From 56-568 to 63-245 miles per hour.

The Meteorological form brought into use at the beginning of 1876 differs in some respects from the former one. It has been adapted 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 August, 1877.

8th. Horsechestnut commencing to break into leaf.

- 14th. Common elder (*Sambucus niger*) ditto.
- 14th. Gooseberries, ditto.
- 20th. Common elm (*Ulmus campestris*) in flower.
- 27th. Common poplar (*Lombardy*) commencing to break into leaf.

28th. Royal apricot in flower.

F. ABBOTT, JUN., Superintendent.

Results of observations taken at New Norfolk for August, 1877, in accordance with new forms, and registered at 7-30 a.m., and 4-30 p.m. :—

Barometer, mean of two daily readings, corrected and reduced, 29.836 in.

Thermometer, mean of 2 ditto, 44.46deg.

Ditto, mean of maximum and minimum in shade, 46.46deg.

Dew point, mean position of 2 daily readings, 39.70deg.

Elastic force of vapour, mean of 2 ditto, .246.

Humidity of air, mean of 2 ditto, .85.

Solar intensity, mean of maximum temperature, 110.90deg.

Terrestrial radiation, mean of minimum temperature, 31.72deg.

Rainfall, 4.36in., in excess of evaporation 2.50in.

Clouds, mean of 2 daily registers, 6.31.

Ozone, mean of 2 daily ditto, 8.59.

W. E. SHOEBRIDGE, Bushy Park.

Rainfall at Hill Station, 1.550ft. above sea level, 4.70in.



## AUGUST WEATHER.

The anticipations of rough, stormy weather at the commencement of this month were fully realised, the prevailing weather being wet and stormy, with severe gales from N.W. and S.W. The first four days were wet and stormy from N.W., 1.35 inches of rain falling in 24 hours, from 2 p.m. on 4th. On the next day snow storms set in from the S.W., and the maximum in shade that had been up to 64° on the 2nd, was only 48° on the 5th. The 6th and 7th were fine, and on the 8th there was a hard frost, the terrestrial radiation being down to 23° with a falling barometer and a great deal of thunder and lightning in the evening. Stormy showers with lightning in W. were the rule till the 14th, when the barometer fell to 29.32 inches, and, after a heavy fall of .46 inch of rain in the afternoon, it cleared up somewhat, and there were fine, clear days and frosty nights, with the exception of a shower on the night of the 18th, till 22nd, when the barometer again went down, and S.W. storms set in, with plenty of snow on the hills, till the 26th, when it veered round for awhile to N.W., but was back again next day to S.W., and on 28th westerly weather and a rising glass brought in fine weather till the end of the month.

Rain fell on 20 days to the large amount of 4.36 inches, being the highest register for August in four years, and was only exceeded in three months during that period, viz. : in November, 1874, when there were 5.35 inches; December, 1875, 5.91 inches; and November, 1876, 4.52 inches; making up a total since the beginning of the year of 14.97 inches to 12.04 inches in 1876, 13.46 in 1875, and 12.48 in 1874, the rainfall for August in those years being 2.17 in., 1.93 in. and 1.79 inches.

The evaporation was only 1.86 inches, whereas last year it was 2.45 inches.

The mean temperature, 46.46°, is about the average for August, and so is the Terrestrial radiation, 31.72°, while the Solar intensity, 110.90°, is 5° higher.

The wet character of the month will no doubt retard the spring growth, and be very injurious to crops in stiff, low-lying, and ill-drained lands, yet it will be of great assistance to the grasses and late crops, by enabling them to withstand the dryness of our summer weather, and judging from the dry windy weather that has already set in, they will need all the moisture they have, and a great deal more before many months.

W. E. SHOBRIDGE,  
Bushy Park.

5th September, 1877.



## METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH AUGUST, 1877, 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 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. |        |     |                   |                         |
|               |                                                            |             |                |                                |                    |         |            | °      | %   |                   |                         |
| 1             | 29.825                                                     | 49.0        | 9.5            | 88                             | S                  | .25     | 7.0        | KN     | In. |                   | Sky thick and hazy      |
| 2             | 29.710                                                     | 57.0        | 14.0           | 88                             | NW                 | .52     | 8.5        | KN     | .03 |                   | Cloudy, stars faint     |
| 3             | 29.930                                                     | 46.0        | 8.0            | 79                             | N E                | .52     | 4.5        | K      | .05 |                   | Starlight               |
| 4             | 29.535                                                     | 43.0        | 6.0            | 100                            | —                  | .26     | 10.0       | N      |     |                   | Continues rain          |
| 5             | 30.019                                                     | 43.0        | 6.5            | 86                             | NW                 | .52     | 4.0        | K      | .95 |                   | Starlight               |
| 6             | 29.810                                                     | 44.0        | 6.5            | 80                             | NW                 | 15.62   | 6.0        | KN     | .20 |                   | Strong wind all day     |
| 7             | 30.240                                                     | 39.5        | 4.0            | 86                             | —                  | .26     | 7.0        | K      | .06 |                   | Few stars in the zenith |
| 8             | 29.610                                                     | 53.5        | 12.0           | 58                             | N                  | .52     | 5.0        | K      |     |                   | Stars in the zenith     |
| 9             | 29.810                                                     | 50.0        | 10.0           | 88                             | N                  | 2.60    | 7.0        | K      | .45 |                   | Few stars in the zenith |
| 10            | 29.510                                                     | 43.0        | 6.0            | 87                             | NW                 | 52.0    | 5.0        | K      | .02 |                   | Stars in the zenith     |
| 11            | 29.710                                                     | 52.0        | 11.0           | 81                             | NW                 | .52     | 7.0        | KN     | .27 |                   | Faint stars in ditto    |
| 12            | 29.840                                                     | 50.0        | 10.0           | 88                             | W                  | .26     | 10.0       | KN     |     |                   | Wind & rain alternate   |
| 13            | 29.735                                                     | 50.0        | 10.0           | 84                             | NW                 | .52     | 7.0        | K      | .33 |                   | Stars in the zenith     |
| 14            | 29.610                                                     | 44.5        | 7.0            | 87                             | NW                 | .52     | 8.5        | K      |     |                   | Heavy clouds            |
| 15            | 29.710                                                     | 43.5        | 6.5            | 85                             | NW                 | .26     | 7.0        | K      | .34 |                   | Star and clouds         |

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.

Force and speed of the N. W. wind on the 6th August:—

Force from 16 to 20 lbs. per square foot.

Speed from 56.568 to 63.245 miles per hour.



# METEOROLOGICAL OBSERVATIONS.

FROM THE 15TH TO THE 31ST AUGUST, 1877, 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 Temperature, Index Error, and to Mean Sea Level |                   | Thermometers |             | Wind.          |                                | Cloud.  |            | Weather. |                         |
|---------------|-------------------------------------------------------------------------|-------------------|--------------|-------------|----------------|--------------------------------|---------|------------|----------|-------------------------|
|               |                                                                         |                   | Fahrenheit.  | Centigrade. | Direction from | Force in lbs. per square foot. | Amount. | Character. |          |                         |
|               | Relative Humidity.                                                      | Rain in 24 hours. |              |             |                |                                |         |            |          |                         |
| 16            | 30.220                                                                  | 39.5              | 4.5          | 93          | —              | .0                             | .0      | .0         | .20      | Moon and starlight.     |
| 17            | 30.140                                                                  | 45.5              | 7.0          | 86          | —              | .0                             | .0      | .0         | .0       | Calm, moon and stars    |
| 18            | 29.925                                                                  | 49.5              | 9.5          | 87          | —              | .0                             | 10.0    | K          | .0       | Cloudy, sky covered     |
| 19            | 29.810                                                                  | 45.0              | 7.0          | 87          | W              | .25                            | K 5     | K          | .05      | Moon, stars, and clouds |
| 20            | 30.030                                                                  | 42.0              | 5.5          | 93          | W              | .52                            | 7.0     | K          | .02      | Moon and cloud          |
| 21            | 30.210                                                                  | 40.0              | 4.5          | 86          | SE             | .26                            | .0      | .0         | .0       | Moon and starlight      |
| 22            | 29.825                                                                  | 45.0              | 7.0          | 87          | NW             | .52                            | 10.0    | K S        | .01      | Cloudy, sky covered.    |
| 23            | 29.420                                                                  | 48.0              | 9.0          | 87          | NW             | .52                            | .0      | .0         | .80      | Moon and starlight      |
| 24            | 29.520                                                                  | 47.0              | 8.0          | 81          | —              | .0                             | 9.0     | K          | .10      | Moon and cloud          |
| 25            | 29.625                                                                  | 46.0              | 8.0          | 81          | NW             | .52                            | 7.0     | K          | .05      | Moonlight               |
| 26            | 29.710                                                                  | 43.5              | 6.5          | 87          | NW             | .26                            | 7.5     | KN         | .01      | Small rain              |
| 27            | 30.140                                                                  | 43.0              | 6.0          | 80          | —              | .0                             | 5.5     | K          | .06      | Moon and stars          |
| 28            | 30.335                                                                  | 44.5              | 6.5          | 81          | —              | .0                             | 5.0     | K          | .01      | Starlight               |
| 29            | 30.410                                                                  | 44.0              | 6.5          | 86          | —              | .0                             | 9.0     | N          | .0       | Rain                    |
| 30            | 30.240                                                                  | 47.0              | 4.5          | 81          | —              | .0                             | .0      | .0         | .02      | Starlight, brilliant    |
| 31            | 29.835                                                                  | 48.0              | 9.0          | 86          | —              | .0                             | 10.0    | N          | .0       | Calm and 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.

In all tables furnished from this Observatory the barometer readings are corrected for temperature, index error, and to mean sea level.

Force and speed of the N. W. wind on the 6th August:—

Force from 16 to 20 lbs. per square foot.

Speed from 56.568 to 63.245 miles per hour.



**METEOROLOGY FOR SEPT., 1877.**  
**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. |                 | Clouds.   |                                | Wind.     |                 | Rain in Inches. | Spoon. Evap.                   | Ozone. Chron. Scale. |      |      |     |
|---------------|---------------------------------------------------------------------------|-----------|-----------|-------------------------|-----------------------|-----------------------|----------------------------------|-----------------------------|----------------------------|--------------------|-----------------|-----------|--------------------------------|-----------|-----------------|-----------------|--------------------------------|----------------------|------|------|-----|
|               | 7 30 a.m.                                                                 | 4 30 p.m. | 8 0       | 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. | 4 30 p.m.                      | 7 30 a.m. | 4 30 p.m.       | 7 30 a.m.       | 7 30 a.m.                      | 7 30 a.m.            |      |      |     |
|               | Per cent                                                                  |           | 7 30 a.m. |                         | 4 30 p.m.             |                       | Character.                       |                             | Amount.                    |                    | Direction from. |           | Force in lbs. per square foot. |           | Direction from. |                 | Force in lbs. per square foot. |                      |      |      |     |
| 1             | 29.720                                                                    | 29.610    | 8.0       | 47.0                    | 60.0                  | 99.0                  | 65.0                             | 36.0                        | 86                         | 67                 | K               | 7.5       | K                              | 4.0       | NW              | 0               | NW                             | .52                  | —    | 7.0  |     |
| 2             | 29.548                                                                    | 29.507    | 11.0      | 52.0                    | 56.0                  | 96.0                  | 65.0                             | 38.5                        | 69                         | 61                 | K               | 7.0       | K                              | 10.0      | N               | .26             | NW                             | .26                  | —    | 8.0  |     |
| 3             | 29.868                                                                    | 29.834    | 8.5       | 48.0                    | 52.0                  | 90.0                  | 59.5                             | 34.0                        | 68                         | 69                 | K               | 4.5       | K                              | 7.5       | S               | 0               | NW                             | .52                  | .09  | 7.5  |     |
| 4             | 29.746                                                                    | 29.802    | 11.5      | 53.0                    | 61.0                  | 98.5                  | 67.0                             | 37.5                        | 65                         | 67                 | K               | 5.0       | K                              | 6.5       | W               | 2.60            | NW                             | .52                  | .01  | 8.0  |     |
| 5             | 29.788                                                                    | 29.767    | 12.0      | 55.0                    | 57.0                  | 95.0                  | 69.0                             | 38.0                        | 65                         | 87                 | K               | 5.5       | K                              | 4.0       | NW              | 2.60            | NW                             | 2.60                 | —    | 9.0  |     |
| 6             | 29.793                                                                    | 29.765    | 10.5      | 51.0                    | 59.0                  | 90.0                  | 61.5                             | 36.5                        | 64                         | 82                 | K               | 8.0       | K                              | 7.5       | N               | 2.60            | NW                             | .52                  | .04  | 9.0  |     |
| 7             | 29.682                                                                    | 29.050    | 12.5      | 55.0                    | 59.0                  | 90.0                  | 62.0                             | 37.5                        | 65                         | 61                 | KS              | 3.0       | K                              | 9.0       | NW              | .52             | NW                             | .52                  | —    | 7.0  |     |
| 8             | 29.175                                                                    | 29.950    | 11.0      | 52.0                    | 63.0                  | 105.0                 | 66.0                             | 36.0                        | 69                         | 59                 | KN              | 9.0       | K                              | 7.5       | NW              | .26             | NW                             | 2.60                 | —    | 10.0 |     |
| 9             | 29.441                                                                    | 29.445    | 10.5      | 51.0                    | 49.0                  | 80.0                  | 62.0                             | 35.5                        | 64                         | 63                 | K               | 6.5       | KN                             | 5.0       | S               | 2.60            | S                              | .26                  | .04  | 10.0 |     |
| 10            | 29.497                                                                    | 29.437    | 7.0       | 45.0                    | 54.0                  | 85.5                  | 58.5                             | 32.5                        | 67                         | 65                 | 0               | 0         | 0                              | N         | .26             | SE              | .52                            | .05                  | 1.87 | 8.0  |     |
| 11            | 29.341                                                                    | 29.371    | 6.5       | 43.0                    | 60.0                  | 95.0                  | 62.0                             | 31.5                        | 67                         | 66                 | 0               | 0         | 0                              | N         | .26             | N               | 0                              | —                    | —    | 7.5  |     |
| 12            | 29.316                                                                    | 29.034    | 5.5       | 42.0                    | 57.0                  | 90.0                  | 64.0                             | 30.5                        | 77                         | 71                 | KN              | 10.0      | KS                             | 7.5       | NW              | .26             | NW                             | .26                  | —    | 6.5  |     |
| 13            | 29.764                                                                    | 29.930    | 10.0      | 50.0                    | 41.0                  | 78.0                  | 58.5                             | 32.5                        | 74                         | 85                 | K               | 8.5       | N                              | 10.0      | NW              | 0               | SS                             | 10.42                | —    | 10.0 |     |
| 14            | 29.061                                                                    | 29.030    | 10.0      | 47.0                    | 51.0                  | 79.5                  | 58.5                             | 32.0                        | 73                         | 73                 | K               | 0         | K                              | 6.5       | NW              | 2.60            | SS                             | .52                  | .20  | 7.5  |     |
| 15            | 29.230                                                                    | 29.155    | 6.5       | 44.0                    | 60.0                  | 95.0                  | 65.0                             | 30.0                        | 73                         | 58                 | K               | 3.0       | K                              | 2.0       | S               | 0               | NW                             | .52                  | .01  | 7.0  |     |
| 16            | 29.301                                                                    | 29.275    | 10.0      | 56.0                    | 56.0                  | 100.0                 | 65.0                             | 36.0                        | 61                         | 75                 | 0               | 0         | K                              | 9.0       | NW              | .26             | E                              | .52                  | —    | 6.0  |     |
| 17            | 29.218                                                                    | 29.155    | 6.0       | 43.0                    | 59.0                  | 95.0                  | 66.0                             | 34.0                        | 85                         | 66                 | 0               | 0         | K                              | 5.5       | NW              | .26             | SE                             | .52                  | —    | 6.5  |     |
| 18            | 29.410                                                                    | 29.850    | 8.0       | 47.0                    | 65.0                  | 90.0                  | 68.0                             | 35.5                        | 73                         | 63                 | 0               | 5.5       | KS                             | .5        | NW              | .26             | S                              | .26                  | —    | 6.0  |     |
| 19            | 29.910                                                                    | 29.860    | 9.0       | 49.0                    | 68.0                  | 1                     | 74.0                             | 36.0                        | 74                         | 60                 | 0               | 0         | KS                             | 5.5       | NW              | .26             | SE                             | 0                    | —    | 7.5  |     |
| 20            | 29.920                                                                    | 29.723    | 10.0      | 50.0                    | 67.0                  | 106.0                 | 72.0                             | 36.5                        | 74                         | 68                 | K               | 9.0       | K                              | 3.5       | NW              | .52             | S                              | .26                  | —    | 1.34 | 5.0 |
| 21            | 29.700                                                                    | 29.832    | 11.0      | 52.0                    | 58.5                  | 98.0                  | 68.0                             | 37.0                        | 86                         | 82                 | N               | 10.0      | N                              | 10.0      | S               | 0               | E                              | .26                  | .25  | 6.0  |     |
| 22            | 29.172                                                                    | 29.172    | 10.0      | 51.0                    | 50.0                  | —                     | 62.0                             | 35.0                        | 93                         | 100                | N               | 10.0      | N                              | 10.0      | S               | 2.60            | S                              | 2.60                 | —    | 9.0  |     |
| 23            | 29.275                                                                    | 29.226    | 10.0      | 50.0                    | 52.0                  | —                     | 58.0                             | 35.5                        | 86                         | 93                 | K               | 8.0       | N                              | 10.0      | S               | .26             | S                              | .26                  | 10.0 | 10.0 |     |
| 24            | 29.292                                                                    | 29.230    | 10.0      | 50.0                    | 50.0                  | —                     | 58.5                             | 35.0                        | 87                         | 98                 | K               | 9.0       | KN                             | 8.0       | SE              | .52             | SE                             | 0                    | .04  | 7.0  |     |
| 25            | 29.201                                                                    | 29.274    | 10.0      | 50.0                    | 58.0                  | 100.0                 | 61.0                             | 35.5                        | 74                         | 76                 | 0               | 0         | K                              | 7.5       | NW              | .26             | SE                             | .52                  | .01  | 10.0 |     |
| 26            | 29.451                                                                    | 29.356    | 12.0      | 54.0                    | 62.0                  | 102.0                 | 65.0                             | 37.0                        | 74                         | 67                 | K               | 2.0       | 0                              | 0         | N               | .26             | S                              | .26                  | —    | 7.0  |     |
| 27            | 29.300                                                                    | 29.212    | 11.0      | 52.0                    | 60.0                  | 107.0                 | 65.0                             | 35.5                        | 71                         | 67                 | K               | 5         | K                              | 4.5       | NW              | .26             | SE                             | .52                  | —    | 7.5  |     |
| 28            | 29.140                                                                    | 29.042    | 12.0      | 56.0                    | 49.0                  | 110.0                 | 63.0                             | 35.0                        | 60                         | 63                 | K               | 7.0       | K                              | 5.0       | N               | .52             | SE                             | .52                  | —    | 5.0  |     |
| 29            | 29.049                                                                    | 29.951    | 9.5       | 49.0                    | 65.0                  | 109.0                 | 73.0                             | 33.5                        | 74                         | 68                 | K               | 0         | KS                             | 4.5       | NW              | .26             | S                              | .26                  | —    | 4.5  |     |
| 30            | 29.200                                                                    | 29.850    | 12.0      | 54.0                    | 55.0                  | —                     | 65.0                             | 36.5                        | 81                         | 81                 | 0               | 10.0      | KN                             | 10.0      | SE              | .26             | S                              | .52                  | —    | .40  | 5.5 |

