MONTHLY NOTICES OF PAPERS AND PRO-

CEEDINGS OF THE ROYAL SOCIETY OF TASMANIA, 1870

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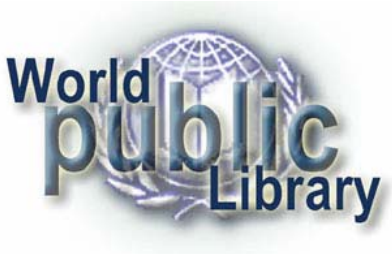

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MONTHLY NOTICES

OF

Papers and Proceedings

OF THE

ROYAL SOCIETY

OF

TASMANIA,

FOR

1870.

TASMANIA:

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

1871.

Contents.

Errata.

Page 12.—End of third, and beginning of fourth line for "Elæorarpus," read "Elæocarpus."

Page 12.—Last line, for "desv. Journ. Bot.," read "Desv. : journ. Bot.

Page 14.—Third line of third paragraph, for "Pterygapappus," read "Pterygopappus."

Page 14.—Ninth line of ditto for "Ptorygopappus," read "Pterygopappus."

Page 20.—First line of second paragraph, for "Gunii," read "Gunnü."

Page 32.—Third and fourth lines of paragraph beginning No. 8, for "Chironectes," read "Cheironectes."

Page xxv.—Second line of heading, for "1820," read "1870."

Page xxvii.—Ninth line below table, (Barometer Mean,) for "29.813 in.," read "29.863 in."

Page xxx.—Last line of table, Barometer Mean, for "29.877," read "29.887."

Page xxxii.—Fifth line, Barometer Mean, for "29.819 in.," read "29.879in."

ROYAL SOCIETY.

MARCH, 1870.

The first monthly evening meeting of the session was held on Tuesday, the 8th March, J. Barnard, Esq., in the chair.

The Secretary, Dr. Agnew, laid on the table the following returns:—

1. Visitors to Museum during January and February, 1836.
2. Ditto Gardens ditto, 3687.
3. Time of leafing, flowering, and fruiting of a few standard plants in Society's Gardens during February.
4. Tench supplied from pond in Gardens during February, 12.
5. Books and Periodicals received in January and February.
6. Presentations to Museum since last meeting.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.,—tables for January and February.
2. Port Arthur, from J. Boyd, Esq.,—table for January.
3. Swansea from Dr. Story,—ditto for December and January.
4. Westbury, from C. Belstead, Esq.,—ditto for January and February.
5. New Zealand, from the Government,—ditto for November and December.
6. Brisbane, Queensland, from E. McDonnell, Esq., Government Observer,—tables for October, November, and December, 1869.

The presentations to the Museum were as follow:—

1. From Miss H. Mayson and Miss J. Mitchell—A collection of Shells from East Coast of Tasmania.
2. From J. T. Leake, Esq., Campbell Town—A specimen of Roman Brick from St. Albans, England (the ancient Verulamium).
3. From the Very Rev. Archdeacon Marum, per Dr. E. S. Hall—A collection of Fossils from neighbourhood of Dromedary Mountain.
4. From Mr. O. H. Hedberg—A collection of Swedish Coins and Notes.
5. From Mr. Dinham—Two stone Hatchets made by Aborigines of Australia and Tasmania. Portions of Skull, &c., of Aborigine dug up at Mona Vale, Tasmania. A fossil Seed from the sandstone, Somersetshire, England, found 80 feet below the surface.
6. From Mrs. S. Crouch—A collection of weapons, &c., from Fiji and Samoa, viz.:—One Fijian Pillow, two pieces Tappa cloth, one female Fijian chief's Dress, one Paddle, two War Clubs, one piece Samoan Cloth, one Sandwich Island Spear, one Spear, Skull of Porpoise, Fœtal Porpoise.
7. From Mr. M. Weber—A War Club from Fiji.
8. From J. W. Graves, Esq.—Two skulls of Axis Deer from Slopen Main.

[These deer were bred from those imported by Sir W. Denison from the Lower Ganges, and turned loose on Tasman's Peninsula.]

9. From Mr. Fencker—Four specimens of auriferous quartz from the Pioneer Reef, Lyndhurst (Waterhouse).
10. From W. A. B. Gellibrand, Esq.—A stone Axe from New Zealand.
11. From H. M. Hull, Esq.—A Lizard, 8 Crickets, and two Fish.
12. From J. W. Graves, Esq.—Nest of Sparrow from a gum tree in Mr. Turner's millyard. A Black Snake *(Hoplocephalus curtus)*.

[This snake was killed near the upper end of Goulburn-street, Hobart

Town, and measured 4ft. 1in. in length. The light colour of the specimen is due to its having but recently changed its skin when killed.]

13. From Mr. G. Weaver—A Musk Duck *(Biziura lobata)*.
14. From Mr. Luttrell—Specimens of Quartz from Tomahawk River and Pioneer Reef, Waterhouse, that from the latter place being auriferous. Four small Crabs from North Coast.
15. From Mr. D. Chisholm—A large Fungus from a gum tree. Skeleton of young Sting Ray.
16. From Mr. A. Nicholas, per Mr. F. Abbott—A fossil Spatangus from New Zealand.
17. From Mr. R. Propsting—A Swamp Hawk *(Circus Assimilis*—Allied Harrier).
18. From Mr. Geo. W. Rex—The crop of a Fowl containing an entire Whip Snake.

[This specimen was discovered on the fowl being killed, and in course of preparation for the table. The bird had previously presented no unusual appearance, and had received no injury from swallowing the reptile.]

19. From Mr. A. Neilson—A very large specimen of the common Slug, which when alive measured six inches in length.
20. From Mr. F. Smith, Holbrook Place—A large mollusk *(Aplysia sp.)*, from Brown's River.
21. From Mr. R. James—Part of the skeleton of a Ray (?).
22. From Mr. G. J. Smith—Piece of native box wood, with thorns embedded in its substance.
23. From Mr. Exton, Oatlands—A Rail *(Rallus Lewinii)*.
24. From Mr. H. Nelson—Sample of Coal from Greymouth, New Zealand. The seam from which this coal is obtained is said to be 16 feet, in thickness.
25. From Mr. Plunkett, Sandy Bay—A Pair of Mittens made by Esquimaux of Behring's Strait.
26. From M. Allport, Esq—A collection of Insects from Port Arthur.
27. From Mr. Gidley Lewis—A Russian Silver Coin of the Empress Catherine, 1796. Specimen of handwriting of General Moreau.
28. From Mr. R. Pybus, Bruni Island—A 5s. piece of Charles II, 1677.
29. From Mr. W. Cole, Cleveland—One Spanish silver coin, Carolus III., 1781. One United States ditto, $\frac{1}{2}$ dime, 1854. One brass ditto, Louis XVI. of France, 1792. One silver Coin unknown.
30. From H. Hopkins, jun., Esq., a fœtal lamb (a monstrosity.) Two Dories.
31. From the Trustees, Australian Museum, Sydney, per the Hon. E. Deas Thomson, C.B.—Part of skull and upper jaw of fossil Sarcophilus (Devil) from Wellington Caves, N. S. Wales. Eight photographs of *Ceratodus Forsteri*, a fish inhabiting the Burnett River, N.S.W.

[This fish is admirably adapted to many of the streams of the colony, which although comparatively large rivers in the winter season, present only a chain of pools in the summer. The Ceratodus by means of its fins is enabled to travel considerable distances on land, and when a pool in which it may be present is dried up it can thus go in search of another.]

32. From M. Allport, Esq.—Part of skull of Tunny, washed on shore, North Coast of Tasmania.
33. From Baron F. Von. Müeller—Skeleton of a White Swan.
34. From Mrs. Chapman, Macquarie-street—Seeds from Borneo.
35. From Mr. James, Collins-street—Jaw of species of Shark.
36. From Mr. Walter Paisley, Franklin, per Mr. Graves—A Cuttle Fish.

[This interesting Cephalopod belongs to the *Octopodidæ*, and specimens

have several times been captured on our coasts. It is very rapacious, and swims with great rapidity by means of its powerful fluke-like tail. Any wounded fish in its neighbourhood are instantly attacked, and the rapidity with which its parrot-like beak cuts into and kills its prey is astonishing. A few years back one of these cuttle fish was exhibited in Hobart Town, and was described by an anonymous writer as belonging to the genus *Onychoteuthis*, but this was undoubtedly an error, as the hook-like processes on the long tentacles, which are the distinguishing mark of the *Onychoteuthidæ*, and from which the name is derived, are absent in this species.]

The only donation to the library was a work by Fleetwood Buckle, Esq., M.D., of H.M.S. Liverpool, on the "Vital and Economical Statistics of the Hospitals, Infirmaries, &c., of England and Wales," presented by the author, per Dr. E. S. Hall.

In reference to the nest of the Sparrow (Presentation No. 12), Mr. Allport remarked, that he was, at first, adverse to the introduction of these birds, but for some time back, he had reason for changing his mind. He found, so far as his observation had as yet extended, that wherever the Sparrow came, it drove away the White Eye *(Zosterops dorsalis)*, a most destructive bird to fruit.