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 September, 1877, in accordance with new forms, and registered at 7-30 a.m. and 4-30 p.m. :-

Barometer, mean of two daily readings, corrected and reduced, 29.973 in.  
 Thermometer, mean of 2 ditto, 50.45deg.  
 Ditto, mean of maximum and minimum in shade, 50.40deg.

| Mean Press.  | Mean M'n. Tem. | Mean Mean. | Mean. | Mean for Month. | Mean Force ... | 82 lb. | Tl.              | Tl.                   | Tl.         |        |      |
|--------------|----------------|------------|-------|-----------------|----------------|--------|------------------|-----------------------|-------------|--------|------|
| 30.123       | 9.88           | 53.62      | 96.27 | 64.22           | 35.00          | 73     | 5.50             | 10.42                 | 84 3/61     | 224.50 |      |
| Greatest do. | Max.           | Max.       | Max.  | Max.            | Max.           | Max.   | Prev. Character, | Greatest Force        | 10.42       | "      | Mean |
| 30.450       | 12.50          | 110.00     | 74.00 | 38.50           | ...            | ...    | K                | Least Force...        | 0           | "      | 7.40 |
| Least do.    | Min.           | Min.       | Min.  | Min.            | Min.           | Min.   | ...              | Prevailing Direction. | N.W. and S. | ...    | ...  |
| 29.543       | 5.50           | 78.00      | 58.00 | 30.00           | ...            | ...    | ...              | ...                   | ...         | ...    | ...  |

Dew point, mean of 2 ditto, 42.30deg.  
 Elastic force of vapour, .270.  
 Humidity, mean of 2 ditto, 74.  
 Solar intensity, mean of maximum temperature, 118.83deg.  
 Terrestrial radiation, mean of minimum temperature, 31.43deg.  
 Rainfall, .50in.  
 Evaporation, 3.96in., in excess of evaporation 3.46in.  
 Clouds, mean of 2 daily registers, 4.96.  
 Ozone, mean of 2 daily ditto, 8.00.

W. E. SHOORBRIDGE, Bushy Park.

Rainfall at Hill Station, 1,550ft. above sea level, .43in.

Time of leafing, flowering and fruiting of a few standard plants in the Royal Society's Gardens during the month of September, 1877.

- 6th. *Quercus pedunculata*, the common oak, commencing to break into leaf.
- 10th. Mountain peony commencing to flower.
- 11th. Horsechestnut commencing to flower.
- 14th. Grape vine commencing to break into leaf.
- 15th. Common sycamore, *Acer pseudo-platanus* commencing to break into leaf.
- 25th. Robinia pseudo-acacia commencing to leaf.

F. ABBOTT, JUN., Superintendent.



## METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH SEPT., 1877, 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. 20.2s. E.

(Registered for the Royal Society, Tasmania.)

| Day of Month. | Barometer corrected for Temperature, Index Error, and to Mean Sea Level |             | Thermometers |             | Relative Humidity. | Wind.          |                                | Cloud.  |            | Rain in 24 hours.      | Weather. |
|---------------|-------------------------------------------------------------------------|-------------|--------------|-------------|--------------------|----------------|--------------------------------|---------|------------|------------------------|----------|
|               | Fahrenheit.                                                             | Centigrade. | Fahrenheit.  | Centigrade. |                    | Direction from | Force in lbs. per square foot. | Amount. | Character. |                        |          |
| 1             | 29.630                                                                  | 49.0        | 9.5          | 81          | NW                 | .52            | 4.5                            | K       | .0         | Stars in the zenith    |          |
| 2             | 29.420                                                                  | 48.0        | 9.0          | 88          | 0                  | 0              | 7.0                            | N       | .0         | Showery and cloudy     |          |
| 3             | 29.834                                                                  | 50.0        | 10.0         | 76          | NW                 | .26            | 10.0                           | KN      | .09        | Cloud, sky covered     |          |
| 4             | 29.840                                                                  | 55.0        | 13.0         | 82          | NW                 | 0              | 10.0                           | KN      | .01        | Ditto, ditto, ditto    |          |
| 5             | 29.840                                                                  | 50.0        | 10.0         | 82          | NW                 | .26            | 5.5                            | K       | .0         | Stars in the zenith    |          |
| 6             | 29.845                                                                  | 53.0        | 11.5         | 82          | NW                 | .52            | 8.5                            | K       | .04        | Cloudy                 |          |
| 7             | 30.110                                                                  | 52.5        | 11.5         | 82          | W                  | 0              | 10.0                           | KN      | .0         | Cloudy, sky covered.   |          |
| 8             | 29.945                                                                  | 53.0        | 12.0         | 80          | NW                 | 0              | 5.5                            | K       | .0         | Stars in the zenith    |          |
| 9             | 30.010                                                                  | 46.0        | 7.5          | 81          | S                  | 0              | 10.0                           | N       | .04        | Cloud, sky covered     |          |
| 10            | 30.510                                                                  | 41.0        | 5.5          | 86          | SE                 | .26            | 5.0                            | K       | .05        | Stars round the zenith |          |
| 11            | 30.375                                                                  | 44.5        | 7.5          | 71          | 0                  | 0              | 0                              | 0       | .0         | Calm and starlight     |          |
| 12            | 29.925                                                                  | 50.0        | 10.0         | 87          | S                  | .26            | 10.0                           | KN      | .0         | Cloud, sky covered     |          |
| 13            | 30.110                                                                  | 38.0        | 3.5          | 86          | S                  | .26            | 0                              | 0       | .0         | Frost after squal      |          |
| 14            | 30.225                                                                  | 48.5        | 9.5          | 57          | SW                 | .26            | 7.5                            | K       | .20        | Moon and starlight     |          |
| 15            | 30.210                                                                  | 47.0        | 8.5          | 81          | NW                 | .26            | 3.5                            | K       | .01        | 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.

In all tables furnished from this Observatory the barometer readings are corrected for temperature, index error, and to mean sea level.



# METEOROLOGICAL OBSERVATIONS.

FROM THE 16TH TO THE 30TH SEPT., 1877, 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 Temperature, 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. |        |    |                   |                                |
|               |                                                                         |      |             |    |                |                                |                    |         |            |        |    |                   |                                |
| 16            | 30.310                                                                  | 45.5 | 7.5         | 81 | %              | .0                             | .0                 | .0      | .0         | .0     | .0 | .0                | Moon & starlight, not a cloud. |
| 17            | 30.040                                                                  | 49.0 | 9.5         | 81 |                | .0                             | .0                 | 10.0    | KN         | .0     | .0 | .0                | Cloudy, sky covered            |
| 18            | 29.910                                                                  | 52.0 | 11.0        | 82 |                | .0                             | .0                 | 7.0     | K          | .0     | .0 | .0                | Moonlight, faint               |
| 19            | 29.945                                                                  | 52.5 | 11.5        | 77 |                | .0                             | .0                 | 4.5     | K          | .0     | .0 | .0                | Moonlight and haze             |
| 20            | 29.725                                                                  | 53.5 | 12.0        | 83 |                | .0                             | .0                 | 6.0     | K          | .0     | .0 | .0                | Moon and cloud after rain      |
| 21            | 29.978                                                                  | 52.5 | 11.5        | 88 |                | SW                             | .26                | 10.0    | KN         | .25    | .0 | .0                | Cloud, sky covered             |
| 22            | 30.210                                                                  | 49.5 | 9.5         | 87 |                | S                              | .52                | 10.0    | N          | .0     | .0 | .0                | Cloud and rain                 |
| 23            | 30.235                                                                  | 52.0 | 11.0        | 64 |                | S                              | .0                 | 10.0    | N          | .10    | .0 | .0                | Cloudy, sky covered            |
| 24            | 30.240                                                                  | 52.0 | 11.5        | 52 |                | .0                             | .0                 | 10.0    | KN         | .04    | .0 | .0                | Ditto, ditto, ditto            |
| 25            | 30.340                                                                  | 52.5 | 11.5        | 83 |                | .0                             | .0                 | 10.0    | KN         | .01    | .0 | .0                | Ditto, ditto, ditto            |
| 26            | 30.410                                                                  | 47.5 | 8.5         | 88 |                | .0                             | .0                 | .0      | .0         | .0     | .0 | .0                | Calm and starlight             |
| 27            | 30.110                                                                  | 53.0 | 12.0        | 94 |                | .0                             | .0                 | 10.0    | N          | .0     | .0 | .0                | Nimbus sky covered             |
| 28            | 30.020                                                                  | 49.0 | 9.5         | 76 |                | S                              | .52                | 3.5     | K          | .0     | .0 | .0                | Starlight to the zenith        |
| 29            | 29.845                                                                  | 53.0 | 11.5        | 88 |                | S                              | .26                | 4.0     | KN         | .0     | .0 | .0                | Alternate star & cloud         |
| 30            | 29.840                                                                  | 53.0 | 11.5        | 88 |                | S                              | .26                | 10.0    | N          | .0     | .0 | .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.

In all tables furnished from this Observatory the barometer readings are corrected for temperature, index error, and to mean sea level.



# METEOROLOGY FOR OCTOBER, 1877.

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.                   | Character.       | Amount. | Character. | Amount.               | Direction from. | Force in lbs. per square foot. | Direction from. | Force in lbs. per square foot. |      |                 |             |                      |
|               |                                                                           |                |                         |                       |                       |                           |                                  |                            |           |                             |                  |         |            |                       |                 |                                |                 |                                |      |                 |             |                      |
| 1             | 29.801                                                                    | 29.786         | 8.0                     | 47.0                  | 50.0                  | 90.0                      | 58.0                             | 34.0                       | 73        | 68                          | KN               | 10.0    | KN         | 7.5                   | NW              | .52                            | SW              | 5.21                           |      |                 |             |                      |
| 2             | 30.181                                                                    | 30.258         | 9.0                     | 49.0                  | 57.0                  | 85.0                      | 62.0                             | 35.0                       | 68        | 65                          | K                | 9.0     | O          | .0                    | W               | .26                            | SE              | .26                            | 17   |                 | 6.0         |                      |
| 3             | 30.492                                                                    | 30.411         | 9.5                     | 49.5                  | 60.0                  | 90.0                      | 64.0                             | 36.5                       | 69        | 71                          | K                | 7.0     | O          | .0                    | NW              | .26                            | SE              | .52                            |      |                 | 5.5         |                      |
| 4             | 30.417                                                                    | 30.339         | 10.0                    | 50.0                  | 59.0                  | 90.0                      | 61.0                             | 37.5                       | 80        | 71                          | KN               | 10.0    | K          | 1.0                   | SW              | .0                             | SE              | .0                             |      |                 | 5.0         |                      |
| 5             | 30.196                                                                    | 30.135         | 12.0                    | 54.0                  | 64.0                  | 93.0                      | 70.5                             | 40.0                       | 70        | 72                          | K                | 4.0     | O          | .0                    | N               | .52                            | SE              | .52                            |      |                 | 4.0         |                      |
| 6             | 30.135                                                                    | 30.125         | 13.5                    | 57.0                  | 54.0                  | —                         | 65.0                             | 40.5                       | 73        | 81                          | K                | 7.5     | KN         | 10.0                  | SE              | .52                            | SE              | .52                            |      |                 | 4.0         |                      |
| 7             | 30.295                                                                    | 30.265         | 8.5                     | 48.0                  | 58.0                  | 90.0                      | 62.0                             | 34.0                       | 86        | 66                          | KN               | 10.0    | O          | .0                    | S               | .0                             | SE              | .0                             |      |                 | 6.5         |                      |
| 8             | 30.200                                                                    | 30.171         | 9.5                     | 49.0                  | 51.0                  | —                         | 59.0                             | 35.0                       | 80        | 86                          | K                | 7.5     | KN         | 10.0                  | S               | .0                             | S               | .26                            |      |                 | 6.0         |                      |
| 9             | 30.128                                                                    | 30.180         | 10.0                    | 50.0                  | 52.0                  | 65.0                      | 58.0                             | 36.0                       | 86        | 59                          | K                | 9.0     | K          | 6.5                   | S               | .52                            | S               | 2.60                           | .02  |                 | 7.0         |                      |
| 10            | 30.352                                                                    | 30.338         | 8.0                     | 47.0                  | 52.0                  | 76.5                      | 56.5                             | 35.5                       | 79        | 74                          | KN               | 10.0    | K          | 8.5                   | S               | .52                            | SE              | .26                            | 1.40 |                 | 7.5         |                      |
| 11            | 30.374                                                                    | 30.813         | 11.0                    | 52.0                  | 60.0                  | 90.0                      | 65.0                             | 36.5                       | 59        | 71                          | K                | 4.5     | O          | .0                    | N               | 2.60                           | S               | 2.60                           | .01  |                 | 4.0         |                      |
| 12            | 30.225                                                                    | 30.024         | 8.0                     | 47.0                  | 67.0                  | 107.5                     | 70.0                             | 35.0                       | 79        | 49                          | K                | 3.5     | K          | 4.5                   | NW              | .52                            | NE              | 2.60                           |      |                 | 6.0         |                      |
| 13            | 30.987                                                                    | 29.738         | 10.0                    | 50.0                  | 72.0                  | 110.0                     | 80.0                             | 38.0                       | 74        | 48                          | K                | 3.0     | K          | 7.0                   | NW              | .52                            | NW              | 2.60                           |      |                 | 5.0         |                      |
| 14            | 29.445                                                                    | 29.375         | 10.0                    | 50.5                  | 52.0                  | 85.0                      | 72.0                             | 38.5                       | 63        | 64                          | KN               | 3.0     | K          | 8.5                   | W               | .22                            | NW              | 5.21                           | .40  |                 | 7.5         |                      |
| 15            | 29.401                                                                    | 29.592         | 5.5                     | 44.0                  | 49.0                  | —                         | 65.5                             | 34.0                       | 85        | 79                          | KN               | 8.5     | KN         | 10.0                  | NW              | 2.60                           | S               | 5.21                           | .25  |                 | 10.0        |                      |
| 16            | 29.908                                                                    | 29.918         | 7.5                     | 45.5                  | 50.5                  | 87.0                      | 61.5                             | 36.0                       | 73        | 58                          | KN               | 10.0    | KN         | 7.0                   | S               | .52                            | SW              | .52                            |      |                 | 7.0         |                      |
| 17            | 29.807                                                                    | 29.530         | 8.0                     | 47.0                  | 54.0                  | —                         | 61.0                             | 37.5                       | 70        | 86                          | K                | 10.0    | KN         | 10.0                  | N               | .26                            | N               | .52                            |      |                 | 4.0         |                      |
| 18            | 29.540                                                                    | 29.650         | 12.5                    | 55.0                  | 59.0                  | 85.5                      | 65.0                             | 40.0                       | 70        | 71                          | K                | 5.0     | K          | 7.0                   | N               | .52                            | SE              | .26                            | .10  |                 | 6.5         |                      |
| 19            | 29.772                                                                    | 29.758         | 9.5                     | 49.5                  | 64.5                  | 79.0                      | 68.0                             | 38.0                       | 80        | 63                          | O                | .0      | K          | 7.0                   | N               | .52                            | NW              | .52                            |      |                 | 5.0         |                      |
| 20            | 29.950                                                                    | 29.950         | 7.5                     | 46.0                  | 51.0                  | —                         | 63.0                             | 34.5                       | 86        | 69                          | KN               | 10.0    | KN         | 7.0                   | S               | .52                            | SE              | .52                            | .13  | 1.49            | 7.0         |                      |
| 21            | 30.145                                                                    | 30.245         | 7.5                     | 45.0                  | 48.5                  | —                         | 58.5                             | 34.0                       | 86        | 86                          | KN               | 10.0    | KN         | 9.0                   | NW              | .26                            | SW              | 2.60                           | .08  |                 | 7.5         |                      |
| 22            | 30.337                                                                    | 30.357         | 9.0                     | 48.5                  | 60.0                  | 70.5                      | 60.0                             | 37.5                       | 68        | 82                          | K                | 7.0     | K          | 7.0                   | N               | .52                            | NW              | .26                            | .21  |                 | 6.5         |                      |
| 23            | 30.387                                                                    | 30.306         | 10.0                    | 50.0                  | 57.0                  | —                         | 62.0                             | 38.0                       | 69        | 81                          | K                | 8.5     | K          | 10.0                  | SW              | .0                             | W               | .26                            | .01  |                 | 5.0         |                      |
| 24            | 30.100                                                                    | 29.851         | 9.0                     | 48.5                  | 62.0                  | 114.0                     | 78.0                             | 37.5                       | 74        | 77                          | K                | 7.5     | KS         | 3.0                   | NW              | .52                            | NW              | 2.60                           |      |                 | 4.5         |                      |
| 25            | 29.903                                                                    | 30.000         | 11.0                    | 52.0                  | 60.5                  | 108.0                     | 72.0                             | 40.0                       | 74        | 76                          | K                | 10.0    | K          | 5.0                   | S               | 2.60                           | W               | .52                            |      |                 | 7.5         |                      |
| 26            | 30.008                                                                    | 29.790         | 6.0                     | 43.0                  | 54.0                  | —                         | 63.0                             | 32.5                       | 77        | 86                          | K                | 10.0    | K          | 9.5                   | NW              | .26                            | NW              | .0                             |      |                 | 4.0         |                      |
| 27            | 29.558                                                                    | 29.544         | 13.0                    | 56.0                  | 65.0                  | 105.0                     | 70.0                             | 37.0                       | 71        | 55                          | K                | 7.5     | K          | 7.5                   | N               | .26                            | NW              | 2.60                           | .03  |                 | 5.0         |                      |
| 28            | 29.455                                                                    | 29.359         | 13.5                    | 57.0                  | 63.0                  | 105.0                     | 69.5                             | 39.0                       | 61        | 51                          | K                | 3.5     | KN         | 3.0                   | NW              | 2.60                           | NW              | 2.60                           |      |                 | 5.0         |                      |
| 29            | 29.287                                                                    | 29.252         | 7.5                     | 46.0                  | 54.5                  | 96.0                      | 63.0                             | 28.5                       | 86        | 59                          | N                | 10.0    | K          | 9.0                   | NW              | 2.60                           | NW              | 2.60                           | .09  |                 | 6.5         |                      |
| 30            | 29.266                                                                    | 29.352         | 8.0                     | 47.0                  | 53.5                  | 100.5                     | 58.5                             | 29.0                       | 79        | 64                          | K                | 7.0     | K          | 6.5                   | NW              | .52                            | NW              | 2.60                           | .08  |                 | 5.5         |                      |
| 31            | 29.583                                                                    | 29.586         | 8.5                     | 47.5                  | 63.0                  | 95.0                      | 68.0                             | 31.5                       | 60        | 67                          | K                | 7.0     | K          | 7.0                   | NW              | 2.60                           | N               | 2.60                           |      | 2.25            | 7.0         |                      |
|               | Mean Press.                                                               | Mean M'n. Tem. | Mean.                   | Mean                  | Mean                  | Mean.                     |                                  |                            |           |                             | Mean for Month.  |         |            | Mean Force            |                 | TL                             | TL              | TL                             |      |                 |             |                      |
|               | 29.940                                                                    | 9.37           | 53.44                   | 92.07                 | 64.68                 | 36.00                     | 72                               |                            |           |                             | 7.00             |         |            | 1.20 lb.              | 1.70            | 5.23                           | 180.50          |                                |      |                 |             |                      |
|               | Greatest do.                                                              | Max.           |                         | Max.                  | Max.                  | Max.                      |                                  |                            |           |                             | Prev. Character, |         |            | Greatest Force        |                 |                                |                 |                                |      |                 |             | Me'n                 |
|               | 30.492                                                                    | 13.50          |                         | 114.00                | 80.00                 | 40.50                     |                                  |                            |           |                             | K and KN.        |         |            | 5.21                  |                 |                                |                 |                                |      |                 |             | 5.80                 |
|               | Least do.                                                                 | Min.           |                         | Min.                  | Min.                  | Min.                      |                                  |                            |           |                             |                  |         |            | Least Force.          |                 |                                |                 |                                |      |                 |             |                      |
|               | 29.252                                                                    | 5.50           |                         | 65.0                  | 58.00                 | 28.50                     |                                  |                            |           |                             |                  |         |            | 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, 1877.