Mr. Graves had a better opinion of the White Eye than Mr. Allport, and had no doubt, that its good qualities were greater than the bad. The benefit which these, and many of our smaller, and comparatively unknown birds conferred on our farms and gardens, by destroying noxious insects, &c., was incalculable. As an addition to our insectivorous birds, he had himself liberated some Canaries, which already had progeny, and if spared by their enemy the cat, would, he thought, become thoroughly acclimatised.

Mr. M. Allport called attention to the presentation of the "Sea Hare" (No. 20), by Mr. Francis Smith (son of the Chief Justice), which is of peculiar interest, as being another example of the manner in which forms of animal life of the lower types are reproduced at opposite ends of the world. The present specimen is of the *Genus Aplysia*, and so closely resembles the English creature *Aplysia punctata*, as to be all but identical —the Tasmanian form being the larger. Its true position amongst the mollusca is beautifully exemplified by the rudimentary shield—like shell which is buried in the tissues of the back, and serves as a guard to the delicate branchial organs of the creature. (This shell, dissected out, was exhibited to the meeting.) Mr. Allport expressed a hope that others of our youth would follow the good example set by Mr. Smith in forwarding to the Museum that which struck him as being new or curious, instead of casting it aside without enquiry, or heed to its scientific value.

Presentation No. 31 is interesting, as proving the former existence on the main land of the larger carnivorous marsupials now found living in Tasmania. In his paper on Mr. Krefft's "Notes on the Fauna of Tasmania," read before a meeting of this Society, Mr. Allport pointed out the probability that the Dingo *(Canis dingo)* had usurped the position of the Tiger *(Thylacinus cynocephalus)* and the Devil *(Sarcophilus ursinus)* on the main land; and that the absence of the Dingo in Tasmania explained their continued existence in the latter colony.

The Secretary read a paper,* entitled "Contributions to the Phytography of Tasmania," by Baron F. Von Müeller, C.M.G., F.R.S., &c. The paper was accompanied by notices of upwards of a hundred plants, many of them hitherto undescribed, observed by the author in the region of Mount Field, &c.

* This paper is the second on the same subject contributed by Baron Von Müeller, for the first see Trans. Royal Soc. Tasmania for 1868, p. 7.

Mr. Stephens begged to mention in reference to a paper which he brought before the Society in October last, on "The occurrence of gold at Port Cygnet," that he had sent some specimens of the rocks he had found there, and described, to the Rev. W. B. Clarke of Sydney. He would read a few lines from Mr. Clarke's reply, as it was satisfactory to find the theory broached in his paper confirmed by so eminent an authority :—"I see so much in these specimens like rocks I have often found in the gold-fields, and especially like the porphyritic bands that traverse the gold-fields, of the Gilbert River and Gympie in Queensland, and I think there must be a relationship. It would be premature to designate the formation at Port Cygnet geologically, but I agree with you as to its probable great antiquity."

Mr. M. Allport proposed a special vote of thanks to Baron Von Müeller. It was pleasant to find a savant of such world-wide fame, and whose scientific labours are so much greater than we are aware of, communicate so freely with this Society, when so many of our other corresponding members are silent. He would also include in the vote the name of Dr. Hall, to whom on this occasion, and formerly for a period of several years the Society was much indebted for the careful analysis he had given of the meteorological records, in connection with the vital statistics of the colony, which had so much enhanced the value and interest of these tables.

Mr. Davies, after some eulogistic remarks on Baron Von Müeller's labours on behalf of Tasmanian botany, cordially seconded the motion, which was unanimously carried, and the usual vote having been accorded to the donors of presentations, the meeting terminated.

APRIL, 1870.

The monthly evening meeting of the Society was held on Tuesday, 12th April, H. Bilton, Esq., in the chair.

W. A. Guesdon, jun., Esq., who had been previously nominated, was duly elected by ballot as a member of the Society.

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

1. Visitors to Museum, 722.
2. Ditto to Gardens, 1846.
3. Plants, &c., sent from Gardens.
4. Time of leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
5. Books and Periodicals received.
6. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.—Table and Summary for March.
2. Westbury, from C. Belstead, Esq.—Table for March.
3. Port Arthur, from J. Boyd, Esq.—Ditto ditto.
4. New Zealand, from the Government,—Ditto for January.
5. Sydney, from G. R. Smalley, Esq.—Ditto for November and December, 1869, and January, 1870.

The presentations to the Museum were as follow :—

1. From Captain Williams, a manuscript newspaper, the *Western Australia Gazette*, June 13th, 1830.
2. From Mr. Watson, Brown's River, a kingfisher *(Alcyone azurea)*.
3. From M. Allport, Esq., a Diamond Snake *(Hopolocephalus superbus)*.
4. From Miss Sherwin, a Lamprey, from Brown's River.
5. From T. Giblin, Esq., a Fish *(Clinus sp. ?)* from Risdon.
6. From Captain Dart, of the Sapphire whaler, four Sharks' Jaws, a Crustacean, a small Pilot Fish, and a Native Hen, from Howe's Island.
7. From Captain Forsyth, brig Waverley, a Snake and Lizard, from Java.
8. From J. W. Graves, Esq., a Cape Barren Goose *(Cereopis Novæ Hollandiæ)*.
9. Two small Falcons *(Falco frontatus)*, donor unknown.
10. From W. Knight, jun., Esq., samples of Cinnabar ore, from Cudgegong, New South Wales.
11. From Mr. G. Edwards, Oatlands, a White Kangaroo, an albino variety of *Halmaturus Bennettii*.
12. From C. Degraves, Esq., four Fossils from the limestone at Cascades.
13. From Mr. W. Smith, a Flounder curiously marked.
14. From C. Dinham, Esq., a Collection of Mineral Specimens, &c., from Somersetshire and Cornwall, England.
15. From H. M. Hull, Esq., Specimens of Iron Pyrites and Malachite.
16. From Mrs. Makepeace, Swansea, four specimens of Echinodermata, and the egg cases of *Fasciolaria sp.*
17. From Captain Clinch, the jaws of a species of Shark from Twofold Bay.
18. From Mr. McKenna, a living specimen of *Gordius aquaticus*, from New Town Rivulet.
19. From Mr. J. Young, Howrah, a Spider Crab.
20. From Mr. Docksey, three Mineral Specimens, from Adelaide.
21. From Mr. Roblin, a specimen of *Aplysia sp.*, from Cornelian Bay.
22. From Mr. M. Tapfield, a specimen of Gorgonia, with species of *Astrophyton* attached.

Mr. Abbott read a paper entitled "Some additional observations on changes which have taken place in the Star η Argus, and its surrounding Nebula."

The paper was illustrated by drawings, showing the present appearance of the star and nebula. Drawings of the same by Sir J. Herschel in 1834, by Mr. Abbott in 1863 and 1868, and by Lieutenant Herschel in 1869, were also exhibited, showing in a striking manner the great and inexplicable changes which have taken place within a few years in this very interesting object.

Some conversational discussion having taken place, the usual votes of thanks were accorded to Mr. Abbott and to the donors of the various presentations, and the proceedings terminated.

MAY, 1870.

The monthly evening meeting of the Society was held on Tuesday, the 10th May, J. Barnard, Esq., in the chair.

The undermentioned gentlemen, who had been previously nominated by the Council, were, after a ballot, declared duly elected as members of the Society :—

1. The Rev. Dr. Bleasdale, of Melbourne, as corresponding member.
2. R. P. Adams, Esq., Hobart Town.
3. Frederick B. Walker, Esq., Rhodes.

The Secretary (Dr. Agnew) laid on the table the usual Monthly Returns, viz. :—

1. Visitors to Museum during April, 642.
2. Ditto to gardens ditto, 1,314.
3. Seeds received at gardens.
4. Time of leafing, &c., of a few standard plants in gardens.
5. Books and periodicals received.
6. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.—Table and summary for April.
2. Melbourne, from R. J. Ellery, Esq.—Tables for Jan., Feb., and March.

The presentations to the Museum were as follows :—

1. From Mr. Edwards, Kewstoke, near Oatlands—A large specimen of Carnelian.
2. From Sir Robert Officer—A Platypus *(Ornithorynchus anatinus)*.
3. From Mr. J. Smith, brig Waverley—A collection of Snakes, Lizards, &c., from China.
4. From Mr. T. Parker—Two specimens of auriferous Quartz from Pioneer Reef, Waterhouse.
5. From T. L. Gellibrand, Esq.—A Wedge-tailed Eagle (*Aquila fucosa*).
6. From Mr. Ballantyne—A curious Fish, caught in the Derwent.
7. From Mr. M. Allport—A Rail (*Rallus Lewinii*).
8. From Mr. Pearsall, Muddy Plains—A Chestnut-faced Owl (*Strix castanops*)
9. From Mr. J. J. Low, Richmond—A Black-cheeked Falcon (*Falco melanogenys*).
10. From Master Ernest Bayley—A Falcon (*Falco frontatus.*)
11. From Mr. Ikin—Two spines from Sting Rays.
12. From Mr. O. E. Hedberg—Jaws of Shark.
13. From Mr. S. H. Wintle—Two specimens of Granite from the Tomahawk River.