- 10th.—Carpinus betulus commencing to leaf.
- 20th.—Ailanthus glandulosa commencing to leaf.
- 24th.—Common Lime commencing to leaf.
- 25th.—Morus Niger commencing to leaf.
- 30th.—Ulmus Campestris commencing to seed.
- 31st.—Melia Azederach commencing to leaf.

F. ABBOTT, JUN., Superintendent.



# METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH OCT., 1877, 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. |        |                        |                   |          |
| 1             | 29.980                                                           | 43.0        | 6.0  | 81             | SW                             | .52                | 7.5     | N          | .0     | Squally throughout     |                   |          |
| 2             | 30.420                                                           | 48.0        | 9.0  | 76             | SE                             | .26                | 10.0    | N          | .17    | Cloud, sky covered     |                   |          |
| 3             | 30.500                                                           | 53.0        | 12.0 | 82             | 0                              | —0                 | 10.0    | N          | .0     | Cloud, sky covered     |                   |          |
| 4             | 30.265                                                           | 51.5        | 10.5 | 88             | SW                             | .0                 | 7.0     | K          | .0     | Stars in the zenith    |                   |          |
| 5             | 30.120                                                           | 52.5        | 11.5 | 88             | —0                             | .0                 | 5.0     | K          | .0     | Stars at the zenith    |                   |          |
| 6             | 30.240                                                           | 51.0        | 10.5 | 88             | —0                             | .0                 | 10.0    | N          | .0     | Cloud, sky covered     |                   |          |
| 7             | 30.320                                                           | 46.0        | 7.5  | 81             | SE                             | .26                | .0      | 0          | .0     | Starlight              |                   |          |
| 8             | 30.150                                                           | 50.0        | 10.0 | 87             | S                              | .26                | 10.0    | N          | .0     | Cloud, sky covered.    |                   |          |
| 9             | 30.320                                                           | 47.0        | 8.5  | 87             | S                              | .26                | 10.0    | N          | .02    | Dark and rainy         |                   |          |
| 10            | 30.440                                                           | 50.0        | 10.0 | 81             | SE                             | .26                | 10.0    | KN         | .10    | Cloudy, sky covered    |                   |          |
| 11            | 30.240                                                           | 49.0        | 9.5  | 82             | S                              | .0                 | .0      | 0          | .01    | Moon & starlight       |                   |          |
| 12            | 30.045                                                           | 55.0        | 13.0 | 49             | NE                             | .52                | .0      | 0          | .0     | Ditto, ditto           |                   |          |
| 13            | 29.540                                                           | 65.5        | 18.5 | 78             | NW                             | .52                | 10.0    | KN         | .0     | Cloudy, sky covered    |                   |          |
| 14            | 29.345                                                           | 44.0        | 7.0  | 81             | NW                             | 2.60               | 10.0    | N          | .40    | Squally, rain and wind |                   |          |
| 15            | 29.745                                                           | 45.0        | 7.5  | 81             | S                              | .52                | 6.5     | K          | .25    | Stars to 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 16TH TO THE 31ST OCT., 1877, 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   |                                | Wind.   |            | Cloud. |     | Rain in 24 hours.      | Weather. |
|---------------|------------------------------------------------------------------|-------------|--------------------|----------------|--------------------------------|---------|------------|--------|-----|------------------------|----------|
|               | Fahrenheit.                                                      | Centigrade. | Relative Humidity. | Direction from | Force in lbs. per square foot. | Amount. | Character. |        |     |                        |          |
| 16            | 29.995                                                           | 48.0        | 9.0                | 81             | SW                             | .26     | 5.0        | K      | .01 | Moon & starlight       |          |
| 17            | 29.320                                                           | 54.5        | 12.5               | 88             | N                              | .52     | 4.5        | K      | .0  | Ditto, ditto           |          |
| 18            | 29.760                                                           | 52.0        | 11.0               | 77             | .0                             | .0      | .0         | .0     | .10 | Calm and starlight     |          |
| 19            | 29.760                                                           | 55.5        | 13.0               | 77             | NW                             | .0      | 10.0       | K      | .01 | Calm and cloudy        |          |
| 20            | 30.075                                                           | 44.5        | 7.0                | 80             | S                              | .26     | 5.0        | K      | .13 | Moon, cloud and star   |          |
| 21            | 30.340                                                           | 45.0        | 7.0                | 86             | SW                             | .52     | 7.0        | K      | .18 | Moon and cloud, hazy   |          |
| 22            | 30.340                                                           | 49.0        | 9.5                | 87             | NW                             | .26     | .0         | .0     | .21 | Clear moon & starlight |          |
| 23            | 30.260                                                           | 52.0        | 11.0               | 88             | W                              | .26     | 10.0       | K      | .01 | Sky cloudy             |          |
| 24            | 29.770                                                           | 61.5        | 16.5               | 67             | NW                             | .52     | 7.5        | K      | .0  | Moon and star          |          |
| 25            | 30.115                                                           | 46.5        | 8.0                | 81             | .0                             | .0      | .0         | .0     | .0  | Starlight              |          |
| 26            | 29.620                                                           | 51.5        | 10.5               | 82             | .0                             | .0      | .0         | .0     | .0  | Starlight              |          |
| 27            | 29.510                                                           | 57.0        | 14.0               | 77             | NW                             | .52     | 10.0       | K N    | .03 | Dark black clouds      |          |
| 28            | 29.280                                                           | 51.5        | 10.5               | 94             | NW                             | .26     | 10.0       | N      | .0  | Dark and raining       |          |
| 29            | 29.175                                                           | 46.5        | 7.0                | 83             | NW                             | .52     | 4.0        | K      | .09 | Stars and cloudy       |          |
| 30            | 29.460                                                           | 45.0        | 8.0                | 87             | NW                             | .52     | 7.5        | N      | .08 | Dark and squally       |          |
| 31            | 29.460                                                           | 56.5        | 13.5               | 77             | N                              | .52     | 10.0       | N      | .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.



# METEOROLOGY FOR NOVEMBER, 1877.

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 instrument error, and to mean sea level. |            | Thermometers (Reading.) |                       |                       | Thermometers (Self-Registering.) |                             |                            | Relative Humidity |           | Clouds.    |         |            | Wind.   |                 | Rain in Inches. | Spon. Evap. | Ozone. Chron. 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. |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 29.171                                                                  | 29.044     | 10.0                    | 54.0                  | 46.0                  | —                                | 62.0                        | 34.5                       | 65                | 100       | K          | 6.0     | N          | 10.0    | NW              | 2.60            | NW          | 10.42                | .09                            | 6.5             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 29.398                                                                  | 29.040     | 9.0                     | 49.0                  | 56.5                  | —                                | 62.5                        | 37.0                       | 79                | 81        | KN         | 9.0     | N          | 7.5     | N               | .52             | N           | .52                  | .33                            | 7.5             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 29.175                                                                  | 29.270     | 10.0                    | 50.0                  | 53.0                  | —                                | 58.5                        | 34.5                       | 86                | 69        | KN         | 7.5     | K          | 7.0     | SW              | 2.60            | W           | .52                  | .25                            | 5.5             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 29.669                                                                  | 29.200     | 8.5                     | 47.0                  | 43.5                  | —                                | 58.0                        | 32.0                       | 93                | 84        | N          | 10.0    | N          | 10.0    | NW              | .52             | S           | .52                  | .30                            | 9.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 29.544                                                                  | 29.563     | 6.0                     | 43.0                  | 52.5                  | 65.5                             | 57.0                        | 29.5                       | 72                | 64        | K          | 7.0     | KN         | 9.0     | N               | .52             | W           | 2.60                 | .48                            | 9.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 29.694                                                                  | 29.770     | 8.0                     | 47.0                  | 53.0                  | 95.0                             | 62.0                        | 34.0                       | 73                | 57        | K          | 5.0     | K          | 4.0     | NW              | .52             | SW          | .26                  | .01                            | 6.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 29.070                                                                  | 29.755     | 9.0                     | 48.5                  | 66.0                  | 92.5                             | 69.0                        | 36.0                       | 80                | 59        | KS         | 8.5     | K          | 5.0     | N               | .52             | NW          | 2.60                 | .03                            | 7.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 29.581                                                                  | 29.450     | 14.5                    | 59.0                  | 60.0                  | 94.0                             | 70.0                        | 39.5                       | 62                | 58        | K          | 7.0     | K          | 7.5     | NW              | 2.60            | NW          | 5.21                 |                                | 4.5             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 29.766                                                                  | 29.830     | 8.5                     | 47.5                  | 52.0                  | 98.0                             | 62.0                        | 36.0                       | 73                | 70        | K          | 4.5     | KN         | 9.0     | NW              | 2.60            | NW          | 2.60                 |                                | 4.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.905                                                                  | 29.836     | 9.0                     | 49.0                  | 51.5                  | 85.0                             | 66.0                        | 33.5                       | 67                | 54        | K          | 7.5     | K          | 9.0     | N               | 2.60            | NW          | 2.60                 | .03                            | 1.72            |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.460                                                                  | 29.562     | 9.0                     | 49.0                  | 54.0                  | 84.0                             | 62.0                        | 36.0                       | 93                | 74        | KN         | 10.0    | K          | 4.5     | NW              | .52             | NW          | 2.60                 | .18                            | 6.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.896                                                                  | 29.845     | 9.0                     | 49.0                  | 59.0                  | 75.5                             | 62.0                        | 36.0                       | 74                | 61        | K          | 7.0     | KN         | 8.0     | NW              | .52             | NW          | 2.60                 | .07                            | 5.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.822                                                                  | 29.739     | 14.0                    | 53.0                  | 72.0                  | 110.0                            | 75.0                        | 33.5                       | 66                | 38        | K          | 7.0     | K          | 7.5     | NW              | 2.60            | NW          | 2.60                 | .01                            | 6.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.635                                                                  | 29.869     | 14.0                    | 53.0                  | 56.0                  | 90.0                             | 71.0                        | 38.5                       | 76                | 70        | K          | 10.0    | K          | 10.0    | NW              | .52             | NW          | .52                  |                                | 5.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.903                                                                  | 29.725     | 9.5                     | 49.5                  | 53.0                  | —                                | 61.5                        | 35.0                       | 83                | 86        | K          | 10.0    | KN         | 10.0    | NW              | 0               | S           | 0                    | .01                            | 6.5             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.891                                                                  | 29.812     | 9.0                     | 49.0                  | 56.0                  | 85.0                             | 63.0                        | 34.5                       | 83                | 70        | KS         | 7.0     | K          | 7.0     | S               | 0               | S           | .52                  | .02                            | 5.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.753                                                                  | 29.594     | 9.5                     | 49.0                  | 50.5                  | 88.5                             | 64.0                        | 35.5                       | 74                | 86        | K          | 10.0    | K          | 7.0     | NW              | .26             | NW          | .52                  | .05                            | 7.5             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.873                                                                  | 29.959     | 12.0                    | 54.0                  | 53.0                  | 65.0                             | 62.0                        | 33.0                       | 70                | 69        | K          | 7.5     | K          | 7.5     | NW              | .52             | SW          | 2.60                 | .06                            | 6.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.136                                                                  | 29.127     | 8.5                     | 48.0                  | 63.0                  | 100.0                            | 69.0                        | 34.0                       | 69                | 63        | KS         | 4.0     | 0          | 0       | NW              | .26             | SE          | .52                  | .15                            | 6.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.897                                                                  | 29.590     | 11.0                    | 52.0                  | 72.0                  | 105.0                            | 78.0                        | 37.5                       | 89                | 61        | KS         | 5.0     | K          | 3.5     | N               | 2.60            | SE          | .26                  |                                | 1.15            |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.400                                                                  | 29.530     | 15.0                    | 60.0                  | 62.0                  | —                                | 72.0                        | 39.0                       | 72                | 63        | K          | 6.0     | KN         | 8.0     | E               | .52             | S           | 2.60                 |                                | 6.5             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.737                                                                  | 29.672     | 11.5                    | 53.0                  | 56.0                  | —                                | 65.0                        | 37.0                       | 76                | 81        | K          | 10.0    | K          | 6.5     | NW              | .26             | SE          | 2.60                 |                                | 5.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.942                                                                  | 29.933     | 10.0                    | 51.0                  | 67.0                  | 100.0                            | 72.0                        | 36.0                       | 80                | 74        | KS         | 7.0     | 0          | 0       | N               | .26             | S           | .26                  |                                | 5.5             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.500                                                                  | 29.746     | 13.0                    | 56.0                  | 79.0                  | 96.0                             | 75.0                        | 38.5                       | 87                | 59        | KN         | 9.0     | K          | 5.5     | NW              | 0               | NW          | .52                  | .03                            | 5.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.929                                                                  | 29.808     | 14.0                    | 58.0                  | 71.0                  | 115.0                            | 81.0                        | 39.0                       | 53                | 65        | K          | 5.0     | K          | 5.5     | N               | 2.60            | SE          | .52                  | .01                            | 6.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.834                                                                  | 29.638     | 12.5                    | 55.0                  | 64.0                  | 106.0                            | 76.0                        | 37.0                       | 70                | 65        | K          | 10.0    | K          | 6.0     | N               | .26             | N           | 2.60                 |                                | 4.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.730                                                                  | 29.728     | 12.5                    | 55.0                  | 64.0                  | 105.0                            | 73.0                        | 37.0                       | 70                | 50        | K          | 7.0     | K          | 7.5     | NW              | .52             | NW          | .52                  | .02                            | 3.5             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.733                                                                  | 29.583     | 11.0                    | 52.0                  | 70.0                  | 106.5                            | 57.5                        | 34.5                       | 69                | 47        | K          | 7.5     | K          | 3.0     | N               | .52             | NW          | 2.60                 |                                | 2.5             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 29                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.685                                                                  | 29.819     | 12.5                    | 55.0                  | 63.0                  | 102.0                            | 71.0                        | 37.0                       | 65                | 63        | K          | 6.5     | K          | 6.5     | E               | .26             | E           | .52                  |                                | 3.0             |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29.937                                                                  | 29.891     | 10.5                    | 51.0                  | 67.0                  | 102.0                            | 71.0                        | 35.0                       | 69                | 60        | K          | 6.5     | K          | 7.0     | N               | .52             | SE          | .52                  |                                | 2.05            |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| <table border="1"> <tr> <td>Mean 29.639</td> <td>Mean 10.70</td> <td>Mean 50.60</td> <td>Mean 93.72</td> <td>Mean 67.55</td> <td>Mean 36.13</td> <td>Mean .71</td> <td>Mean for Month. 7.00</td> <td>Mean Force 1.44lb.</td> <td>TI 2.03</td> <td>TI 4.92</td> <td>TI 173.50</td> </tr> <tr> <td>Greatest do. 30.103</td> <td>Max. 15.00</td> <td></td> <td>Max. 115.00</td> <td>Max. 81.00</td> <td>Max. 39.50</td> <td></td> <td>Prev. Character, K and KN.</td> <td>Greatest Force 10.42</td> <td></td> <td></td> <td>Me'n 5.80</td> </tr> <tr> <td>Least do. 29.040</td> <td>Min. 6.00</td> <td></td> <td>Min. 65.50</td> <td>Min. 57.00</td> <td>Min. 29.50</td> <td></td> <td></td> <td>Least Force. 0</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="12">Prevailing Direction. NW</td> </tr> </table> |                                                                         |            |                         |                       |                       |                                  |                             |                            |                   |           |            |         |            |         |                 |                 |             | Mean 29.639          | Mean 10.70                     | Mean 50.60      | Mean 93.72                     | Mean 67.55 | Mean 36.13 | Mean .71 | Mean for Month. 7.00 | Mean Force 1.44lb. | TI 2.03 | TI 4.92 | TI 173.50 | Greatest do. 30.103 | Max. 15.00 |  | Max. 115.00 | Max. 81.00 | Max. 39.50 |  | Prev. Character, K and KN. | Greatest Force 10.42 |  |  | Me'n 5.80 | Least do. 29.040 | Min. 6.00 |  | Min. 65.50 | Min. 57.00 | Min. 29.50 |  |  | Least Force. 0 |  |  |  | Prevailing Direction. NW |  |  |  |  |  |  |  |  |  |  |  |
| Mean 29.639                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Mean 10.70                                                              | Mean 50.60 | Mean 93.72              | Mean 67.55            | Mean 36.13            | Mean .71                         | Mean for Month. 7.00        | Mean Force 1.44lb.         | TI 2.03           | TI 4.92   | TI 173.50  |         |            |         |                 |                 |             |                      |                                |                 |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| Greatest do. 30.103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Max. 15.00                                                              |            | Max. 115.00             | Max. 81.00            | Max. 39.50            |                                  | Prev. Character, K and KN.  | Greatest Force 10.42       |                   |           | Me'n 5.80  |         |            |         |                 |                 |             |                      |                                |                 |                                |            |            |          |                      |                    |         |         |           |                     |            |  |             |            |            |  |                            |                      |  |  |           |                  |           |  |            |            |            |  |  |                |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |
| Least do. 29.040                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Min. 6.00                                                               |            | Min. 65.50              | Min. 57.00            | 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 Royal Society's Gardens during the month of November, 1877.