    Fossil Ripple marks from Southport.

In reference to the last named presentation the following note from Mr. Wintle was read :—"These fossil ripple marks I obtained from a vertical section of the carboniferous strata at Southport, Tasmania. The shales in which they occur are overlaid by a bed of sandstone 12 feet thick. Underneath the smallest ripple marks I found a beautiful fossil impression of *Glossopteris angustifolia* (McCoy). The cliff is one of great geological interest."

The following list of new species of Tasmanian land shells furnished by Mr. Legrand was laid on the table. The specimens have been named and

described by Dr. J. Cox, of Sydney, and will form the subject of a paper at a future meeting of the Society :—

Helix	medianus.	Helix	plexus.
H.	helice.	H.	dubitans.
H.	cœsus.	H.	vigens.
H.	austrinus.	H.	fulgetrum.
H.	occultus.	H.	Gouldi.
H.	ruga.	H.	Ramsgatensis.
H.	marchianæ.	H.	Halli.
H.	Stephensi.	H.	Nelsonensis.
H.	Agnewi.	H.	Allporti.

The Secretary intimated that he had received from Sir Robert Officer some specimens of the so-called Red Spider, which had recently affected the hops at New Norfolk, with a request to be furnished with any information that the microscope, or the experience of any of the Fellows could throw on its exact character, habits, food, &c. These observations had been commenced, but as it had been found advisable to compare the insect from the hop with those of a similar character from the apple tree, the hot-house, and possibly other sources, no report could be laid before the present meeting, but he hoped before the next some definite information would be obtained on the subject, if the season be not too far advanced for procuring the perfect insect.

Mr. M. Allport made the following remarks on the present state of the salmon question :—As every step in the experiment for the introduction of salmon has been from time to time recorded in the transactions of the Society, it now becomes necessary to complete the series by a short account of the last step. As the Fellows are aware, one of the smolts captured in the Derwent was sent to Dr. Günther for his opinion as to its species, and that opinion is embodied in the following extract from a letter which I received by the last mail :—" Some weeks ago a small specimen of a salmonoid was handed over to me by the Secretary of the Zoological Society, with the request to determine the species, and to let you know the result of my examination. The example is 9 inches long, and from its general appearance, small size of the scales, form of the caudal fin, arrangement of teeth on the palate, number of pyloric appendages, there cannot be the least doubt that it is an example of sea trout *(Salmo trutta)*. I am informed that a lot of sea trout eggs were forwarded to Tasmania several years ago, and hatched in May, 1866; if you never on any other occasion received eggs of salmo trutta, it would follow that this example is $3\frac{1}{2}$ years old, and consequently what may be called a stunted individual, as a fish of that age ought to have attained to a larger size, and exhibit a certain development of the sexual organs, of which no trace could be discovered in the individual sent." Dr. Günther is with respect to reptiles and fish, what Professor Owen is to mammals, and it would simply be presumption in me to doubt the correctness of his opinion as to the species of the particular fish sent to England, but I must demur to his assumption that such fish was $3\frac{1}{2}$ years old, and therefore a stunted individual. The fact that it was immature, affords to my mind the most conclusive proof that the fish sent was not $3\frac{1}{2}$ years old, and my view is borne out by all the facts relating to the salmon trout eggs received in this colony, such facts being far more within the cognizance of the Tasmanian Salmon Commissioners than Dr. Günther. In April, 1866, the only salmon trout eggs ever received by the Commissioners arrived. In May and June following they hatched. The majority of the fry were placed in the same pond with the salmon fry of that year, and the remainder were placed in a separate pond and rill, specially prepared for them, in the hope that these salmon trout might arrive at maturity, and spawn be obtained from them without

the usual migration to the sea. A large proportion of the young salmon trout which were placed in the salmon pond, assumed the smolt dress, and left for sea in October, 1867 ; and in October, 1868, all that were then left, departed in the same manner. Of the salmon trout retained in the special pond, several put on the smolt scales in November, 1867, became uneasy at their detention, and one or two which jumped out of the pond died ; of these latter, one is on the table before you. In November, 1868, the same restlessness under restraint was exhibited by the remaining fish and many died, leaving only 12 survivors. These 12 fish, however, were kept well fed, and became handsome silvery fish, weighing from half a pound to more than one pound, and in June, 1869, five pairs of them constructed spawning rids and deposited ova. In September last this ova hatched, and the two fish now exhibited are of the produce of such ova —these two fish are seven months old, and do not in the least resemble stunted unhealthy fish ; nor could they be the progeny of such. They bear about them the distinct characteristics of the parr of one of the migratory salmonidæ, and when fresh from the water exhibited in great perfection the brilliant orange coloured fins from which the parr of *Salmo trutta* derives its trivial English name. Bearing in mind all the above facts, I must now revert to Dr. Günther's assumption, that the fish sent to England was hatched from the ova received here in 1866, and was consequently $3\frac{1}{2}$ years old. I have shown that the last of the fish derived from those eggs, which were at liberty to do so, went to sea in November, 1868 ; in June, 1869, the smallest of those unnaturally detained in fresh water weighed half a pound, had unmistakeably passed the smolt stage, and had arrived at sexual maturity. Yet, we are asked to believe that the fish sent to England had found its way more than 30 miles from its birthplace, and had been 12 months in salt water without adding one inch to its length, or one ounce to its weight. If it can be shown that it is possible, nay even probable, that our original salmon trout, spawned in Tasmania in the winter of 1868, all difficulty in accounting for the capture of the specimen sent to England vanishes, without the necessity of having recourse to the forced and unnatural assumption that such specimen was an abortion. Our first salmon trout smolts went to sea in November, 1867. If any of those smolts returned (as many British authorities assert they would) in February following the fish that so returned must have spawned in the winter of 1868, that is to say in June of that year, and a portion of the fry hatched in September, 1868, would have arrived in October, 1869, at the very stage in which the specimen sent to England was when caught. As scientific truth is, to my mind, of greater importance than the discussion of mere theories, I must here point out that none of the fish retained in the special pond did spawn in the winter of 1868, but it is quite possible that their unnatural detention from salt water retarded their sexual development for a year beyond their brethren, which were free to seek their own advantage in suitable waters. In conclusion, I may state that the beautiful specimen now before you, and which was caught six weeks later than that sent to England, will be forwarded (with the other specimens referred to) to the Zoological Society, London, by the outgoing mail, and be submitted to the examination of any scientific men taking an interest in the subject. In this large specimen, I found the rudimentary sexual organs well developed, and, further, by the help of the written descriptions of Yarrell and Dr. Günther, I have come to the conclusion that it is a true *salmo salar*.

Judge Francis, of New South Wales, offered some remarks to the effect that he had had long and varied experience of fishing generally, and although rather a practical sportsman than a scientific naturalist, was perfectly well acquainted with the appearance and habits of the Salmonidæ

in the lakes and streams of England, Wales, and Scotland. He had also frequently compared the young of the different varieties with each other and could speak with confidence in the matter. He had not the slightest doubt that the specimen now before them (caught Dec., 1869) was a true salmon, and a fine and well-grown fish. He would say it had been about eight weeks at sea—was assuming the grilse condition, and would in the course of the autumn have proceeded up the river to spawn. As to the fish sent home (of which an exact counterpart was said to be before the meeting) he could not in any way agree with Dr. Günther's hypothesis that it might be a stunted or abortive individual, incapable of performing the functions of reproduction. In the case of a young salmon in one of the Welsh brooks, which had been accidentally debarred from proceeding to sea, he had had the opportunity of noticing how these unnatural circumstances affected the appearance of the fish, and certainly its lanky and big-headed figure was unmistakeable. There could, therefore, be no difficulty in coming to a conclusion as to a fish being stunted or otherwise, and no one could look on the comely and shapely specimen before them and say it was imperfect in any respect. Even admitting, however, that the fish sent home was, as Dr. Günther admitted, a *Salmo trutta*, that fact alone was confirmatory of the entire success of the experiment. They knew, that of the *Salmo trutta*, about two hundred only were sent to sea, whilst of the *Salmo salar* not less than four thousand five hundred were liberated from the breeding ponds. If, therefore, several of the former had been caught in the salt water, so full of health and vigour as to show they were at home in these southern waters, *a fortiori* how much more certain was it that the true salmon had escaped all their imaginary danger, and in far greater numbers than the others had become thoroughly acclimatised.

Discussion of a conversational character ensued, in which the Rev. Dr. Bleasdale, Mr. Buckland, Mr. Giblin, Mr. Stephens, and Judge Francis took part. In reply to an observation by the latter to the effect that he wished we had a fresh supply of salmon ova at command, in order to try if in the event of the young fish being retained in the ponds, and never allowed to proceed to sea, they could arrived at maturity, and prove capable of perpetuating their species.

Mr. Allport stated that in part II, of the proceedings of the Zoological Society for 1868, there was a paper on the supposed arrest of the development of the salmon when retained in the fresh water, by James Murie, M.D., F.L.S., F.G.S., and from which paper it would appear that the experiment had been virtually tried if it could be positively ascertained that the fish experimented on were really specimens of salmon salar, but on this point authorities differed. In the account of the experiment the most curious circumstance noted was that in the summer of the second year several of the fish assumed the silvery scales of the smolt, which scales were partially lost in the autumn following, the parr markings becoming again distinctly visible. This was repeated in the summer and autumn of the third year—after the fourth year the fish came to a standstill as to growth, and at the end of the fifth year only two remained, figures of which accompany the paper referred to. These figures show them to have been large-headed long-bodied fish with the parr markings distinctly visible, and bearing little resemblance to a healthy smolt.

A vote of thanks having been accorded to the donors of presentations, the meeting terminated.

CONTRIBUTIONS TO THE PHYTOGRAPHY OF TASMANIA.

By Ferd. Von Mueller, C.M.G., M.D., F.R.S.

II.

The following pages have but slight claims on special scientific consideration. They are merely the results of a short excursion through Tasmania, at a time when the writer sought invigoration from the bracing air and rural tranquillity of the island, and preferred to spend the very few days allotted to his stay rather in the undisturbed highland solitudes than in the pleasures of sociality. He bent his way to the phytologically unexplored ranges of Mount Field, to institute a comparison of their vegetation with that of other alpine rises of Tasmania. The charm of this occupation was augmented by the circumstance that it was his first visit to a country whose vegetation he had aided to elucidate from museum-materials more than 20 years since, and with whose plants he commenced to become acquainted fully 30 years ago. Here, then, for the first time, he could glance over the many endeared highland plants, in all their gay freshness and wild natural grace! This short exploratory tour had still another additional interest. It afforded means of contrasting not only the considerations of many alpine plants of Tasmania with the complexer of highland species in the Australian Alps, but it led also to some researches by which the relation of the existing Tasmanian vegetation to distinct geological formations should be traced. In this direction lengthened inquiries need yet to be carried on—inquiries which are of general philosophical importance.

For the notes herewith offered, some material was also contributed by enlightened and generous friends, whose taste and knowledge led them to observe the forms of vegetation near their domiciles. It may encourage future inquiries to know that the whole tracts of lofty ranges from West Mount Field to Mount Humboldt and Frenchman's Cap remain, as regards vegetable life, hitherto utterly unexplored; that also from the country about Port Davey hardly any plants have ever been brought away, although the snow-clad summits of the former, and the jungles of the latter, must teem with rarities. Even the extreme north-east of Tasmania, as well as Hunter's Island and the adjacent shores, promise to render known to systematic searchers many kinds of plants, with which we are only hitherto acquainted from Gipp's Land, and this remark

applies still more forcibly to portions of the Furneaux Group and to King's Island. Indeed the three genera recorded on this occasion for the first time as Tasmanian—viz., Elæorarpus, Pseudanthus, and Leeuwenhoekia—came from the islands of Bass Straits. The freshwater plants of all Tasmania need yet largely renewed investigation. Again, any tide may cast ashore additions to the 300 Algae which, through the glorious labours of Professor Harvey and his co-adjutors, rendered Tasmania famed as one of the richest and most remarkable phycolagii stations of the globe. Since Flinder's voyage in the beginning of this century, hardly any new searches after marine plants have been instituted at Kent's Group, yet Turner obtained, for his large work, from there some of his rarest treasures. Under any circumstances, we have still much to learn in reference to the range of the species over the main island and all the islets which stand under Tasmanian dominion. To Wilson's Promontory, Queenscliff, or Cape Otway, on the extremes of the Victorian coast, numerous plants extend, of the existence of which on the islands of Bass's Straits we are as yet not aware, however likely such may be. We may be thus reminded of the probability that such plants as Cakile maritima, Erodium cygnorum, Drosera, Whitakiri, Viminaria denudata, Acacia oxycedrus, Myriophyllum, Muelleri, Leptospermum myrsinoides, Eclipta platyglossa, Lobelia platycalyx, Banksia integrifolia, Hakea nodosa, Triglochin muconata, Lemna oligorrhiza, Aspidium decompositum, Blechnum cartilagineum, &c., would likely not in in vain be searched for on the Straits' islands, not to mention many other species. Enough has been explained to demonstrate the desirability of carrying phytological investigations into many new directions within Tasmanian territory; and that this end may early be attained is all the more to be desired, while yet the volumes of the universal work on Australian plants are under elaboration. The writer of this brief record, should life and health be spared him, will always experience delight in the elucidation of plants from any of the localities indicated, or of places otherwise remarkable; and this would afford him also the privilege of continuing this series of essays for the meetings and literary notices of the Tasmanian Royal Society.

Melbourne Botanical Garden,
New Year's Eve, 1869.

Caltha introloba, F. M. in transact, Phil. Soc. Vict. i. 98. On alpine brooks of Mount Field East, at an elevation of 4000′.

Lepidium foliosum, desv. Journ. Bot. iii. 164. King's Island.

**Fumaria officinalis*, L. sp. 984. King's Island, immigrated but now naturalized.

**Papaver aculeatum*, Thunb. Fl. cap, 431. King's Island.

Drosera Arcturi, Hook. Journ. of Bot. i. 247. In Alpine morasses of Mt. Field East, at 3–4000′ elevation.

**Elæocarpus cyaneus*, Ait. Epit. hort. Kew. add. 367. In various parts of King's Island; M'Gowan.

Lasiopetalum dasyphyllum, Sieb. according to Hook. Journ. ii. 404. Schouten Island; Dr. Story.

Acaena montana, T. Hook. in Lond. Journ. of Bot. vi. 276. On alpine springs at Mt. Field East, 3–4000′.

Rubus Gunnii, Hook. icon. plant. t. 291. Descends on Mt. Wellington and Mt. Field East to 2000.′

Bauera rubifolia, Salisb. in Kœn. and Sims's Annal. of Bot. i. 514 t. 10. In a depressed small-leaved state, ascending the summits of Mt. Field East and Mt. Wellington, therefore undoubtedly hardy in Middle Europe.

Donatia Novæ Zelandiæ, J. Hook. Flor. Nov. Zel. i. 81, t. 20. On moist alpine meadows bordering Lake Fenton, at about 3000′ elevation. The remarkably rigid white flowers scattered like pearls over the shining green cushions of the foliage, impart to this plant a singular beauty.

Platylobium formosum, Sm. in Transact. Linn. Soc. ii. 350. At Swanport; G. Story.

Pultenæa pedunculata, Hook. Bot. Mag. t. 2859. Kelvedon; G. Story.

Melaleuca squamea, La Bill. Nov. Holl. plant. spec. ii. 28, t. 68. On the summit of Mt. Field East, bearing flowers and perfect fruit, although only a few inches high.

Eucalyptus urnigera, J. Hook. in Lond. Journ. of Bot. vi. 477. In the alpine regions of Mt. Field East, together with E. coccifera and E. Gunnii.

**Pseudanthus ovalifolius*, F. M. in Transact. Phil. Inst. Vict. ii. 66. Gathered in Flinder's Island nearly a quarter of a century ago, by Dr. Jos. Milligan.

Ricinocarpus pinifolius, Desf. in mem. du mus. iii. t. xxii. Schouten Island; Dr. G. Story.

Stackhousia spatulata, Sieb. in Spreng. syst. cur. post. 124. King's Island.

Spyridium serpillaceum, F. M. Fragm. Phyt. Austr. iii. 80. At Swansea; Story.

Spyridium ulicinum, Benth. flor. Austr. i. 434. The variety with bifid leaves on the Derwent at Fenton's Forest. Fruits separated by the bracts and often solitary. Carpels 1 line long, ovate, without a spacious aperture.

Actinotus bellidioides, Benth. Flor. Austr. iii. 369. On moist alpine meadows at Lake Fenton, 3000.′

Huanara cordifolia, J. Hook. and Benth. gen. plant. i. 877 ; Diplaspis cordifolia, J. Hook. Fl. Tasm. i. 157. On springs in the highest regions of Mt. Field East.

Galium albescens, J. Hook. in Lond. journ. of Bot xvii. 462. Swanport ; Dr. Story.

Abrotanella forsteroides, J. Hook. Handb. New Zeal. Flor. 139. On Mount Field at an elevation, from 3500′ to 5000′, accompanied there by Pterygapappus Lawrencii. The dense cushion-like patches of these two plants impress quite a peculiar feature on the alpine vegetation of Tasmania, when contrasted with that of the Australian Alps, although this cushion-like vegetation of Composites is still more extensively developed among the alpine plants of New Zealand. The patches of Ptorygapappus are less vividly green and shining than those of Abrotanella, and more velvety in aspect. The former I did not observe on Mt. Wellington. Both deserve to be transferred to Musea, and it might be even tried to bring large aged masses to the Sphagnum-moors of Britain. Out of these patches sprout species of Restio, Danthonia, Sprengelia, Styphelia, and other plants in a diminutive state. Pterygopappus forms either cushions by itself or is nesting in those of Abrotanella. The peduncles of the former are not rarely as much as one inch long.