20th.—Trollop's Victoria Strawberry commencing to ripen.

24th.—Early May Duke Cherry commencing to ripen.

30th.—Black Mulberry (*Morus niger*) in full flower.

31st.—Early Red Antwerp Raspberry commencing to ripen.  
NOTE.—The double-flowered Pomegranate and Bougainvillea spectabilis which usually commence flowering towards the end of November, have not done so this year.

F. ABBOTT, JUN., Superintendent.

Results of observations taken at New Norfolk, November 1877, in accordance with new forms, at 7.30 a.m. and 4.30 p.m. :—

Barometer, mean of two daily readings, corrected and reduced, 29.709in.

Thermometer, mean of 2 ditto, 54.32deg.

Ditto mean of maximum and minimum in shade, 53.24deg.

Dew point, mean position of 2 ditto, 42.60deg.

Elastic force of vapour mean, of 2 ditto .270.

Humidity of air, mean of 2 ditto, .66.

Solar intensity, mean of maximum temperature, 130.58deg.

Terrestrial radiation, mean of minimum temperature, 35.83deg.

Rainfall, 2.92in.

Evaporation, 4.72in., in excess of rainfall 1.80in.

Clouds, mean amount of 2 daily observations, 5.83.

Ozone, mean ditto, 2 ditto ditto, 8.54.

W. E. SHOORIDGE, Bushy Park.



## METEOROLOGICAL OBSERVATIONS.

FROM THE 1ST TO THE 15TH NOV., 1877, 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. |                   |                       |
| 1             | 29.245                                                           | 46.0         | 8.0         | 93                 | NW             | .52                            | 7.0     | N          | .09               | Stars in the zenith   |
| 2             | 29.065                                                           | 45.0         | 7.5         | 81                 | N              | .52                            | 7.5     | KN         | .33               | Cloudy and changeable |
| 3             | 29.020                                                           | 43.5         | 6.5         | 87                 | W              | .52                            | 7.5     | KN         | .25               | Showery               |
| 4             | 29.425                                                           | 43.0         | 6.5         | 86                 | S              | .52                            | 4.5     | K          | .30               | Stars and clouds      |
| 5             | 29.640                                                           | 46.0         | 8.0         | 86                 | NW             | .52                            | 7.5     | KN         | .48               | Cloudy                |
| 6             | 29.860                                                           | 47.5         | 8.5         | 86                 | NW             | .26                            | 4.0     | K          | .01               | Faint starlight       |
| 7             | 29.665                                                           | 53.0         | 14.5        | 65                 | NW             | .0                             | 10.0    | N          | .03               | Cloud, sky covered    |
| 8             | 29.620                                                           | 50.0         | 10.0        | 77                 | NW             | .52                            | .0      | .0         | .0                | Starlight             |
| 9             | 30.010                                                           | 49.0         | 9.5         | 70                 | NW             | .52                            | 7.5     | K          | .0                | Cloudy                |
| 10            | 29.645                                                           | 55.0         | 12.5        | 76                 | NW             | .52                            | 10.0    | KN         | .03               | Cloud after wind      |
| 11            | 29.720                                                           | 49.5         | 9.5         | 81                 | NW             | .52                            | 7.5     | K          | .18               | Moon and cloud        |
| 12            | 29.840                                                           | 54.5         | 12.5        | 82                 | NW             | .52                            | 8.5     | K          | .07               | Massive cloud         |
| 13            | 29.620                                                           | 60.0         | 15.5        | 78                 | N              | .26                            | 8.5     | KS         | .01               | Cloudy                |
| 14            | 29.920                                                           | 51.0         | 10.5        | 70                 | NW             | .26                            | 10.0    | K          | .0                | Cloud, sky covered    |
| 15            | 29.765                                                           | 49.0         | 9.5         | 79                 | NW             | .52                            | 4.0     | K          | .01               | Moon, star, and 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 15TH TO THE 30TH NOV., 1877, 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 |             | Wind.              |     | Cloud.         |                                | Rain in 24 hours. | Weather.              |         |            |
|---------------|------------------------------------------------------------------|------|--------------|-------------|--------------------|-----|----------------|--------------------------------|-------------------|-----------------------|---------|------------|
|               |                                                                  |      | Fahrenheit.  | Centigrade. | Relative Humidity. |     | Direction from | Force in lbs. per square foot. |                   |                       | Amount. | Character. |
|               |                                                                  |      |              |             | %                  |     |                |                                |                   |                       |         |            |
| 16            | 29·810                                                           | 49·0 | 9·5          | 83          | S                  | ·26 | 10·0           | K N                            | ·02               | Light rain            |         |            |
| 17            | 29·735                                                           | 52·0 | 11·0         | 74          | NW                 | ·26 | 5·0            | K                              | ·08               | Cloud, moon and star  |         |            |
| 18            | 29·935                                                           | 49·5 | 9·5          | 59          | SW                 | ·26 | 7·5            | K                              | ·03               | Cloud in flocks       |         |            |
| 19            | 30·110                                                           | 53·0 | 12·0         | 70          | SE                 | ·26 | ·0             | ·0                             | ·15               | Star and moonlight    |         |            |
| 20            | 29·463                                                           | 61·5 | 16·5         | 82          | ·0                 | ·0  | 7·0            | K                              | ·0                | Moon, star, and cloud |         |            |
| 21            | 29·635                                                           | 60·0 | 15·5         | 82          | W                  | ·52 | 10·0           | K                              | ·0                | Cloud, sky covered    |         |            |
| 22            | 30·020                                                           | 57·5 | 14·0         | 71          | NW                 | ·25 | 10·0           | K                              | ·0                | Cloud, sky covered    |         |            |
| 23            | 29·675                                                           | 61·0 | 16·0         | 77          | W                  | ·26 | 7·0            | K                              | ·0                | Cloud and star        |         |            |
| 24            | 29·935                                                           | 57·0 | 14·0         | 62          | NW                 | ·52 | ·0             | ·0                             | ·03               | Starlight             |         |            |
| 25            | 29·965                                                           | 56·5 | 13·5         | 71          | ·0                 | ·0  | ·0             | ·0                             | ·01               | Starlight             |         |            |
| 26            | 29·565                                                           | 63·0 | 20·0         | 78          | NW                 | ·26 | 10·0           | N                              | ·0                | Cloud, sky covered    |         |            |
| 27            | 29·840                                                           | 57·0 | 14·0         | 76          | NW                 | ·26 | 7·0            | K                              | ·02               | Stars and cloud       |         |            |
| 28            | 29·525                                                           | 63·0 | 17·5         | 72          | NW                 | ·52 | 4·5            | K                              | ·0                | Stars and clouds      |         |            |
| 29            | 29·970                                                           | 51·5 | 11·5         | 70          | SE                 | ·52 | 4·5            | K                              | ·0                | Stars and clouds      |         |            |
| 30            | 29·775                                                           | 59·0 | 15·0         | 77          | ·0                 | ·0  | ·0             | ·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 THE 1ST TO THE 15TH DEC., 1877, 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   |                                | Wind.   |            | Cloud. |     | Rain in 24 hours. | Weather.             |
|---------------|------------------------------------------------------------------|-------------|--------------------|----------------|--------------------------------|---------|------------|--------|-----|-------------------|----------------------|
|               | Fahrenheit.                                                      | Centigrade. | Relative Humidity. | Direction from | Force in lbs. per square foot. | Amount. | Character. | In.    |     |                   |                      |
|               |                                                                  |             |                    |                |                                |         |            |        | %   |                   |                      |
| 1             | 29.420                                                           | 60.0        | 15.5               | 72             | NW                             | 2.60    | 0          | 0      | 0   | 0                 | Starlight            |
| 2             | 29.860                                                           | 59.5        | 15.0               | 82             | NW                             | .52     | 10.0       | N      | .01 | 0                 | Cloud, sky covered   |
| 3             | 29.625                                                           | 56.5        | 13.5               | 82             | S                              | .26     | 3.5        | K      | .0  | 0                 | Starlight brilliant  |
| 4             | 29.235                                                           | 55.0        | 12.5               | 71             | NW                             | .52     | 4.0        | K      | .0  | 0                 | Starlight            |
| 5             | 29.635                                                           | 48.5        | 9.5                | 80             | W                              | .52     | 4.0        | K      | .09 | 0                 | Starlight            |
| 6             | 29.630                                                           | 62.0        | 17.0               | 72             | NW                             | .52     | 5.0        | K      | .01 | 0                 | Stars and cloud      |
| 7             | 29.865                                                           | 62.5        | 17.0               | 67             | N                              | .52     | 7.5        | K      | .0  | 0                 | Cloudy, a few stars  |
| 8             | 29.720                                                           | 63.0        | 17.5               | 77             | 0                              | .0      | 10.0       | N      | .0  | 0                 | Cloud, sky covered   |
| 9             | 30.160                                                           | 55.0        | 13.0               | 66             | SW                             | .52     | 0          | 0      | .01 | 0                 | Starlight brilliant  |
| 10            | 30.140                                                           | 58.0        | 14.5               | 82             | NW                             | .52     | 3.0        | K      | .0  | 0                 | Starlight            |
| 11            | 30.165                                                           | 54.5        | 12.5               | 81             | NW                             | .52     | 2.5        | K      | .0  | 0                 | Ditto                |
| 12            | 29.265                                                           | 64.0        | 18.0               | 88             | 0                              | .0      | 10.0       | K      | .0  | 0                 | Cloudy and calm      |
| 13            | 29.772                                                           | 66.5        | 19.5               | 73             | NW                             | .52     | 10.0       | K      | .0  | 0                 | Cloud, sky covered   |
| 14            | 29.260                                                           | 67.0        | 19.0               | 83             | NW                             | .52     | 10.0       | K      | .0  | 0                 | Heavy detached R     |
| 15            | 29.320                                                           | 69.0        | 20.5               | 55             | NW                             | 2.60    | 4.0        | K      | .0  | 0                 | Wind, star, 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 DEC., 1877, 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. |        |     |                       |          |
| 16            | 29.5 65                                                          | 53.0        | 15.0           | 72                             | NW                 | .52     | 9.5        | K      | .04 | Large conglomerate K  |          |
| 17            | 29.620                                                           | 60.0        | 15.5           | 77                             | W                  | .52     | 10.0       | N      | .01 | Raining               |          |
| 18            | 29.445                                                           | 53.0        | 15.0           | 77                             | NW                 | .52     | 7.5        | K      | .06 | Moon, cloud, and star |          |
| 19            | 29.760                                                           | 60.0        | 15.5           | 77                             | NW                 | .52     | 9.0        | K      | .06 | Large K, and moon     |          |
| 20            | 30.080                                                           | 54.0        | 12.0           | 78                             | SW                 | .52     | .0         | .0     | .0  | Moonlight             |          |
| 21            | 29.915                                                           | 60.0        | 15.5           | 88                             | S                  | .26     | 10.0       | KN     | .0  | Cloudy, sky covered   |          |
| 22            | 29.425                                                           | 66.0        | 19.0           | 83                             | NW                 | .26     | 9.0        | KN     | .0  | Cloud and rain        |          |
| 23            | 29.630                                                           | 55.0        | 13.3           | 76                             | NW                 | .26     | 10.0       | N      | .95 | Do., sky covered      |          |
| 24            | 29.665                                                           | 54.0        | 12.0           | 80                             | NW                 | .52     | 10.0       | KN     | .02 | Cloud, sky covered    |          |
| 25            | 29.835                                                           | 56.5        | 13.5           | 76                             | SE                 | .26     | 4.5        | K      | .07 | Stars and cloud       |          |
| 26            | 29.915                                                           | 60.5        | 16.0           | 82                             | N                  | .26     | 10.0       | KN     | .0  | Cloud, sky covered    |          |
| 27            | 30.010                                                           | 62.0        | 16.5           | 82                             | SE                 | .26     | 10.0       | N      | .0  | Cloud, sky covered    |          |
| 28            | 30.120                                                           | 60.5        | 16.0           | 88                             | SE                 | .26     | 4.0        | K      | .0  | Starlight             |          |
| 29            | 30.060                                                           | 64.5        | 18.0           | 73                             | SE                 | .52     | 3.5        | K      | .0  | Starlight             |          |
| 30            | 29.860                                                           | 66.0        | 19.0           | 73                             | NW                 | .26     | 3.0        | K      | .0  | Ditto, ditto          |          |
| 31            | 30.020                                                           | 60.0        | 15.5           | 77                             | S                  | .52     | 10.0       | N      | .0  | Set 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.



RESULTS of METEOROLOGICAL OBSERVATIONS taken at HOBART TOWN during the Year 1877.