Cotula filicula, J. Hook. in Benth. Fl. Austr. iii. 551. Mt. Field East, 3-4000′.

Cotula alpina, J. Hook. Fl. Tasm. i. 192, t. 51 A. Mt. Field East, 4-5000′.

Aster ledifolius, A. Cunn. in Cand. prodr. v. 269. Mt. Field East.

Aster pinifolius, F. M. fragm. v. 71. Mt. Field East.

Aster persoonoides, A. Cunn. in Cand. prodr. v. 268. Mt. Field East.

Aster obcordatus, F. M. fragm. v. 69. In the alpine and sub-alpine regions of Mt. Field East.

Crospedia Richea, Cass. dict. soreni. nat. xi. 353, var. leucocephala. Mt. Field East.

Helichrysum scorpioides, Lab. Nov. Holl. plant. spec. ii. 45, t. 191 ; var. pygmaea. Stems when flowering only 2-3 inches high. Alpine summit of Mount Wellington ; Abbott and Mueller.

Helichrysum pumilum, J. Hook. Flor. Tasm. i. 213, t. 60. Mt. Sorell ; Dr. Milligan.

Helichrysum Backhousii, F. M. in Benth. Flor. Aust. iii. 632. Mt. Sorell and Black Bluff Mountain ; Dr. Milligan. Mt. Field East.

Helichrysum Gunnii, F. M. in Benth. Flor. Austr. iii. 630. Flinder's Island ; Milligan.

Helichrysum antennarium, F.M. in Benth. Flor. Austr. iii., 632. At an elevation of 2–3000′ on Mt. Field East.

Helichrysum baccharoides, in Benth. Flor. Austr. iii. 633, Mt. Field East in alpine regions.

Helichrysum rosmarinifolium, Less. in Stend. nom. ed. i., 1821; var. erubescens on Mt. Field East. This shrub is of balsamic fragrance.

Helichrysum lycopodioides, Benth. Flor. Austr. iii., 634. On this rare plant Dr. Story offers the following observations:—"I have discovered this on another locality, the summit of the rocky hills above Kelvedon, not growing by itself, as I always found it previously, but amongst other plants, much shaded by them; and hence instead of being a straight stiff plant from 4 to 5 feet, it has grown slender, lax, and crooked, with long naked stems, but is easily recognised by its peculiar flowers. When in perfection it chose a bare spot with but little soil, which forms a shallow basin on the rock holding some water."

Gnaphalium indutum, J. Hook, in Lond. jour. of Bot, t. 121. King's Island.

Gnaphalium Japonicum, Thunb. Fl. Japon. 311, var. monocephala. A dwarf variety less than one inch high, forming dense tufts on the flat, cold summits of Mt. Field East; its leaves are very small, lanceolate or oval, densely grey—downy on both sides. The precise position of G. Travirsi to this variety merits further enquiry, especially as on the Snowy River in the Australian Alps scapelus forms of G. Travirsi occur, scarcely distinguishable from this one-headed variety of G. Japonicum.

Antennaria nubigena, F. M. in transact, Phil. Soc. Vict. i. 45, var. Meredithæ. On the highest alpine meadows of Mt. Field East in springy localities. This new form, to which possibly specific value could be attributed, differs from the ordinary plant in a less dense finally somewhat flavescent indument which in age almost disappears; moreover its stems are often elongated into somewhat distantly foliate or bracteate peduncles, which attain a length of $1\frac{1}{2}$ inches; the radiating scales are longer; the female flowers are far less slender, also less numerous and more persistent; the bristles of the pappus are more rigid and in their length more barbellate, while the achenes are almost silky. These characteristics, whether specific or indicating a singular variety, are sufficiently marked to entitle this plant to a special record, and I avail myself of this opportunity of attaching to this everlasting the name of a lady, who by her artistic skill, her fondness for flowers, and her literary accomplishments, has much contributed to raise a taste for the local study of the lovely Tasmanian vegetation.

To this species approach in many respects Helichrysium Youngii as well as Raoulia subsericea from the South Alps of New Zealand.

Senecio centropappus, F. M. catal. Melb. Bot. Gard. 1858, pag. 26. Descends at least to 2000 feet on Mt. Wellington, which as yet remains the only known locality of this singular plant. It attains a height of at least 20 feet.

Senecio pectinatus, Cand. prodr. vi. 372 ; var. ochroleuca. This variety is frequent on the alpine plateau of Mt. Wellington, but I did not observe it on Mt. Field East. It produces short-toothed leaves, single flower heads and ligules almost white. Although S. pectinatus is widely spread over the Australian Alps, I never noticed it with cream-colored rays. S. leptocarpus, a variety of this plant, occurs on Mt. Field East.

**Lobelia pratioides*, Benth. Flor. Austr. iv. 131. South Esk.

Goodenia humilis, Br. pr. 575. A one-flowered variety, only about one inch high, was discovered many years ago by Dr. Milligan at Macquarie Harbour.

Scaevola Hookeri, F. M. first gen. rep. xv. On springs and in crevices of rocks. On the alpine parts of Mt. Field East.

**Leeuwenhoekia dubia*, Sond. in Lehm. pl. Preiss. i. 392. A solitary specimen of this minute plant adhered to a specimen of Helichrysum bractatum, var. albiflora, from Strzelecki's Peak, Flinder's Island, in Dr. Milligan's collections. The plant abounds in some parts of Australia Felix.

**Styphelia lanceolata*, Sm. Bot. New Holl. xlix. Port Dalrymple ; R. Brown according to Bentham.

Styphelia dealbata, Br. pr. in nota 536. Depressed into densely intricate very dwarf masses, like those of Decaspora pumila on the higher parts of Mt. Field East, sometimes growing out of cushions of Pterygopappus.

Styphelia Hookeri, F. M., fragm. vi. 44. Mt. Field East, 3–4000′.

Styphelia pinifolia, Br. pr. in nota 536. Schouten Island ; G. Story.

Styphelia straminea, Br. pr. in nota 536. In the higher regions of Mt. Wellington and Mt. Field East. Flowers as indicated by the specific name, greenish yellow, not white.

**Styphelia scoparia*, Sm. Bot. New Holl. 48. Bay of Fires ; Walt. Bissell.

**Styphelia elliptica*, Sm. Bot. New Holl. 49. Swanport ; Story.

Trochocarpa thymifolia, Spreng. syst. veg. i. 650. Mt. Field East.

**Brachyloma depressum*, Benth. Flor. Austr. iv. 173. Bicheno ; G. Story.

Epacris acuminata, Benth. Flor. Austr. iv. 240. New Norfolk; Mt. Wellington; N. W. Bay; Gunn and J. Hooker.

Richea sprengeloides, F. M. Fragm. vi. 68. Mt. Field East, 3–4000′. Seldom above 3′ high. Corolla yellowish-white.

Richea acerosa, F. M. Fragm. vi. 69. Mt. Field East, 3–4000′, on Alpine flats. A shrub 1½–3′ high. Corolla nearly white.

Richea scoparia, J. Hook. in Lond. Journ. of Bot. vi. 273. Mt. Field East.

Richea Gunnii, J. Hook. in Lond. Journ. vi. 273. Mt. Field East.

Richea dracophylla, Br. prodr. 555. Lake Fenton.

Richea pandanifolia, J. Hook. Fl. antarct. i., 50. Under the shelter of the highest alpine ridges of Mt. Field East, at 4,800′ and descending to 4000′ on the slopes towards Lake Fenton. This magnificent plant is said to occur also on the back parts of Mt. Wellington, but possibly Dracophyllum Milligani, which attains on Mt. La Perouse a height of 40′, may have been confused with this Richea, both being so similar in habit. I noticed on Mt. Field stems clothed to the length of 12 feet, with the very aged leaves and panicles, which thus are shown to be sometimes persistent for many years. The auxiliary inflorescence is remarkable. The flowers occur as often brilliantly red as white, and in all intermediate shades. Mess. Rayner contend that they had seen this Richea attaining a height of about 70 feet in the rich alpine valleys of the Gordon River.

Pernettya Tasmanica, J. Hook. in Lond. Journ. of Bot. vi., 268. At Mount Field East, from 3000′ to 4000′ elevation.

Solanum vescum, F. M. in Transact. Vict. Inst. 1855, 69. King's Island; also towards the Russell's Falls. Probably hybrids between this species and S. avidilare may occur. It produces occasionally white flowers.

Ourisia integrifolia, Br. pr., 439. On the highest alpine brooks of Mt. Field East sparingly, but on the summit of Mt. Wellington frequently occurring. The habitual aspect of this neat plant is almost that of a Gentian. It attains a height of fully six inches, with occasionally three pairs or whorls of cauline leaves. Corolla pure white.

Gratiola nana, Benth. in Cand. prodr. x., 404. Mt. Field East.