PRIVATE OBSERVATORY.

Latitude, 42° 52' 13" S.

Height above sea level, 67 feet.

Longitude 9h. 49m. 29.2s. E.

| Months.          | Baromet.                    |                                               | Thermometers (Reading.)                |                         | Thermometers (Self-registering.) |                          |                                                        | Clouds (Scale, 0-10.)                   |                       | Wind (lbs. per square foot.) |                       |                | Total Amount. | Spontaneous evaporation. | Ozone. |
|------------------|-----------------------------|-----------------------------------------------|----------------------------------------|-------------------------|----------------------------------|--------------------------|--------------------------------------------------------|-----------------------------------------|-----------------------|------------------------------|-----------------------|----------------|---------------|--------------------------|--------|
|                  | Mean of two daily readings. | Mean of Centigrade Mean of one daily reading. | Fahrenheit Mean of two daily readings. | Mean of highest in Sun. | Mean of highest in Shade.        | Mean of lowest on Grass. | Relative humidity per cent. of two daily observations. | Mean amount for two daily observations. | Prevailing Character. | Prevailing Direction.        | Mean force for Month. | Maximum force. |               |                          |        |
| January          | 29.747                      | 13.37                                         | 61.03                                  | 91.83                   | 73.82                            | 41.00                    | .64                                                    | 6.00                                    | K                     | W                            | 1.33                  | 5.21           | 1.05          | 6.00                     | 4.16   |
| February         | 29.889                      | 13.71                                         | 62.70                                  | 98.30                   | 76.03                            | 42.11                    | .67                                                    | 6.79                                    | K & KN                | W SE                         | .83                   | 5.21           | .83           | 4.43                     | 4.50   |
| March            | 30.049                      | 11.63                                         | 59.23                                  | 99.71                   | 73.60                            | 41.23                    | .75                                                    | 5.69                                    | K KS KN               | SE, S W NW                   | .36                   | 2.60           | .65           | 4.70                     | 4.34   |
| April            | 30.035                      | 9.83                                          | 54.38                                  | 84.62                   | 66.85                            | 36.72                    | .77                                                    | 6.10                                    | K KN                  | NW, N, S                     | .63                   | 5.21           | 2.45          | 2.02                     | 4.73   |
| May              | 29.831                      | 7.90                                          | 49.54                                  | 72.90                   | 58.20                            | 35.58                    | .84                                                    | 5.55                                    | K KN                  | NW, N, S                     | .41                   | 5.21           | 1.45          | 1.38                     | 4.50   |
| June             | 29.981                      | 8.00                                          | 49.34                                  | 71.22                   | 55.13                            | 32.88                    | .83                                                    | 7.32                                    | K KS                  | NW, W                        | .44                   | 5.21           | 3.37          | 1.51                     | 4.32   |
| July             | 30.132                      | 5.28                                          | 47.63                                  | 77.72                   | 59.70                            | 31.70                    | .82                                                    | 6.00                                    | K KS                  | NW, N                        | .13                   | .52            | 1.96          | 2.11                     | 4.43   |
| August           | 29.841                      | 7.16                                          | 48.95                                  | 73.15                   | 59.00                            | 33.71                    | .78                                                    | 6.83                                    | K KN                  | NW                           | 1.00                  | 15.62          | 3.14          | 3.50                     | 4.95   |
| September        | 30.133                      | 9.83                                          | 53.62                                  | 73.00                   | 64.22                            | 35.00                    | .73                                                    | 5.50                                    | K                     | NW, S                        | .82                   | 10.42          | .84           | 3.61                     | 7.40   |
| October          | 29.940                      | 9.37                                          | 53.44                                  | 92.07                   | 64.63                            | 36.00                    | .72                                                    | 7.00                                    | K KN                  | NW                           | 1.20                  | 5.21           | 1.70          | 5.23                     | 5.80   |
| November         | 29.699                      | 10.70                                         | 59.60                                  | 93.72                   | 67.55                            | 36.13                    | .71                                                    | 7.00                                    | K KN                  | NW                           | 1.44                  | 10.42          | 2.03          | 4.92                     | 5.80   |
| December         | 29.719                      | 13.10                                         | 60.94                                  | 99.90                   | 72.30                            | 36.30                    | .67                                                    | 6.40                                    | K                     | NW, NW                       | 1.13                  | 5.21           | 1.35          | 5.10                     | 4.05   |
| Sum              | 353.986                     | 119.98                                        | 651.40                                 | 1019.14                 | 794.08                           | 438.36                   | 8.92                                                   | 70.18                                   |                       |                              | 9.72                  | 76.05          | 20.82         | 45.50                    | 53.98  |
| Mean for Year... | 29.915                      | 10.00                                         | 54.28                                  | 84.93                   | 66.17                            | 36.53                    | .74                                                    | 6.35                                    | K                     | NW, W                        | .81                   | 6.34           | 1.73          | 3.80                     | 4.91   |

Heavy gale on 6th August; force of wind from 16 to 20lbs. per square foot; velocity from 56.508 to 63.245 miles per hour.

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.



MONTHLY MEANS OF OBSERVATIONS TAKEN AT NEW NORFOLK, 1877.

Latitude 42° 46' 43" South.

Longitude 147° 4' 45" East.

| Months.        | Baro-meter.         |                                         | Thermometer.                            |                     |                       |                             | Humidity of Air.         |                          |                                  | Condensation.   |                                 | Ozone.                             |                    | Clouds.   |                      | Winds.                      |                               |
|----------------|---------------------|-----------------------------------------|-----------------------------------------|---------------------|-----------------------|-----------------------------|--------------------------|--------------------------|----------------------------------|-----------------|---------------------------------|------------------------------------|--------------------|-----------|----------------------|-----------------------------|-------------------------------|
|                | At 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. | Scale     | Prevaling Direction. | Force in lbs. per sq. foot. | Horizontal Movement in Miles. |
| January.....   | 29.768              | 60.87                                   | 60.64                                   | 23.83               | 129.83                | 4.39                        | 43.60                    | .67                      | .346                             | 1.01            | 9                               | 8.52                               | 0-10               | W.S.E     | 119.71               | 3.595                       |                               |
| February.....  | 30.111              | 62.55                                   | 63.10                                   | 24.42               | 128.03                | 4.75                        | 51.30                    | .67                      | .378                             | 1.71            | 13                              | 6.71                               | 0-10               | W.S.E     | 63.55                | 3.555                       |                               |
| March.....     | 30.102              | 60.69                                   | 61.01                                   | 26.25               | 130.74                | 40.87                       | 51.25                    | .72                      | .378                             | .34             | 6                               | 5.86                               | 0-10               | S.E.W     | 43.42                | 30.30                       |                               |
| April.....     | 30.082              | 51.78                                   | 53.91                                   | 26.16               | 115.86                | 35.50                       | 45.75                    | .80                      | .315                             | 2.22            | 11                              | 3.30                               | 0-10               | W         | 40.45                | 25.50                       |                               |
| May.....       | 29.850              | 45.62                                   | 46.80                                   | 17.41               | 104.41                | 31.19                       | 42.20                    | .80                      | .270                             | 1.60            | 13                              | 1.44                               | 0-10               | W.S.W     | 38.29                | 23.50                       |                               |
| June.....      | 30.025              | 45.38                                   | 46.16                                   | 15.96               | 99.23                 | 32.86                       | 42.46                    | .80                      | .278                             | 2.46            | 15                              | 1.74                               | 0-10               | W         | 45.33                | 20.10                       |                               |
| July.....      | 30.100              | 43.33                                   | 44.46                                   | 19.93               | 100.01                | 29.42                       | 39.15                    | .81                      | .240                             | 1.27            | 6                               | 1.44                               | 0-10               | N.W.W     | 21.91                |                             |                               |
| August.....    | 30.007              | 44.46                                   | 46.45                                   | 19.83               | 110.50                | 31.72                       | 59.0                     | .85                      | .246                             | 4.36            | 20                              | 1.86                               | 0-10               | W.N.W     | 62.75                |                             |                               |
| September..... | 30.144              | 50.45                                   | 50.40                                   | 22.56               | 118.83                | 34.43                       | 42.30                    | .74                      | .270                             | .50             | 9                               | 3.96                               | 0-10               | S.E.W     | 48.00                |                             |                               |
| October.....   | 30.231              | 52.58                                   | 50.87                                   | 21.65               | 120.00                | 34.85                       | 40.45                    | .64                      | .251                             | 2.75            | 9                               | 4.53                               | 0-10               | S.E.W     | 82.86                |                             |                               |
| November.....  | 29.709              | 54.32                                   | 53.24                                   | 22.65               | 130.58                | 35.83                       | 42.60                    | .63                      | .270                             | 2.92            | 17                              | 4.72                               | 0-10               | N.W.W     | 84.85                |                             |                               |
| December.....  | 29.849              | 60.32                                   | 59.37                                   | 24.19               | 131.89                | 41.95                       | 46.79                    | .62                      | .322                             | 1.40            | 12                              | 7.23                               | 0-10               | N.W.S.E   | 79.60                |                             |                               |
| Stems.....     | 560.069             | 632.55                                  | 635.82                                  | 204.37              | 1420.25               | 432.29                      | 532.55                   | 9.00                     | 3.564                            | 22.63           | 140                             | 51.35                              | 0-10               | W.S.E.N.W | 727.72               | 17.909                      |                               |
| Mean for 1877. | 30.005              | 52.71                                   | 52.98                                   | 22.63               | 118.35                | 33.02                       | 44.37                    | .75                      | .297                             | 1.58            | 11.66                           | 4.28                               | 7.91               | W.S.E     | 60.64                | 24.69                       |                               |
| Mean for 1876. | 29.887              | 52.92                                   | 54.13                                   | 21.61               | 116.37                | 37.12                       | 45.22                    | .75                      | .308                             | 1.93            | 11.41                           | 4.10                               | 6.81               | W         | 67.15                | 24.80                       |                               |
| Mean for 1875. | 29.863              | 54.62                                   | 53.65                                   | 21.33               | 116.84                | 37.69                       | 45.99                    | .75                      | .329                             | 2.34            | 14.41                           | 4.03                               | 7.31               | W.S.E     | 73.56                |                             |                               |
| Mean for 1874. | 29.912              | 54.90                                   | 54.33                                   | 18.47*              | 115.50                | 40.67                       | 49.31                    | .83                      | .392                             | 1.92            | 11.30                           | 3.55                               | 7.77               | W.S.E†    | 83.80                |                             |                               |

\* Mean of 3 months. † Mean of 6 months. ‡ Total Rainfall for 1876, 23.54in.; for 1875, 28.17in.; for 1874, 23.04in.

W. E. SHOORIDGE.



REPORT  
OF THE  
ROYAL SOCIETY  
OF  
TASMANIA

FOR THE YEAR

1877.



Tasmania:

JAMES BARNARD, GOVERNMENT PRINTER, HOBART TOWN.

---

1878.



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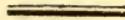
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Bidencope, J., Hobart Town.

Butler, E. H., ditto.

Bailey, Rev. J. H. Brooke, ditto.

Barnard, C. E., M.D., &c., ditto.

Chapman, Hon. T. D., M.L.C., New Town.

Cook, Henry, Hobart Town.

Clark, J. M., ditto.

Creswell, C. F., ditto.

\*Cotton, Francis, Swanport.

Crawford, Lieut.-Colonel, Hamilton-on-Forth.  
 Crosby, W., Hobart Town.  
 Clarke, J. K., ditto.  
 Cruttenden, Thomas, Woodsden.  
 Coote, Audley, Sandy Bay.  
 Cowle, Miss, Hobart Town.  
 Crowther, A. B., M.R.C.S., Eng., ditto.  
 Crosby, R., ditto.  
 Crowther, E. L., M.D., ditto.

Davies, Ven. Archdeacon, V.P., ditto.  
 \*Dobson, His Honor Mr. Justice, ditto.  
 Dobson, H., ditto.  
 Dowdell, C., ditto.  
 Davies, R. L., ditto.  
 Dear, Rev. R. E., ditto.  
 Dodds, J. S., ditto.  
 Dobson, Hon. Alfred, ditto.

Elliston, C. H., ditto.  
 Evans, T. M., ditto.

Fysh, Hon. P. O., M.H.A., ditto.  
 Freeman, E. J., ditto.

Giblin, Thomas, ditto.  
 \*Gould, C., F.G.S., late Government Geologist, London.  
 †Gunn, R. C., F.R.S., F.L.S., Launceston.  
 †Gellibrand, Hon. W. A. B., M.L.C., Hon. Member Leeds  
 Institute, River Ouse.  
 Grant, C. H., Hobart Town.  
 Gilmore, G., Launceston.  
 Gray, Rev. John, Glenorchy.

\*Hall, E. Swarbreck, M.R.C.S., Eng., Hobart Town.  
 Harris, Rev. R. D. P., M.A., ditto.  
 Hunter, Henry, ditto.  
 Huybers, A., ditto.  
 Hazell, C., Carlton.  
 Howell, F. G., Hobart Town.  
 Hopkins, A., ditto.  
 Hammond, W. S., ditto.

Irving, M.H., M.A., &c., Melbourne.  
 †Jeffery, Molesworth, Bournbank, Lachlan.  
 Jackson, Hon. J. A., Hobart Town.  
 \*Johnson, R. M., Launceston.

Kennerley, Hon. Alfred, M.L.C., Hobart Town.  
 Kelsh, Rev. Thomas, New Norfolk.  
 Kermode, W. A., Mona Vale.

Lewis, David, M.H.A., Hobart Town.  
 Legge, R. V., Cullenswood.  
 Lucas, R. J., Hobart Town.  
 Latham, G. H., ditto.  
 Lovett, W., Colonial Auditor, ditto.  
 Lord, R. W., Launceston.  
 Langdon, Capt. W., R.N., Hobart Town.

Maclanachan, James, Ballochmyle.  
 Macfarlane, James, Hobart Town.  
 Macfarlane, John, ditto.  
 Mather, J. B., ditto.  
 Maxwell, C. M., ditto.

\*† Milligan, Joseph, F.L.S., England.  
 Moore, J. A., M.R.C.S., Eng., New Norfolk.  
 Meredith, Hon. C., M.H.A., Orford.  
 Marsh, H. J., ditto.  
 † Mace, G., Spring Bay.  
 Morriss, W. V., Hobart Town.  
 Murphy, Most Rev. D., Bishop of Hobart Town, ditto.  
 Manley, E. J., ditto.

Napier, G. R., ditto.  
 \*Nowell, E. C., ditto.

Officer, Hon. Sir Robert, V.P., New Norfolk.

Pillinger, J., Antill Ponds.  
 Perkins, H.A., M.D., M.R.C.S., Eng., Hobart Town.

Roberts, H. L., ditto.  
 Read, R. Cartwright, Redlands, New Norfolk.  
 Riddoch, A., M.H.A., New Norfolk.  
 Roblin, T., Curator of Museum, Hobart Town.  
 Reynolds, W. J. J., ditto.  
 Richards, Rev. George B., President of Horton College,  
 Ross.  
 Rex, R. R., Hobart Town.

Seal, M., Hobart Town.  
 Smith, His Honor Sir Francis, Chief Justice, ditto.  
 † Solomon, Joseph, Hobart Town.  
 \*Stephens, T., M.A., F.G.S., Inspector of Schools, ditto.

- Story, Dr. G. F., Swanport.  
 Storie, Rev. J., Hobart Town.  
 Salier, F. J., Hobart Town.  
 \*Swan, J., New Town.  
 Smith, P. T., England.  
 \*Shoobridge, W. E., New Norfolk.  
 Shoobridge, E., ditto.  
 Simson, A., Brighton.  
 Scott, Hopton, Hobart Town.  
 Swan, E. D., ditto.  
 Sharp, J., ditto.  
 Shoobridge, R. W. G., New Norfolk.  
 Simson, F. J., Brighton.  
 Smith, C. H., Launceston.  
  
 \*Travers, S. Smith, New Town.  
  
 Walch, James H. B., Hobart Town.  
 Weaver, W. G., ditto.  
 Whyte, Hon. James, ditto.  
 Wilson, George, Mount Seymour.  
 Wilson, Hon. Sir J. M., M.L.C., President of Legislative  
 Council, Hobart Town.  
 Wise, F. H., ditto.  
 Webster, A. G., ditto.  
 Wright, Stephen P. H., Glenorchy.  
 Westbrook, T., Bellerive.  
 Westbrook, G. C., Hobart Town.  
 Woodgate, E. W., Launceston.  
  
 Young, Russell, M.H.A., Hobart Town.

## Obituary.

WILSON, JAMES, J.P.—Died at Ashgrove, Oatlands, July 18, 1877, æt. 41.

SCOTT, JAMES REID, J.P.; M.L.C. for South Esk.—Born in 1839, at Earlston, in Scotland. Died August 25, 1877, æt. 39. Was educated in Scotland. Elected to House of Assembly in 1867. Returned to the Legislative Council in 1872. Colonial Secretary from 1872 to 1873. A good botanist, and a hardy and enthusiastic explorer, he made several expeditions to the wild and lesser known portions of the Southern and Western Districts of the Island, and wrote for the Royal Society several Papers on the Natural History and Physical Features of those regions. A Fellow of the Society since 1868.