**Veronica notabilis*, F. M. First Gen. Report, 1853, 17. St. Patrick's River; R. Gunn.

**Veronica plebeja*, Br. pr. 435. At Swanport; G. Story.

Veronica nivea, Lindl. Bot. Reg. 1842, misc. 42. Mt. Field East.

Mitrasacme montana, J. Hook. Fl. Tasm. i., 274 t. 88 c. On

Lake Fenton. The inequality of the sepals, faithfully represented by Fitch's drawing, is often particularly conspicuous in the fruit-bearing calyx. The ripe seeds of this and the following species need still comparison.

Mitrasacme Archeri, J. Hook. Fl. Tasm. ii. 368. In the most elevated valleys of Mt. Field East and also on Lake Fenton. The leaves are singularly shining and rigid, along the edge remarkably transparent, and not so distinctly narrowed into the petiole as those of the M. montana.

* *Lithospermum arvense*, L. sp. pl. 190. Naturalised in King's Island.

* *Myoporum parvifolium*, Br. pr. 516. In marshes at Long Point, Flinder's Island ; Dr. Milligan. To this plant belongs probably M. Tasmanicum j. J. Hook. Fl. Tasm. i. 287.

Myoporum insulare, Br. pr. 516. To this the ordinary forms of M. Tasmanicum are referable.

Chenopodium glaucum, L. sp. pl. 320. To this belongs probably C. furfuraceum, Mog. in Cand. prodr. xiii. ii., 64, recorded as a Tasmanian plant from D'Entrecasteaux's Straits.

Australina pusilla, Gaudich. voy. Uranie 305. Macquarie Harbour ; Dr. Milligan.

Leptomeria glomerata, F. M. in Jos. Hook. Flor. Tasm. ii. 370. Macquarie Harbour ; Dr. Milligan.

**Pimelia axiflora*, F. M. in Linnaea xxvi. 345. King's Island.

* *Pimelea stricta*, Meissn. in Linnaea, xxvi. 348. Swanport ; Dr. Story.

Pimelea serpillifolia, Br. pr. 360 ; Flinder's Island ; Dr. Milligan. King's Island.

Pimelea sericea, Br. pr. 361. Frequent on Mt. Wellington, but not noticed on Mt. Field East.

Orites acicularis, Br. suppl. 32. Abundant on Mt. Field East from 3-4000′. The foliage of a remarkable yellowish green. Sepals white, with reddish tinge outside.

Orites diversifolia, Br. pr. 388 ; Mt. Field East, 2-4000′. The leaves some times toothed from the base.

Hakea lissosperma, Br. pr. 382. In the fern tree regions of Mt. Field East.

Bellendena montana, Br. pr. 374. In the alpine regions of Mt. Field East, descending to 2500′. Flowers almost white, tinged at the upper extremities with red. The pedicels sometimes dark-red. Some of the leaves may occur perfectly entire.

Fagus Cunninghamii, Hook. journ. 1840, p. 152, t. 7 ; var. alpina. Depressed by exposure and cold to a small shrub, as well on Mt. Wellington as on Mt. Field East. Leaves only 3-4 lines long.

Athrotaxis cupressoides, Don. in Transact. Linn. Sot. xviii. 172 t. 13. On Lake Fenton at 5000′ elevation.

Athrotaxis laxifolia; Hook, icon-plant, t. 573. Among boulders on the descent from Mt. Field East to Lake Fenton. Nearer the following than the preceding species.

Athrotaxis selaginoides; Don. L. P. 172, t. 14. At Mt. Field East, from 3000′ to 4000′.

Podocarpus alpina, R. Br. in Mirb. mem. du mus. xiii., 75. Creeping over boulders on the summit of Mt. Field East.

Microcachrys tetragona, J. Hook, in Lond. Journ. Highest alpine valleys of Mt. Field East. The whole fruit becomes in maturity beautifully crimson.

Pherosphaera Hookeriana (W. Archer in Hook. Lond. Journ. of Botany ii. 52 in part.; J. Hook. Fl. Tasm. i. 355, t. I C). On the highest springs of Mt. Field East. An erect shrub, 2–4′ high. Mr. W. Archer, F.L.S., of Cheshunt, who many years ago defined the genus Pherosphaera and more recently aided Dr. Hooker in the elucidation of the Alpine Coniferæ of Tasmania, has shown me the kindness, while on a visit to Melbourne, to examine this plant with me. We established from remnants of the male amenta the identity of one of the dwarf, but erect, Coniferæ of Mt. Field with his Pherosphaera, fruit not being found, although I searched long for it. It is however not improbable, that Diselma exists also there, and it seems even contained in my collection, as it is not easy to distinguish these bushes, except when in flower or fruit. That Pherosphaera much differs in habit from Microcachrys, is now for the first time rendered known. The absence of the genera Microcachrys, Diselma, Pherosphaera, and Athrotaxis in the Australian and New Zealand Alps, and indeed, in any other part of the globe, remains a remarkable phytographic fact.

* *Potamogeton marinus* L. Sp. 184. In marshes between Bridgewater and New Norfolk; F. Abbott.

Hewardia Tasmanica, Hook. ic. pl., t. 858. Lake Fenton.

Uncinia compacta, Br. pr. 241. On alpine brooks at Mt. Field East.

Oreobolus Pumilio, R. Br. pr. 236. Alpine regions of Mt. Field East.

Herpolirion Novae Zelandiæ, J. Hook, Fl. N. Zeal. i. 258; H. Tasmaniæ, J. Hook, Fl. Tasm. ii. 54, tab. cxxxii. B. Found very many years ago by Mr. Milligan on the summits of the Hampshire Hills.

Lycopodium Selago, L. sp., pl., 1565. Mt. Field East.

Isoetes Gunnii, Al Braun in den Monat's berichten der Koen, Akad., der Wissensch. zu Berlin, 13 Aug., 1868. On the shallow marginal bottom of Lake Fenton I observed tufts fully half a foot in diameter. The leaves are so rigid, that my companions bestowed jocularly the name "Water Porcupine" on this plant.

The Tasmanian species of Isoetes became very recently the subject of Prof. Braun's masterly researches. From the important memoir above quoted I have translated the cardinal characters of the diagnoses, which I here the more readily subjoin, as the essay will not be easily accessible to Australian observers. The repetition of some of the characteristic notes was deemed necessary to contrast the four Tasmanian species with three or four from continental Australia, and with several other, to us, exotic species, those of Tasmania being all endemic. It is, however, possible that some of them may yet be discovered in the Australian Alps, or in the rivers of the lowlands of Victoria.

Isoetes Gunii, Al. Br. L. C., and Monats Berrichton, 22 July, 1869. Lacustrial; rhizome three-lobed; leaves short, very stout, rigid; cuticle olive-brown, thick; sheath brown; stomata absent; vellum, none or rudimentary; sporangium small, upwards flat, acute at the margin, with copious sclerenchymatic cellules, macrospores very large, beset with numerous minute tubercules, microspores indistinctly tuberculate. In alpine lakes.

**Isoetes elatior*, F. M. in Linnea 1852, 722; Al. Br. L. P. 536.

Fluvial; rhizome 3-lobed; leaves very long, flaccid, green; sheath pale; stomata absent; velum none or rudimentary; sporangium pitch-coloured, upwards flat, at the margins acute with copious sclerenchymatic cellules; macrospores moderately large, pale, beset with numerous minute tubercules; microspores distinctly tuberculate. South Esk.

* *Isoetes humiliar*, F. M., L. P. 722; I. Hookeri, Al. Br. L. P. 538.

Fluvial, rhizome, bilobed; leaves hard; cuticle thick, turning brown; sheat brown, short; stomata absent; vellum complete; closed, brown; sporangium without sclerenchymatic cellules; macrospores rather large, pale, beset with numerous minute tubercules; microspores intensely brown, short tuberculate, South Esk.

Isoetes Stuartii. Al Braun, L. P., 539.

Fluvial; rhizome two-lobed; leaves rather slender and soft, green; cuticle thin; sheath pale; stomata absent; vellum complete, closed, pale; sporangium mottled with brown and pale thickened sclerenchmatic cellules; macrospores rather large, pale, beset with numerous minute tubercules. South Esk.

An excellent series of specimens of Isoetes, very obligingly secured by the Honourable W. Archer, from the waters of the Western Mountains, are since some time in the hands of Monsieur Durien de Maisonneuve, for elucidation in his illustrated monography of the genus.

SOME ADDITITIONAL OBSERVATIONS ON MORE RECENT CHANGES WHICH HAVE TAKEN PLACE IN THE STAR η ARGUS AND ITS SURROUNDING NEBULA.

By F. Abbott, F.R.A.S., F.R.M.S., Read 12th April, 1870.

I would remind the members present, that many of the notes in this short paper are intended to answer questions that have arisen in various discussions which have taken place on the preceding one on the same subject read in 1868.

These notes have been, for the most part, suggested by some critical remarks, made on the subject by Sir John Herschel, to which I shall presently refer.

In continuation of the observations detailed in the communications referred to, I now bring under the notice of the Society a third paper, with accompanying drawings, relative to this singular object which has of late caused long and animated discussion in the astronomical world.

When I first brought the subject under the notice of the Society (see Papers and Proceedings for June, 1863), I was fully aware that the varied changes there recorded as having taken place in the object, and particularly the fluctation of the Nebula, would cause great excitement; but did not expect it would meet with the severe critical test to which it has been subjected by Sir John Herschel, who, commenting on the drawing at a meeting of the R.A.S., remarks that "The question is not one of minute variations of subordinate features which may, or may not be attributable to differences of optical power in the instruments used by different observers, as in the case of the Orion Nebula—but of a total change of form and character—a complete subversion of all the greatest and most striking features, accompanied with an amount of relative movement between the star and the Nebula, and of the brighter portions of the latter *inter se*, which remind us more of the capricious changes of form and place in a cloud drifted by the wind. The great increase of light that has taken place in the brightness of the Nebula is very remarkable; it could not be seen at all by the naked eye, when I was at the Cape, but the changes which have taken place in the figure of the Nebula are still more startling. Mr. Abbott supplies two pictures, one representing the appearance of the Nebula as seen

in 1863, the other drawn in February 1868. Neither of these pictures resembles my drawing of 1834-8 in the slightest degree, nor do the two pictures in any way resemble each other, and Mr. Abbott remarks that a series of drawings taken at comparatively short intervals of time would afford even stronger evidence of the mutability; this is very strange, no phenomenon in nebulous or sidereal astronomy as yet ever turned up like this, and it must be settled."

Sir J. Herschel clearly supposes by these remarks, that my drawings are meant to indicate the true arrangement of the stars. He has been at great pains to try all possible means of reconciling his own splendid drawing of the Nebula with mine, so far as the distribution of the stars is concerned, but without being able to find a situation of the tracing paper, in which any tolerable coincidence of the stars in the two drawings could be noticed.

Lieutenant Herschel, Sir John's son, was sent out to India at the head of a party of scientific men to observe the great eclipse of August 18th, and was fully commissioned to settle in some way the nature of the capricious changes recorded of this object; how he succeeded can be seen by a comparison of his drawings with my own, and that of the Cape Monograph, now lying on the table. On the receipt of these drawings Admiral Manners, President of the Royal Astronomical Society, thought that Lieut. Herschel had not sufficient instrumental means at his disposal to settle the question.

The first object to be examined with the large Melbourne reflector was the Nebula in Argus, in reference to which Gen. Sabine, in his recent address to the Royal Society, regrets the temporary failure of that telescope from some cause or other not clearly known, but reminds the Society that it has been able to show some of the changes recorded in the Nebula of Argus.

These preliminary remarks will tend to show the present meeting a part of the interest excited by my last remittance to the Royal Astronomical Society on the subject, and I think the present paper and drawing will tend to set all doubts as to the fluctuations that have already taken place at rest.

The severe critical remarks of Sir John Herschel on the drawing and notes of 1868 were made with a view of disproving that which I never intended to prove, viz., a correct measurement of the distance applied to all the stars in the field of the telescope; this in all probability arose from my not having expressed myself with sufficient clearness in my remarks on the drawing which accompanied the observations. In this way the road to truth often runs through the midst of error, but that does not in any way alter the fact that changes have been, and still are taking place in the object—such

changes being principally confined to a space near to η and the so-called lemniscate*

As some objections have been raised on the ground that larger optical means than those employed by me are required for recording truthfully the changes which occur in this object, it may be well, perhaps, to state that the 5ft. equatorial previously mentioned, although the best for the purpose, is not the only instrument at my command; other telescopes have been used in the open air, from a $3\frac{1}{2}$ inch Cook and Son's, to a 7ft. Dollond—with, for the whole, a complete battery of Micrometers, and eye-pieces giving magnifying powers of from 25 to 450. This statement may go towards proving that with due care such observations can be correctly made without very large instruments.

In Mr. Proctor's article on the Nebula in Argo, (*Frazer's Magazine* for December, 1868,) it is stated not to be quite clear that the stars which appear in my drawing of 1868 have been really copied from the view given by the telescope, &c. In reply to this I beg to state that all the drawings, the present, as well as the former ones, were carefully copied from the object, as described in the *Astronomical Register* for January, 1869. There is little doubt but that Mr. Proctor's views on this subject would be much enlarged if he had the opportunity of seeing the star and its Nebula as they appear in the telescope, when above the Pole, at Hobart Town.

Having now seen the object with the large Melbourne reflector, and compared the effect with that produced by my own instruments during the last two years, I feel greater assurance in communicating the result of observations on the changes which have taken place since 1868.

On comparing the present with the former drawing, it will clearly appear that alterations have taken place, both in the magnitude of the star η, and in the dispersion of the Nebula, and from what follows it will be seen that the remarks made by Professor Loomis and others on the period of this star are premature. At the time of my visit to Melbourne (21st June last), Mr. Ellery considered the star η to be of the 7th magnitude, and Mr. Le Suer thought it to be $6\frac{1}{2}$. On returning to Hobart Town, and resuming the observations on this interesting object, I found by comparison with other stars, given in the drawing and recorded in the Cape Catalogue as of the

* I scarcely think this term a good one, *Lemniscate*, or *Lemniscus*—a curve formed as the figure 8, or a bow tied of a riband (Barlow and B. H. Smart). Such a curve is closed in the centre, which is not the case in the Cape drawing, the space being there shown as a long enclosure, slightly compressed in the centre. It was in this compressed part of the dark space that the star η appeared when out of the dense Nebula in 1863.

7th magnitude, that η Argus cannot now be more than a 7th magnitude star. In the catalogue there are two stars of the 6th and nine of the 7th magnitude, the remainder being all of low magnitude. In the drawing the two 6th magnitude stars are out of the field, and the nine of the 7th magnitude in the field, are by careful comparison exactly the same magnitude as η, which is left among them not marked. The magnitudes of these stars are given by Sir J. Herschel, and may be considered correct.

Measures of these stars have recently been recorded as having been made by small transit means; but from my own experience in such observations, I believe it all but impossible to measure correctly such a cluster of small zenith stars by these means. Two years ago I dismounted a 24 inch transit by Varley in order to re-place it with a 3) inch by Dallmayer, made with a deep diagonal eye-piece for the purpose of reaching small zenith stars up to the 7th mag., as agreed upon for correcting any error in longitude between Hobart Town and Melbourne. Mr. Ellery selected 49 such stars, which were to be used at both places, reversing the instruments for each observation so as to eliminate any errors. With these means, and for this purpose, I find it difficult, and only under very favourable circumstances possible, to reach zenith stars of the 7th mag. My reason for not attempting measures with the equatorial is in consequence of a long experienced difficulty arising from the want of clock movement, which I consider indispensable for the accurate measurement of distances. I have therefore preferred an eye and hand drawing when the object has been in a convenient position—approximately 75° from the meridian towards the East, and 35° from the zenith.

A very singular circumstance in connection with the extraordinary object under consideration is, that although it has within the last few years undergone such rapid changes, causing great excitement amongst astronomers in Europe, and laying a foundation for new theories—yet, apart from the Melbourne Observatory, scarcely any one in the Australian colonies appears to know it, notwithstanding that on every fine night through the year it is to be seen above the horizon at Hobart Town, and particularly well situated for examination, when near the meridian. The only person who occasionally studied this object with myself was a member of this Society—the late Joseph Facy—who on suitable occasions would devote a few hours to an inspection through the telescope of some of the principal objects in the great Creator's workshop. He would, in his pious zeal, apart from theological theories, frequently comment upon the mode of manipulating, mechanical, geometrical, and

ROYAL SOCIETY.

JUNE, 1870.

The monthly evening meeting of the Society was held on Tuesday, 14th June, James Barnard, Esq., in the chair.

The following gentlemen, who had previously been put in nomination by the Council, were, after a ballot, declared duly elected as Fellows of the Society :—F. Aubin, Esq., Spring Bay ; C. J. Willes, Esq., Oatlands ; R. McI. Isaacs, Esq., Hobart Town ; R. C. Read, Esq., Redlands, New Norfolk.

The Secretary, Dr. Agnew, submitted the following returns for the month of May ; viz. :—

1. Visitors to Museum, 514.
2. Ditto to Gardens, 1969.
3. Plants received at Gardens.
4. Leafing, flowering, and fruiting of a few standard plants in Society's Gardens.
5. Books and Periodicals received.
6. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., Table and Summary for May.
2. Port Arthur, from J. Boyd, Esq., ditto for April and May.
3. Swansea, from Dr. Story, ditto for February, March, and April.
4. Queensland, from the Government Observer, tables for August, September, and October, 1869 ; January, February, March, 1870 ; and table shewing rain-fall at various stations during February.
5. New Zealand, from the Government, tables for February.
6. Melbourne, from R. L. J. Ellery, Esq., table for April.