SHARLAND, WILLIAM STANLEY, J.P.—Born in County Salop, England. Died at Hobart Town, October 23, 1877, æt. 77. Arrived, with his father and family, in Tasmania in 1823, and, at the age of 22, was made Assistant Surveyor. Explored various unknown regions of the Colony, and discovered Lake St. Clair. Was nominated as a Member of the old Legislative Council by Sir William Denison in 1849. Elected Member for New Norfolk in the Upper House, 1857. Represented New Norfolk in the House of Assembly, from 1861 to 1872, when he retired from public life. A Fellow of this Society almost since its formation.

ALLPORT, JOSEPH.—Born in 1800, at Aldridge, in Staffordshire. Left England in 1831, bound for Sydney, but, touching at Hobart Town, was induced by the then Governor, Sir George Arthur, to remain. Mr. Allport was remarkable for the brightness, perspicuity, and interest which he exhibited in matters outside his profession, especially such as related to natural objects and to progressive science. He was probably the first to attempt the introduction of live fish to the Australia, having as far back as 1842 constructed ponds for their reception. Some years later he succeeded in introducing perch and tench. He was an ardent horticulturist, and there are now in his garden trees and shrubs seldom seen elsewhere in the Colony. He was one of the original members of the Tasmanian Society, from which has sprung the present Royal Society of Tasmania, of which he has ever since been a Fellow; and from the formation of the Tasmanian Public Library till his death he was one of the Trustees of that Institution.

*MINUTES of the Annual General Meeting of the ROYAL SOCIETY OF TASMANIA, held at the Museum, Macquarie-street, on the 29th January, 1878: The Right Rev. the Lord BISHOP OF TASMANIA in the Chair.*

The Chairman, having read the advertisement by which the meeting had been convened, requested that the Report might be read.

Mr. M. Allport (in the absence of the Honorary Secretary, Dr. Agnew) read the Report of the Council for the year 1877.

It was moved by the Rev. W. W. Spicer, seconded by Mr. Manley, and carried, "That the Report be adopted, and printed for circulation amongst the Fellows."

Mr. Allport having reported that the retiring Members of Council were Sir Robert Officer, Messrs. T. Stephens, H. J. Buckland, and J. Barnard, it was unanimously resolved that they should be re-elected.

Messrs. H. Cook and F. Butler were elected Auditors of Annual Accounts.

The following gentlemen were balloted for and declared duly elected as Corresponding Members:—James Hector, Esq., M.D., F.R.S., &c., Director of the Geological Survey of New Zealand; and Robert Etheridge, jun., Esq., F.G.S., of the Geological Survey of Scotland.

Mr. Morton Allport stated that in future the printed proceedings of the Society would not be distributed as heretofore to the members, but would be obtainable on application at the Museum. The part for 1876 was now ready. This plan would be pursued, as by the old system of distribution the Society had run out of some of the earlier numbers of its proceedings. Mr. Allport continued that he would take the opportunity, in the absence of their Hon. Secretary, Dr. Agnew, to move a direct vote of thanks for his services during past years, more especially for those in the year which was just ended. (Cheers.) Nothing that he could say would tend to increase the respect that was felt for him. It was simply a fact that had it not been for Dr. Agnew's labours on behalf of the Society there would have been no society at all. (Hear, hear.) Dr. Agnew's services had been great in previous years, but last year they had been more than ever valuable. Many improve-

ments had to be made in the Museum and Library, and, with a larger printing bill, had swelled the amount of the debt of the Society to their Secretary, who had advanced the sums necessary for the expenditure. Of this debt he had now made the Society a present, and on this account also their thanks were especially due to him. He (the Speaker) would propose that the special and cordial thanks of the Society be accorded to the Hon. Secretary, Dr. Agnew, for his services.

Mr. Justin Browne seconded the motion.

His Lordship the Chairman, in putting the motion, said that he would add nothing to it, but to say that he thought the vote was perfectly deserved. "The bird that we feed is the bird that we love," and Dr. Agnew's love for the Society made him devote his time and energies to it, and he had added to the obligations under which they were to him by clearing off their debt.

The motion was carried by acclamation.

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## R E P O R T .

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THE Session of 1877 opened on March 13 with a Paper "On some South Australian Polyzoa," by F. W. Hutton, Esq., F.G.S., communicated by Professor R. Tate, F.G.S., of Adelaide, a Corresponding Member of the Society.

The following Papers were brought forward at the various subsequent meetings during the year:—"A Census with brief description of the Marine Shells of Tasmania and the adjacent Islands," by the Rev. J. E. Tenison-Woods, F.L.S., F.G.S., F.R.G.S., &c.; "Notes on a curious Confervoid substance from the Cascades Reservoir," by the Rev. W. W. Spicer, M.A.; "On 'Aliens,' or Plants which have been introduced into Tasmania and naturalised," by the Rev. W. W. Spicer, M.A.; "On Plants as Insect Destroyers," by the Rev. W. W. Spicer, M.A.; "The Modern Progress of Astronomy," by F. Abbott, F.R.A.S.; "On the occurrence of 'Ergot' on Rye Grass at Kingston," by the Rev. W. W. Spicer, M.A.; "On the Hobart Town Storage Reservoir," by T. Stephens, M.A., F.G.S.; "Notes on the Flora of Tasmania," by the Rev. W. W. Spicer, M.A.; "On Tasmanian Siphonaria, including a new species," by the Rev. J. E. Tenison-Woods, F.G.S., F.R.G.S., &c.; "On Silk and Silk Producers," by the Rev. W. W. Spicer, M.A.; "On some new Tasmanian Marine Shells," by the Rev. J. E. Tenison-Woods, F.G.S., F.R.G.S., &c.; "On the present stage of the Salmon Experiment," by M. Allport, F.L.S., F.Z.S., &c.; "On Insect Parasites," by the Rev. W. W. Spicer, M.A.

In addition to the Papers above referred to, communications on the following subjects were brought under notice during the Session:—"Fossils from Darling Downs, Queensland," from G. Bennett, M.D., F.Z.S., &c.; "The occurrence of species of *Belemnites* and *Salenia* in the Middle Tertiaries of South Australia," from Professor R. Tate, Adelaide; "The Islands of New Britain, New Ireland, and the Duke of York Group,

their Natural History, and the Language, Manners and Customs of the Inhabitants," from the Rev. George Brown, Wesleyan Missionary; "The alleged Sanitary Influence of the Blue Gum Tree (*Eucalyptus globulus*)," "Difference in the Time of Leafing of English Trees in the Colony and in England," "The Screw Bean (*Prosopis pubescens*)," "The Origin of the Potato known as the 'Brown's River Black,'" "Fossil Fruits from Gulgong, New South Wales," &c., &c.

Mr. Abbott and Mr. W. E. Shoobridge (New Norfolk) have been indefatigable as usual in carrying on the Meteorological Observations, and the various Lighthouses have supplied their monthly tables regularly. The "Simultaneous Observations" are still taken by Mr. Abbott, and are forwarded to the Meteorological Department, United States, where they are incorporated with observations of a similar character taken at various stations throughout the world.

Our usual thanks are due to Messrs. W. Crosby and Co., and Macfarlane Bros., for the transmission of parcels free of expense to England and elsewhere; also to Messrs. Walch and Sons for the gratuitous distribution of the Society's publications to Members resident in the country.

Fourteen Fellows and seven Corresponding Members were admitted. Four have been lost by death, and three by resignation. Of the resignations two were due to the circumstance that the Members have gone to official positions on the northern side of the Island.

#### COUNCIL.

One vacancy which occurred, owing to the retirement of Mr. T. Giblin, was filled by the election of the Rev. W. W. Spicer. The list of Retiring Members has been posted in the Library for the last three days, in accordance with No. 33 of the Amended Rules of the Society.

#### FINANCE.

The income from all sources was as follows:—Government grant in aid to Museum, £200; ditto Gardens,

£400; subscriptions, £168 10s.; from Marine Board, £20; sale of Plants &c. at Gardens, £88 6s. 8*d.*; this, with £30 12s. in the hands of the Superintendent of the Gardens for the payment of wages and arrears of subscriptions, £50, will give a total of £957 8s. 8*d.* The expenditure and liabilities as per balance-sheet amounted to £1024 8s. 10*d.*, leaving a balance to debit of £67 0s. 2*d.*

Large and unusual as the outlay for printing was last year, it has, owing to the great value and interest of Papers read at the meetings, been exceeded by nearly £30 this year. The result has been an increase on our debt to this amount. As the printing account, however, is not likely to be again so large, it is expected that a great portion of the debt will disappear during the ensuing year.

#### GARDENS.

The gates which were ordered from England last year are now being erected; and when this work is complete, and the general approach to the gardens properly laid out, the present mean and discreditable entrance, which has long been an eye-sore, will cease to exist. To all who are interested in the beauty and well-doing of the Gardens, it must be a matter of congratulation that the grant in aid has been increased by the annual addition of £200. By means of this timely assistance the workmen can now receive fairer wages, and the deserts of the zealous and most efficient Superintendent will be more adequately recognised.

The principal new work executed consists in the extension of the sea-wall, completion of reclaimed flat at lower part of Gardens, trenching, and forming paths on new ground intended for an arboretum. Efforts will be made to complete this work forthwith in order that more attention may be given to many general works of importance which have hitherto, from want of means, been neglected.

A quantity of peat soil has been received from Port Arthur for the purpose of forming a Rhododendron bed, in

which about seventy varieties have been planted. This gives promise of great success, many of them having already flowered freely.

Many new Plants have been introduced, the following being a few of the most noteworthy :—Orchids and Palms, from Mons. J. Linden, Ghent, Belgium ; Fruit Trees and various Plants, from A. Van Geert, Ghent ; North American Plants, from Mr. C. Moore, Director Botanical Gardens, Sydney ; Seeds of the Mesquit Bean (*Prosopis pubescens*) and of the Algaroba Bean (from which Plants have been raised), from His Excellency the President. In addition to these, contributions have been received from Mr. A. Simson, George's Bay ; and from Mr. L. Bernays, Queensland, &c.

The grant from Government has, as usual, been supplemented by a gang of prison labour, which has been of great service in carrying out new work, and in performing the rougher operations. Without this, indeed, it would not have been possible to maintain the Gardens in anything like fair condition.

The number of visitors has been estimated at 55,880, being nearly 8000 more than last year.

#### MUSEUM.

In addition to the new Shell Cases acquired last year two new ones have been added, and all the available space in the room is now fully occupied. Mr. Legrand is making progress with the arrangement and display of our shells, 450 species of which have been mounted and named. Among these are included the type specimens of the new species described by Rev. J. E. Tenison-Woods. The thanks of the Society are due to Mr. Legrand, not only for the work in the Museum, but also for his valuable assistance in correcting the proofs of the Conchological Papers which have passed through the Press, and for his liberality in presenting many specimens from his private collection. Our thanks are also due to Mr. W. F. Petterd for numerous presentations, many of them unique, to this Department.

In this place it is due to Mr. R. C. Kermode and to Mr. P. T. Smith to record that the special thanks of the Society have been given to the former for a very liberal donation of Tasmanian Insects in a valuable cabinet; and to the latter for his generosity in presenting a first-class Microscope (by Ross) furnished with many accessories and mounted objects.

Mr. A. Simson has also been a donor of numerous mineralogical and other specimens from the George's Bay District.

For the past six weeks the Museum has been thrown open to the public on Sundays for a few hours in the afternoon. The experiment has been attended with marked success. The attendance has been very large and orderly, and many who have hitherto been prevented by their avocations from visiting the Museum have gladly availed themselves of the opportunity now afforded them of doing so.

The number of visitors to the Museum was 22,463, being an increase of 3737 on that of 1876.

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*STATEMENT of Funds of the ROYAL SOCIETY of TASMANIA for the Year 1877.*

|                                                                                                            | <b>£</b> | <b>s. d.</b> | <b>£</b>                                                                         | <b>s. d.</b> |
|------------------------------------------------------------------------------------------------------------|----------|--------------|----------------------------------------------------------------------------------|--------------|
| <b>Receipts.</b>                                                                                           |          |              | <b>Expenditure.</b>                                                              |              |
| Annual Subscriptions from 98 Members                                                                       | 147      | 0 0          | Jan. 17—Balance overdrawn at Commercial Bank as per statement for 1876           | 63 12 8      |
| Arrears of ditto                                                                                           | 21       | 10 0         | Interest on overdrawn account, 30th June, £1 9s. 1d.; 31st December, £1 16s. 9d. | 3 5 10       |
| From the Marine Board for clerical assistance in completing Meteorological Tables from Lighthouses, &c.... | 20       | 0 0          |                                                                                  |              |
| Total Royal Society                                                                                        | 188      | 10 0         | <i>Royal Society.</i>                                                            |              |
| <b>Museum.</b>                                                                                             |          |              | Printing and Advertising                                                         | 108 6 0      |
| Grant in aid from Treasury                                                                                 | ...      | 200 0 0      | Postage, Parcels, &c.                                                            | 3 13 8       |
| <i>Botanic Gardens.</i>                                                                                    |          |              | Collector's Commission                                                           | 8 8 6        |
| Grant in aid from Treasury                                                                                 | 400      | 0 0          | Messenger                                                                        | 0 5 0        |
| Proceeds of sale of Plants, Fruit, &c.                                                                     | 88       | 6 8          | Clerical assistance for completing Lighthouse Meteorological Tables              | 20 0 0       |
| Total Botanic Gardens                                                                                      | 488      | 6 8          | Library Books, Stationery, &c.                                                   | 41 6 9       |
|                                                                                                            |          |              | Total Royal Society                                                              | 181 19 11    |
|                                                                                                            |          |              | <i>Museum.</i>                                                                   |              |
|                                                                                                            |          |              | Salary of Curator                                                                | 125 0 0      |
|                                                                                                            |          |              | Wages of Attendant                                                               | 52 0 0       |
|                                                                                                            |          |              | Ditto extra for attendance on Sundays                                            | 2 0 0        |
|                                                                                                            |          |              | Insurance                                                                        | 6 7 6        |
|                                                                                                            |          |              | Purchase and preparation of Specimens                                            | 3 8 0        |
|                                                                                                            |          |              | Water rate                                                                       | 6 5 0        |
|                                                                                                            |          |              | Fuel and Light                                                                   | 4 11 6       |
|                                                                                                            |          |              | Sundries and Petty Cash                                                          | 5 2 1        |
|                                                                                                            |          |              | Ironmongery, Brushware, &c.                                                      | 5 16 3       |

|                                      |          |                   |
|--------------------------------------|----------|-------------------|
| Freight and carriage of Specimens .  | 0 10 6   |                   |
| Fittings, Repairs, &c. ....          | 29 1 9   |                   |
| Total Museum .....                   |          | 240 2 7           |
| <i>Botanic Gardens.</i>              |          |                   |
| Salary of Superintendent .....       | 150 0 0  |                   |
| Wages of Laborers.....               | 260 0 0  |                   |
| Tools and Repairs .....              | 11 16 0  |                   |
| Freight and carriage of Plants ..... | 23 19 5  |                   |
| Stationery and Stamps .....          | 4 11 4   |                   |
| Forage .....                         | 10 14 9  |                   |
| Ironmongery .....                    | 12 16 6  |                   |
| Repair of Buildings, Timber, &c. ... | 6 12 6   |                   |
| Seeds .....                          | 7 16 9   |                   |
| Sundries .....                       | 30 14 11 |                   |
| Water rate .....                     | 3 2 8    |                   |
| Flower Pots .....                    | 7 4 0    |                   |
| Fittings .....                       | 5 19 0   |                   |
| Total Botanic Gardens .....          |          | 535 7 10          |
|                                      |          | <u>£1024 8 10</u> |

|                                                 |                   |
|-------------------------------------------------|-------------------|
| 1878.                                           |                   |
| Jan. 18.                                        |                   |
| Balance overdrawn at Com-<br>mercial Bank ..... | 147 12 2          |
|                                                 | <u>£1024 8 10</u> |

|                                                                    |                |
|--------------------------------------------------------------------|----------------|
| <b>NOTE.</b>                                                       |                |
| To overdrawn balance at Bank .....                                 | 147 12 2       |
| <i>Dr.</i>                                                         |                |
| By Cash in hands of Mr. Abbott for<br>payment of men's wages ..... | 30 12 0        |
| Subscriptions due.....                                             | 50 0 0         |
|                                                                    | <u>80 12 0</u> |
| Balance to Debit.....                                              | <u>£67 0 2</u> |

Audited and found correct,  
FRANCIS BUTLER.  
HENRY COOK.

29th January, 1878.

*BOOKS, &c. Purchased and Presented during 1877.*

[Presentations marked thus \*.]

Athenæum, The, current numbers.

Arts, Journal of Society of, ditto.

—————, vols. 23 and 24.

Agricultural Gazette, ditto.

\* ———— Society, Wisconsin State, Regulations of, 1876.

\* Arboriculture, Prizes for promoting, (Massachusetts Society).

\* Academy of Natural Sciences, Philadelphia, Proceedings of, 1876.

\* Avi-fauna of New Guinea, Notes on, by Dr. G. Bennet, F.L.S., F.Z.S.  
From the author.

Belemnites and Salenia, on some new species of, from South Australia, by  
Prof. Ralph Tate, F.G.S., Adelaide University.

\* Colonies, the current numbers.

Conchologia Iconica, Reeves, parts 330 to 337.

\* Climate of New South Wales, by H. C. Russell, B.A. From the author.

Crusta Catalogue of Stalk and Sessile-eyed, New Zealand, by E. J.  
Miers, F.L.S. From the author.

\* Catalogue of Birds, British Museum, vol. 2. From the trustees.

\* Confervoid Substance from Cascades Reservoir, Notes on, by Rev. W. W.  
Spicer, M.A., F.R.M.S. From the author.

\* Diatomacean Typen Platte, Catalogue of, Möller. From P. T. Smith,  
Esquire.

\* England and Wales, Return of Landowners in, vols. 1 and 2.

\* Ergot, on the occurrence of, on Rye Grass, in the Colony, by the Rev. W.  
W. Spicer, M.A., F.R.A.S. From the author.

Florist and Pomologist, the, current numbers.

\* Flora of Iowa, contributions to. From the Commissioners, Philadelphia  
Exhibition.

Feathers, Stray, vol. 4, Nos. 4, 5, 6; vol. 5, Nos. 1 to 4.

Geological Magazine, Nos. 149 to 160.

Gardeners' Chronicle, current numbers.

Gazetteer, Tasmanian, (Baillier's), 1877.

Geological Survey of Victoria, Report of, No. 4, 1877.

————— Explorations in New Zealand, with Map of Buller Gold Field,  
by Dr. J. Hector, F.R.S. &c. From the author.

\* Historical and Archæological Society of Ireland, Royal Journal of, vol. 3,  
Nos. 23, 24; vol. 4, Nos. 25, 26, 27. From the Hon. J. W. Agnew, M.D.,  
M.L.C.

\* Ireland, Census of 1871, vol. 1, parts 1 and 2; vol. 2, parts 2, 3; vol. 4,  
part 1.

—————, Return of Landowners in.

\* Institute, Royal Colonial, Report of, 1877.

\* ————, New Zealand, Proceedings of, vol. 9, parts 1 and 2. From Dr.  
Hector.

—————, New Zealand, Index to Proceeding, vols. 1 to 8.

Journal, Quarterly, of Science, Nos. 53 to 56.

- \* Lincei, L'Academia Royale des, Rome, Publications of, 1876-7.
- \* Longitude, Report on difference of, between Washington and Ogden, Utah.

Magazine, Country Gentleman's, current numbers.

- \* Microscope, the, by W. B. Carpenter, M.D. &c. From P. T. Smith, Esquire.

\* Microscopic Mounting, Martins. From ditto.

- \* Micrographic Dictionary, Griffith & Henfrey's, 2nd edition. From ditto.

\* Meteorological Society, Quarterly Journal of, current numbers.

- \* Meteorological Office, Calcutta, Publications of, 1874-5-6.

\* ———— Report, New Zealand, 1875. From Dr. Hector.

- \* ———— Observations, Adelaide, 1876. From C. Todd, Esquire.

—————, Melbourne, 1875, Results of. From R. J.

L. Ellery, Esquire.

- \* ———— Data for the nine 10° squares of the Atlantic between 20° N. and 10° S. lat., and 10° to 40° W. long. From Meteorological Office, London.

\* ———— Report, Quarterly. From ditto.

- \* ————, of Kew Committee, 1876. From ditto.

\* ———— Observations at Windsor, N. S. Wales, Results of. From J. Tebbutt, Esquire, F.R.A.S.

- \* ———— Tables, Monthly, Hobart Town. From F. Abbott, Esq.

\* ————, New Norfolk. From W. E. Shoobridge, Esquire.

- \* ————, Mount Nelson, South Bruni, Goose Island, Swan Island, Kent's Group, and King's Island. From the Marine Board.

\* ————, Tamar Heads, June to December. From R. Henry, Esq.

- \* Moon, the, Investigations of, corrections to Hansen's tables of, by Prof. Newcomb, U. S. Navy. From the author.

\* Mines, Report of Department of, N. S. Wales, 1876. From Government of N. S. W.

Nature, current numbers.

Natural History, Animals and Magazine of, ditto.

New South Wales, Progress and Resources of, by C. Robinson, Sec. to Commissioners, Philadelphia Exhibition.

- \* Orchids, Australian, by R. D. Fitzgerald. From the Government of N. S. Wales.

\* Physicalisch-ökonomischen Gesellschaft zu Königsberg, Schriften der, 1875.

- \* Plants eligible for Industrial culture and Naturalisation in Victoria, by Baron Fred. von Mueller, C.M.G., M.D., F.R.S., &c.

\* ————, Papuan, Descriptive Notes on, by the same.

- \* ————, Alien, on, by Rev. W. W. Spicer, M.A., F.R.M.S.

—————, as Insect Destroyers, by the same.

Parasites, on Insect, by the same.

Palm House, the, in Botanic Gardens, Adelaide, by Dr. Schomburgh.

- \* Photoheliograph, Theory of Horizontal, by Prof. W. Harkness, United States Naval Observatory, Washington.

\* Polyzoa, on some South Australian, by F. W. Hutton, F.G.S. From Prof. Ralph Tate, Adelaide.

- \* Rain Gauge, Register of, at Adelaide, 1839 to 1874, by Sir George Strickland, Kingston. From the author.

- \* Report, Botanic Gardens, Adelaide. From Dr. Schomburgh.
  - \* ———, Colonial Museum and Laboratory, Wellington, N. Z. From Dr. James Hector.
  - of British Association, 1875.
  - Reservoir, Hobart Town Water Works, on the, by T. Stephens, M.A., F.G.S.
  - \* Society, Royal Astronomical, Monthly Notices, vol. 36, No. 9 ; vol. 37, Nos. 1 to 9.
  - \* ———, Asiatic of Japan, Transactions, vol. 4, 1875-6. From the society.
  - \* ———, Linnean of New South Wales, Proceedings, 1876. From the society.
  - \* ———, Royal, Proceedings, 1877, current numbers. From the society.
  - \* ———, Royal, of Victoria, Proceedings of, vol. 12, 1876. From the society.
  - , Palæontographical, Publications of, 1875-6, vols. 29, 30.
  - \* ———, Geological, Quarterly Journal of, vol. 32, Nos. 125, 128.
  - \* ———, Royal Asiatic, Journal of, vol. 8, parts 1 and 2 ; vol. 9, part 1, 1876.
  - , Royal Geographical, Journals of, vol. 45, 1875 ; Proceedings, vol. 20, Nos. 1, 6 ; vol. 21, No. 1.
  - , Linnean, Journal of, vol. 15, Nos. 82 to 87, (Botany) ; vols. 12 and 13, Nos. 60, 66, (Zoology).
  - , Zoological, Proceedings of, 1875 and 1876.
  - \* ———, Geological and Polytechnic of West Riding of Yorkshire, Proceedings of, 1876.
  - \* ———, Royal, New South Wales, Report, 1877 ; Proceedings, 1876.
  - \* ———, Leeds Philosophical and Literary, Report, 1876-7.
  - \* Société Royale du Nord, Memoirs, 1875-6.
  - \* Statistics of Tasmania, 1876. From government.
  - \* ———— Victoria, 1876. Ditto of Victoria.
  - \* ————, Australian, 1876. Ditto of N. S. Wales.
  - \* Shells, Marine, of Tasmania, a Census of, 1877, by the Rev. J. E. Tenison Woods, F.G.S., F.R.G.S., &c.
  - \* ———, Marine, on some new Tasmanian, 1877, by the same.
  - \* Siphonaria, on Tasmanian, by the same.
  - \* Silk and Silk Producers, on, by the Rev. W. W. Spicer, M.A.
  - \* Salmon Experiment, on present stage of, 1877, by M. Allport, F.L.S., F.Z.S., &c.
  - \* Tobacco, its culture, &c., by A. Morris, Executive Commissioner, Philadelphia Exhibition.
  - \* Victorian Year Book, 1876. From H. H. Hayter, Esq., Government Statist, Victoria.
  - Wissenschaften, Der K. B. Akademie der Munich, publications of, 1874, 1875.
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*LIST of Donors to the Museum during 1877.*

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

- |                                            |                                        |
|--------------------------------------------|----------------------------------------|
| Archer, R. F., Mr.                         | Lucas, Mr. J., Huon.                   |
| Allport, Mr. C., Hobart Town.              | Langdon, Lieut. F. G. C., R.N.         |
| Armstrong, Mr., Christchurch, New Zealand. | Meredith, Mr. O., Orford.              |
| Blythe, W. C., Mr., Campbell Town.         | Maddock, A., Master, Hobart Town.      |
| Bates, T., Mr., Adelaide.                  | Murray, Mr. R. A., Hampshire Hills.    |
| Brown, Rev. G.                             | Nicholas, Mr. E. J., Meadsfield.       |
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| Crowther, Dr. E. L.                        | Rex, G., Mr., Hobart Town.             |
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| Clark, J. K., Esq., Hobart Town.           | Rex, Mr. R. R., Hobart Town.           |
| Dixon, W. K., Ouse.                        | Sandberg, Mr. C., Ringarooma.          |
| Dury, Mr. T., Hobart Town.                 | Swan, John, Esq., Hobart Town.         |
| Dillner, Capt., brig <i>Prairie</i> .      | Swan, E. D., Esq., ditto.              |
| Dear, Rev. R. E., Hobart Town.             | Shoobridge, W. E., Esq., New Norfolk.  |
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| Ferguson, Mr., Tinder-box Bay.             | Spicer, Rev. W. W., Hobart Town.       |
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| Johnston, Mr. R. M., Launceston.           | Wise, Mr. F., Hobart Town.             |
| Jones, Master H., Hobart Town.             | Witherington, Mr. J., ditto.           |
| Kermode, R. C., Esq., Mona Vale.           | Yeoland, Miss E., Long Bay.            |
| Knight, Miss, Sandy Bay.                   |                                        |

PLANTS AND SEEDS RECEIVED AT THE BOTANIC GARDENS  
DURING THE YEAR 1877.

From Mr. William Meyer, San Francisco Nursery, San Francisco—16 packets Seeds of Coniferæ : 7th February.

From Mr. James Jones, Melbourne—65 varieties Dahlia, imported : 17th February.

From Mons. Ch. Huber, Hyères, France—2 packets Seeds : 8th March.

From Mons. August Van Geert, Ghent, Belgium—Case containing 112 Plants, and also 80 varieties of Fruit Trees : 17th March.

From the Royal Gardens, Kew—One box Willow Cuttings : 17th March.

From Baron Ferd. Von Mueller, Government Botanist, Melbourne—Seeds of *Festuca dives* : 17th March.

From the Chamber of Agriculture, Washington, America—39 packets Seeds : 3rd April.

From Ch. Huber & Co., Hyères, France—43 packets Seeds : 3rd April.

From the Botanic Gardens, Calcutta—14 packets Seeds Coniferæ : 28th April.

From Mr. Piesse, Hobart Town—14 packets Seeds : 4th May.

From His Excellency F. A. Weld, Esq.—Seeds of *Prosopus pubescens* and *Prosopus juliflora* : 7th May.

From Mr. J. Dawson, Hobart Town—16 packets Seeds of Fijian Plants : 23rd May.

From Ch. Huber—Seeds of *Jocaranda mimosæfolia* : 23rd May.

From the Philadelphia Exhibition Commissioners—25 packets Seeds : 9th June.

From Baron Ferd. Von Mueller—3 packets Seeds : June 13th.

From Mr. William Lawrence, Melbourne—Seeds of *Quercus egilops* : 15th June.

From A. Simpson, Esq.—Plants from Flinder's Island : 19th July.

From the Botanic Gardens, Sydney—Plants of *Nymphæa lutea* and *Nymphæa odorata* : 18th August.

From Mr. G. Brunning, St. Kilda Nurseries, Melbourne—Case containing 41 Plants, 23 varieties Fruit Scions : 31st August.

From Messrs. Shepherd & Co., Sydney—21 Fruit Trees : 31st August.

From W. S. Bernays, Esq., Queensland—Seeds of two species *Nymphæa* : 15th September.

From Mr. J. Purchase, Sydney—Case containing 24 Plants : 15th September.

From Mr. Inglis—18 packets Seeds from India : 29th September.

From Mr. A. Simpson, George's Bay—Large plant of *Alsophila Australis* : 15th October.

From Mons. J. Linden, Ghent, Belgium—Case containing 50 plants of Orchids and Palms : 19th October.

From L. Bernays, Esq., Queensland—Two cases Water Lilies : 23rd November.

From Mr. Latham, Hobart Town—Numerous varieties Dutch Bulbs : 30th November.

From Mr. F. M. Baily, Queensland—Four varieties Grass Seed : 30th Nov.

From Mons. Ch. Huber, Hyères, France—32 packets Seeds.

PLANTS AND SEEDS SENT FROM THE GARDENS DURING  
1877.

- May 12th : To the Botanic Gardens, Kew, London—Seeds of *Eucalyptus globulus*.
- May 12th : To Mr. Wm. Bull, London—Seeds, *Eucalyptus globulus*.
- May 12th : To the Botanic Gardens, Calcutta—Seeds of *Eucalyptus globulus*.
- May 25th : To the Rev. W. W. Spicer—60 packets seeds.
- June 26th : To the Department Agriculture, Washington, United States, America—100 packets seeds.
- July 4th : To Baron Ferd. von Mueller—100 packets seeds.
- July 8th : To Mr. Wm. Bull, London—10 packets seeds.
- July 8th : To the Botanic Gardens, Calcutta—23 packets seeds.
- July 8th : To the Royal Gardens, Kew—106 packets seeds.
- July 8th : To the Royal Horticultural Gardens, London—10 packets seeds.
- July 18th : To Messrs. Vilmorin, Andrieux, & Co., Paris—14 packets seeds.
- July 18th : To C. Huber & Co., Hyères, France—14 packets seeds.
- July 18th : To Mr. C. F. Creswell, Melbourne—Plants and seeds.
- July 31st : To Mr. James Jones, Melbourne—Packets seeds.
- August 7th : To Messrs. Shepherd & Co., Sydney—Box plants and seeds.
- August 8th : To Mr. G. Brunn, Melbourne—1 case plants and seeds.
- November 23rd : To Dr. Hector, Colonial Museum, Wellington—18 plants.
- November 23rd : To Mr. Travers, Nelson, New Zealand—12 packets seeds.
- November 26th : To the Royal Gardens, Kew—Seeds, hardy *Eucalypti*.
- November 26th : To Mr. Wm. Bull, London—Various seeds.
- November 26th : To Thos. Ledbetter, Esq., Notary Public, Bombay—Seeds, *Eucalypti*.
- November 26th : To Mons. Ch. Huber, France—Seeds, Hardy *Eucalypti*.
- November 26th : To Messrs. Vilmorin, Andrieux, & Co., Paris—Seeds, hardy *Eucalypti*.
- November 26th : To Jean Verschaffelt, Belgium—Package seeds.
- November 26th : To Baron Ferd. von Mueller—Package seeds.
- November 26th : To Mr. C. F. Creswell, Melbourne—Package seeds.
- November 26th : To the Royal Horticultural Society, London—Seeds of hardy *Eucalypti*.
- November 26th : To the Chamber of Agriculture, United States, America—Seeds, hardy *Eucalypti*.
- November 26th : To J. King, Esq., Botanic Gardens, Calcutta—Package seeds.

## PLANTS SUPPLIED FOR PLANTING PUBLIC PLACES.

- May 1st : For Hospital Grounds and Public Buildings, Launceston—  
176 plants, and various bulbs.
- May 29th : For St. Mark's Church, Kangaroo Point—100 plants.
- May 29th : For Public Recreation, New Norfolk—100 plants.
- May 31st : For Cemetery, Hobart Town—80 plants.
- June 7th : Ditto—40 plants.
- June 13th : For Hospital, Launceston—150 plants.
- June 21st : Horton College, Ross—100 plants.
- June 21st : St. David's Cathedral—2 Deodors.
- June 30th : For Cemetery, Sandy Bay—50 plants.
- July 15th : Public School, Sorell—18 plants.
- July 15th : Church of England, St. Mary's—30 plants.
- July 19th : Church of England, Spring Bay—25 plants.
- July 24th : Municipality Deloraine—100 plants.
- August 21st : Public School, Oatlands—55 plants.
- September 14th : Scotch Church, Launceston—50 plants.

F. ABBOTT, *Superintendent.*

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PLANTS INTRODUCED INTO THE ROYAL SOCIETY'S GARDENS  
DURING THE YEAR 1877.

|                                       |                                            |
|---------------------------------------|--------------------------------------------|
| <i>Albizzia procera</i>               | <i>Gladiolus purpureus auratus</i>         |
| <i>Andropogon angulatus</i>           | <i>Gladiolus Saundersoni</i>               |
| <i>Anemia flexuosa</i>                | <i>Gladiolus viperatus</i>                 |
| <i>Antigonon leptopus</i>             | <i>Gongora aureo-purpurea</i>              |
| <i>Aspidium Molley</i>                | <i>Griffinia hyacinthina</i>               |
| <i>Aspidium acuminatum</i>            | <i>Gymnogramma lauchiana</i>               |
| <i>Asplenium eburnum</i>              | <i>Gymnogramma sulphurea</i>               |
| <i>Asplenium felix fœmina</i>         | <i>Gymnogramma tomentosa</i>               |
| <i>Asplenium proliferium</i>          | <i>Habranthus Bagnaldi</i>                 |
| <i>Bauhinia Hookeri</i>               | <i>Habranthus pratensis</i>                |
| <i>Bauhinia tomentosa</i>             | <i>Hæmanthus albiflorus</i>                |
| <i>Bignonia adenophora</i>            | <i>Hedera marmorata elegans</i>            |
| <i>Boronia citriodora</i>             | <i>Helianthus cucumeriæfolius</i>          |
| <i>Brodæa coccinea</i>                | <i>Hernionitis cordifolia</i>              |
| <i>Bromus arenarius</i>               | <i>Hesperia populnea</i>                   |
| <i>Calochortus elegans luteus</i>     | <i>Hydnophytium fornicatum</i>             |
| <i>Calochortus luteus oculatus</i>    | <i>Laclaria calicarpa</i>                  |
| <i>Calochortus splendens</i>          | <i>Lawsonia alba</i>                       |
| <i>Calochortus uniflorus</i>          | <i>Magnolia alba superba</i>               |
| <i>Calochortus venusta</i>            | <i>Magnolia cordata</i>                    |
| <i>Canna Coquette</i>                 | <i>Magnolia conspicua</i>                  |
| <i>Caryota speciosa</i>               | <i>Magnolia Fischeri</i>                   |
| <i>Cattleya citrina</i>               | <i>Magnolia Norberti</i>                   |
| <i>Cattleya labiata</i>               | <i>Magnolia triumphans</i>                 |
| <i>Ceanothus florabundus</i>          | <i>Magnolia Yulan Thompsonianum</i>        |
| <i>Ceanothus gloire de Versailles</i> | <i>Martinezia disticha</i>                 |
| <i>Ceanothus ovatus roseus</i>        | <i>Martinezia Lindeni</i>                  |
| <i>Cænarrhenes nitida</i>             | <i>Matricaria eximea</i>                   |
| <i>Centaurea rugosina</i>             | <i>Maxillaria lutea alba</i>               |
| <i>Chamærops Moccini</i>              | <i>Maxillaria picta</i>                    |
| <i>Cheilanthes hirta</i>              | <i>Morenia corallina</i>                   |
| <i>Chrysanthemum inodorum</i>         | <i>Mosospinidium sanguineum</i>            |
| <i>Cocos campestris</i>               | <i>Narcissus Ajax bicolor moschata</i>     |
| <i>Cocos mipaniana</i>                | <i>Narcissus cernuus flora plæno</i>       |
| <i>Cyclobothra pulchella</i>          | <i>Narcissus incomparabilis plæno</i>      |
| <i>Danthonia elymoides</i>            | <i>Narcissus incomparabilis aurantiaca</i> |
| <i>Danthonia pectinata</i>            | <i>Narcissus intermedius</i>               |
| <i>Dendrobium calceolaria</i>         | <i>Narcissus intermedius bifrons</i>       |
| <i>Dendrobium citrosum</i>            | <i>Narcissus japonica</i>                  |
| <i>Dendrobium Denisonianum</i>        | <i>Narcissus junceæfolius</i>              |
| <i>Dendrobium Paxtoni</i>             | <i>Narcissus nanus minor</i>               |
| <i>Doryopteris palmata</i>            | <i>Narcissus odoros</i>                    |
| <i>Eucalyptus maculata</i>            | <i>Narcissus odoros majus</i>              |
| <i>Eucalyptus Watsoni</i>             | <i>Narcissus odoros minor</i>              |
| <i>Eucalyptus Vernicosa</i>           | <i>Narcissus obsallaris</i>                |
| <i>Euchryphia Billardieri</i>         | <i>Narcissus ornatus</i>                   |
| <i>Eulalie japonica</i>               | <i>Narcissus pulchellus</i>                |
| <i>Euterpe antioquiensis</i>          | <i>Narcissus tazetta lacticolor</i>        |
| <i>Euterpe ædulis</i>                 | <i>Narcissus tazetta nobilissima</i>       |
| <i>Epidendrum Macrochilum</i>         | <i>Narcissus tazetta papyraceus</i>        |
| <i>Equinedium atropurpureum</i>       | <i>Narcissus trewiana minor</i>            |
| <i>Equinedium rubrum</i>              | <i>Nephrolepis tuberosa</i>                |
| <i>Equinedium violaceum</i>           | <i>Nymphæa lutea</i>                       |
| <i>Festuca dives</i>                  | <i>Nymphæa octora</i>                      |
| <i>Galphinium nitida</i>              | <i>Obeliscaria atosanguinea</i>            |

Odontoglossum Cervantesi  
 Odontoglossum grande  
 Odontoglossum Pescatorei  
 Odontoglossum pulchellum  
 Oncidium hypnematicum  
 Oncidium lanceanum  
 Ornithogalum aureum  
 Ozothamnus Gravesi  
 Phædronassa gloriosa  
 Phœnix tenuis  
 Phœnix zelanica  
 Pinus Elliotti  
 Podocarpus Donniana

Poinciana pulcherrima  
 Prosopis juliflora  
 Prosopis pubescens  
 Rhododendron calophyllum  
 Scilla triandra parviflora  
 Sophronites grandiflora  
 Tacsonia exoniensis  
 Trichonema bulbococleum  
 Trichonema ramiflora  
 Trillium grandiflorum  
 Trillium pendulum  
 Tropœolum Moretzianum  
 Typha bicornis

*Dahlias.*

A la Mode  
 Annie Rawlings  
 Alexander  
 Amy Creed  
 Annie Hobbs  
 Arborea  
 Bluebeard  
 Chairman  
 Countessa of Pembroke  
 Crimson King  
 Decoration  
 Don Pedro  
 Edward Purchase  
 Florence Pontin  
 Gem of Dwarfs  
 German Daisy  
 Golden Canary  
 Guiding Star  
 Hindo  
 Hercules  
 Hero  
 High Sheriff  
 Harward  
 Henry Walton  
 Imperial Yellow  
 John Standish  
 King of Primroses  
 Little Beauty  
 Little Dear  
 Little Lydia

Model  
 Maid of Essex  
 Mr. Harris  
 Magic  
 Monarch  
 Marchioness of Bath  
 Nabob  
 Ne plus ultra  
 Osiris  
 Oriental  
 Ovid  
 Paradise Williams  
 Pearl  
 Pluton  
 Panorama  
 Pet  
 Pure Love  
 Queen's Messenger  
 Robert Lambert  
 Rose Flake  
 Sarah M'Millan  
 Scarlet Gem  
 Sunshine  
 Titans  
 Venus  
 Viridiflora  
 Washington  
 William Eckford  
 White Bedder  
 Yellow Gem

*Pelargoniums.*

Beauty of Oxton  
 Bridal Wreath  
 Ceres  
 Duke of Cambridge  
 Distinction  
 Eclipse  
 Fairy Queen

Florinda  
 Heartsease  
 Letitia  
 Mabel Siren  
 Statesman  
 Sir Percival Dyke

*Fuchsia.*

|                  |                            |
|------------------|----------------------------|
| Lord Derby       | Striata splendens          |
| Prince of Orange | White Souvenir de Chiswick |

*Colens.*

|            |             |
|------------|-------------|
| Ambassador | Masterpiece |
| Butterfly  | Mrs. Kirton |
| Hero       | Quadricolor |
| Laciniata  |             |

*Lilium.*

|                  |                            |
|------------------|----------------------------|
| Alternans        | Thunbergianum fl. pl.      |
| Atrosanguineum   | Thunbergianum citrinum     |
| Browni           | Thunbergianum cruentum     |
| Candidum fl. pl. | Thunbergianum grandiflorum |
| Carnolicum       | Thunbergianum macrantium   |
| Humboldtii       | Thunbergianum venustum     |
| Paroum           | Vitellinum maculatum       |
| Pinifolium       | Umbellatum atrosanguineum  |
| Takesime         | Umbellatum punctatissimum  |
| Staminosum       | Tigrinum splendens         |

*Mountan Peony.*

|                       |                          |
|-----------------------|--------------------------|
| Compt de Bombuseau    | Lilacina                 |
| Clara                 | Madame de Vitry          |
| Emilie d'Italie       | Modesta                  |
| Edworthi              | Pride of Hong Kong       |
| Fortscrit             | Parviflora               |
| Imperatrice Josephine | Sericea purpurea superba |
| Leopold d'Italie      | Triomph de Gand          |

*Apples.*

|                    |              |
|--------------------|--------------|
| Bellefleur         | Irish peach  |
| Caroline red, June | Juliana      |
| Carter's blue      | Kittagaska   |
| Hoary morning      | Tête de Chat |
| Haute bouté        |              |

*Pears.*

|                        |                           |
|------------------------|---------------------------|
| Ah Mon Dieu            | General Tottleben         |
| Baronne de Mello       | Lawrence                  |
| Besi Veat              | Marie Guise               |
| Beurre de l'Assumption | Madame Appert             |
| Beurre de Ghelin       | Madame Babiiste Desportes |
| Beurre Hardy           | Madame Loriei de Barny    |
| Beurre L'Inconnu       | Marechal de Cœur          |
| Colmar d'Été           | Oliver de Serres          |
| Deux Sœurs             | Paradise Autumn           |
| Desire Cornelis        | Robert Hogg               |
| Doyenne d'Alençon      | Saint Michel Archangel    |
| Doyenne du Comice      | Souvenir de Congress      |
| Duc de Nemours         | Sucre verte               |
| Elisa de Heyste        | Verte Longan              |

*Plums.*

D'Agen

| Imperatrice de Milan

*Cherries.*

Beauman's May

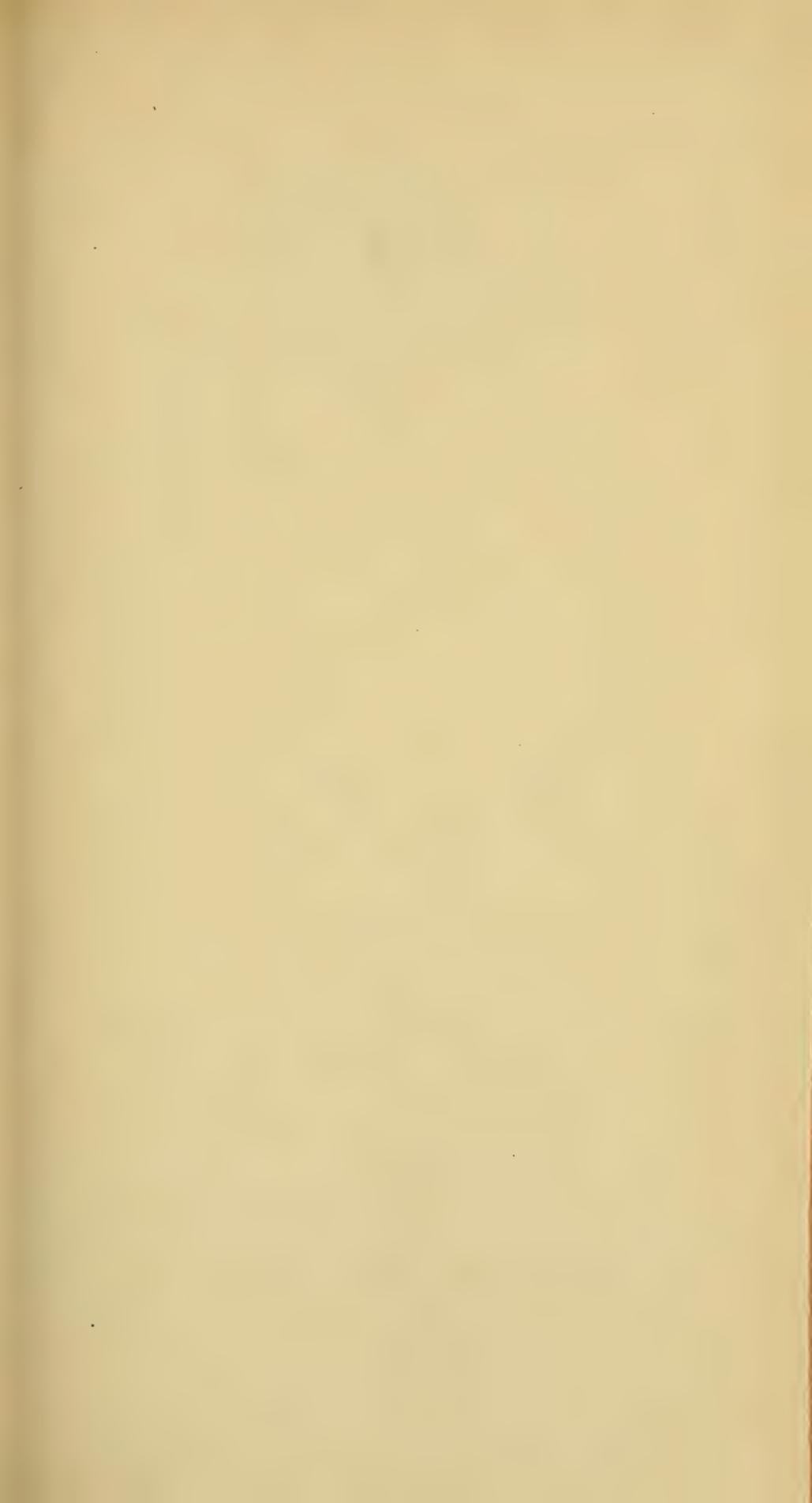
| White Bigarreau

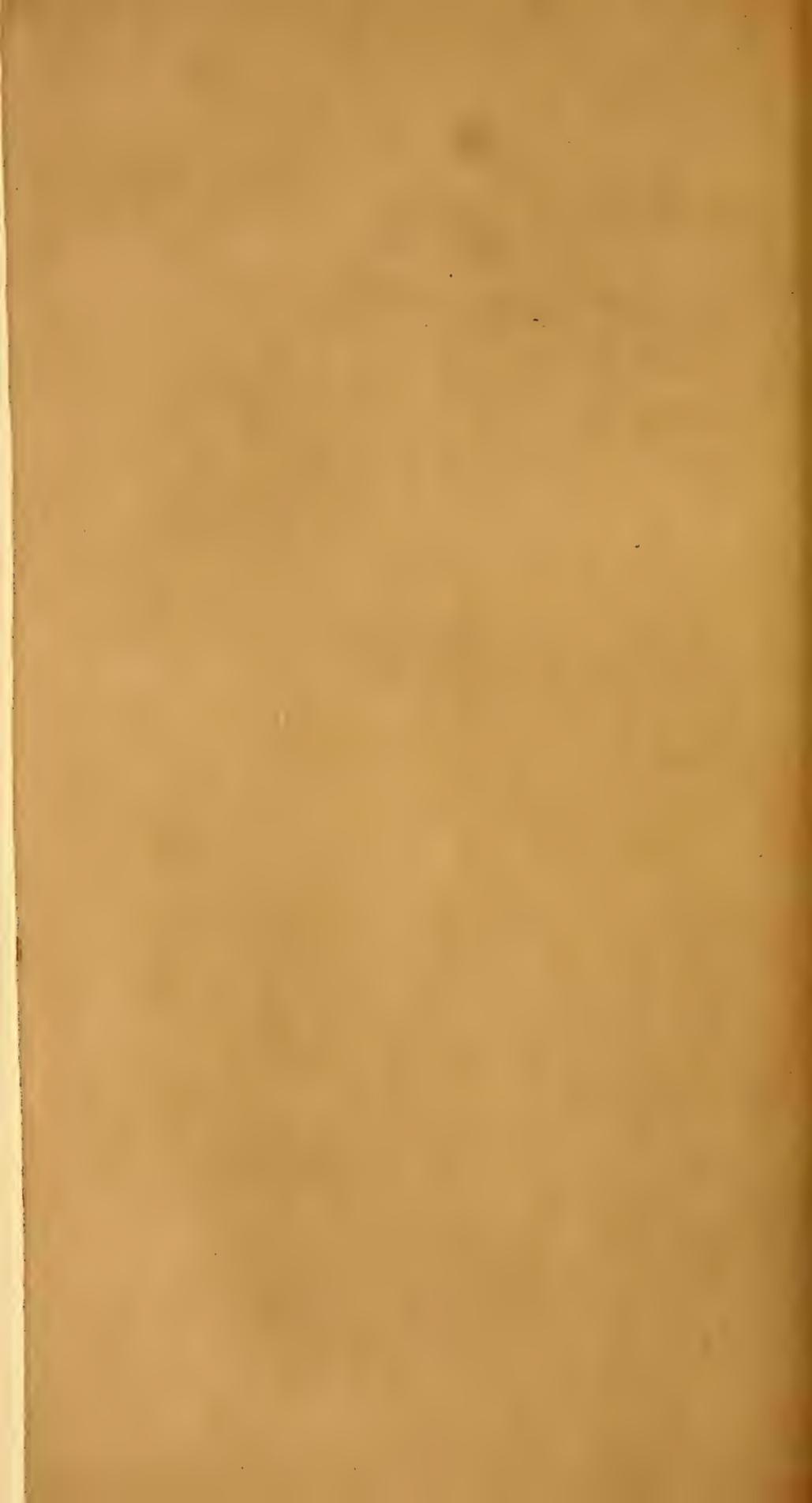
*Vines.*

Auger's frontignac  
 Bicane  
 Black champion  
 Black muscat  
 Chasselas de falloux  
 Chasselas de musque  
 Chasselas de rose  
 Chasselas royal  
 Champion muscat  
 Early summer frontignac

Gros Guillaume  
 Gros Colman  
 Gros Maroc  
 Ingram's hardy prolific  
 Madeira frontignac  
 Madresfield Court black muscat  
 Royal Ascot  
 Waltham cross  
 Winter muscadine

F. ABBOTT, JUN., *Superintendent.*











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