Accompanying the returns from Swansea were some remarks by Dr. Story, from which the following extract was read :—

"We have now (19th April) had nearly six inches of rain since the beginning of the month, more than has fallen in so short a time for many years ; it will no doubt act beneficially upon all vegetation. I have always observed that after a drought the rain first began in New South Wales, and when we heard of it falling there we shortly had it on the East Coast ; but this time it has been longer in reaching us than I ever before knew. Now we have had as much rain as will moisten the deepest roots."

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

1. From G. Dinham, Esq.—A copy of "The whole workes of W. Tyndall, John Frith, and Dr. Barnes, three wortby martyrs and principal teachers of this Churche of England, collected and compiled in one tome together, being before scattered, and now in print here exhibited to the Church. To the prayse of God, and profit of all good Christian Readers. At London. Printed by John Daye, and are to be sold at his shop under Aldersgate, An. 1573."
2. From H. Cook, Esq.—"A brief and accurate treatise concerning the taking of the fume of tobacco." By Tobias Venner, Doctor of Physic, 1621.
3. From T. Giblin, Esq.—A list of subscribers (with signatures), to a testimonial for presentation to Mr. Taylor, of Macquarie River, for his spirited and manly conduct in resisting an attack upon his house by escaped convicts from Macquarie Harbour. Dated 20th July, 1824. [Of the forty-six persons whose names appear in this interesting document, only four are now living.]
4. From Mr. Cearns.—Large specimens of Oysters from North-West Bay.

5. From Mr. R. A. Jeffrey, Campbell-street.—Two large Mussels, from near New Wharf.
6. From Mr. R. Giblin.—A fish said to have been taken in Mr. Walker's mill-race.
7. From J. Butler, Esq., Dunedin, per J. W. Graves, Esq.—A thigh bone of the Moa (*Dinornis sp.*)
8. From Rev. H. D. Atkinson.—Specimen of Ibacus, from Three Hut Point.
9. From the Hon. J. Maclanachan, Esq.—A Carolina Drake, and a Peacock.
10. From Captain Serckoff, H.I.M.'s corvette "Boyarin."—A collection of Russian coins, viz:—Gold—5 roubles (half imperial), Russian. Silver—20 kopeks, Russian; 15 ditto; 10 ditto; 5 ditto; 25 penny, Finnish. Copper—5 kopecks, Russian, old mint; 3 ditto; 2 ditto; 1 ditto; 5 ditto, new mint; 3 ditto; 2 ditto; 10 ditto, penny, Finnish; 1 ditto.

In reference to presentation No. 5, Mr. M. Allport remarked that these enormous mussels (which measure eight inches in length, and the same in girth are of a different species to the small common kind. They are remarkable for having a disk-like termination to the fibres of the byssus, several of which fibres are seen to be attached to the external surface of the shell. This species is found in mud in deep water, and specimens have been obtained from Southport and Spring Bay, as well as in the harbour.

Dr. Agnew then referred to the subject of the red spider of the hop, which he had brought under the notice of the Fellows at the last monthly meeting. As he then feared, he had not been able to procure from Sir R. Officer any better specimens of the insect, owing no doubt to the lateness of the season. On microscopic examination, however, of those sent they were found to be identical with the *Acarus telarius*, as figured in McIntosh's Book of the Garden, vol. 2, p. 77; although a later authority gave it the name of *Gamasus telarius*—an allied genus of the same great class, *Arachnida*. It is oviparous, and many broods are hatched during the season. The ova are probably for the most part deposited on the under surface of the leaves, whence the young when hatched can extract nourishment, but it is possible some may also be deposited in the bark of the hop poles, or even in the ground (as suggested by Mr. M. Allport), where the animals themselves are found in great numbers. The presence of the pest is attempted to be accounted for in two ways. Some think the hop itself from exposure to high winds, from scant supply of water or manure, or from other causes, first becomes sickly, and thus favours or provokes the development of the spider. Others think the fault is not in the plant in the first instance, but that under some peculiar and unknown influence, whether atmospheric or telluric, or by consent of both, vast developments of animal life take place at certain periods in a manner not yet accounted for. We have all seen plagues of green beetles, aphides, and caterpillars, and again we read of locusts, grasshoppers, etc., appearing in one year in overwhelming numbers, and in the next being almost altogether absent; and as these visitations take place without any apparent disease having previously existed in the plants destroyed by them, the inference was in favour of the latter view, viz., the primary development of animal life, and with this he (the speaker) was inclined to agree. In either case the effect would be the same; the weak and sickly plants would first yield to the attack of the enemy, whilst the strong and healthy would make a struggle, in many cases a victorious one, for existence. By the assistance of Mr. Roblin he had mounted specimens of the acari from the hop, from some hot house plants, and from the apple tree. For the last, which was accompanied with several ova, he was indebted to Mr. Stephens, who had paid a good deal of attention to the subject. These were placed under the

three microscopes now before the meeting, and the Fellows could examine them for themselves. All were evidently of the same genus, which also embraced the parasite of the itch in man, and of the scab in sheep, etc. As to remedial measures, he could scarce offer any suggestions. As a matter of course, seeing that the healthy plant alone had a chance of resisting the destroyer, every suitable hygienic measure should in all cases be adopted. Due shelter from winds should be afforded. If the ground was found to be exhausted of any necessary chemical element, this should be restored, and proper quantities of manure and water furnished. From the numbers of the animals he had seen in the bark it was evident the poles should be carefully deprived of their bark, and it would probably be advisable to soak them in tar before setting them up. This could be done very cheaply, by means of rude wooden troughs of the same length as the poles, as coal tar could be procured at a nominal price from the gas works. The poles would thus be no longer a nidus for the parasite. As to any application to the plant itself, it was difficult to imagine how it could be effected as it was impossible to reach by any means at our command, the under surface of the leaf where the insect and the ova were chiefly found. The soil itself, however, as has been already noticed, was greatly infested, and here the same agent, sulphur, which was so noxious to the acarus (itch) in man and in sheep (scab) naturally suggests itself, as a possibly effective application. A pound of sulphur mixed with a pound of quicklime, might be boiled in a gallon of water for half an hour. When cold, the clear liquor to be diluted with water in the proportion of about one to sixty. This, by means of a watering-pot, would be of easy application, and if found to answer, would probably be as cheap as any other remedy, as sulphur, if in large demand could, he was informed, be obtained in any quantity, and at a very moderate price from New Zealand or its vicinity.

Mr. M. Allport remarked he had been speaking on the subject a few days ago to Mr. Wright, who informed him that sulphur had been tried at home, but was decidedly objected to as it was found to be injurious to the plant, although it was made use of with advantage in the preparation of the hop for market.

Dr. Agnew did not know anything of the matter practically, but thought if the experiments made at home were not conclusively adverse to the sulphur, it would be well worth trying it in the manner indicated, if only on a small scale, and on a few plants in the first instance. (As tobacco is noxious to the parasite and can be grown so cheaply, would it not, in the case of so valuable a plant as the hop, be worth a trial in the form of a very dilute decoction applied in the same manner as suggested for sulphur? If the pest were treated vigorously by either of these means, on its first appearance, even at the risk of injuring some of the plants, a great discouragement might be given to its further progress, and thus the nuisance be at least abated if not abolished.)

Mr. Davies considered the subject just treated was one of considerable interest, and suggested that the remarks by the honorary secretary should appear in the form of a paper. Dr. Agnew promised he would at all events notice the discussion at length in the official report of the proceedings.

Mr. M. Allport said: Mr. Chairman and gentlemen, at the risk of wearying you with the frequent recurrence to one subject, I must again refer for a few moments to the small salmonoid first sent to England. By the mail before last, Sir Robert Officer received a letter from Mr. Youl, which contains much that will interest the Fellows of the Society, especially as it tends to prove, as I have long suspected, that the difficulty of distinguishing between the smolt of the true salmon (*Salmo salar*) and the smolt of the sea trout (*Salmo trutta*) is very great. Mr. Youl says:—"I brought the little fish home from Dr. Günther's, and carefully examined

it myself with my son-in-law, a medical man. We did this first with the description of the different varieties of the salmonidæ and directions given by "Yarrell" for distinguishing them, but not being able to come to any decision we went to a fishmonger, and upon carefully comparing it with a full grown salmo salar, concluded that upon the whole it was a salmon or sea trout, *Salmo trutta*, of Linnæus. After this I took the fish to Mr. J. K. Lord, the principal editor of *Land and Water*, a person fully competent to give an opinion, and with whom I had a personal acquaintance. Upon examination Mr. Lord stated his belief that it was a true *Salmo salar*. I asked him to examine it again, which he did in my presence and with his pocket microscope, when he again stated his belief that it was a true *Salmo salar*, but said if I would leave him the fish he would take time and give it a more careful examination; this I did, and upon seeing him again he said that he had altered his opinion and thought it was a salmon or, sea, trout. I then told him for the first time that the fish came from Tasmania, and that Dr. Günther had pronounced it to be a salmon trout Mr. Lord at the same time assured me that he had never heard anything about the fish until that moment, and that his opinion was formed without any knowledge of where the fish came from or that anyone had given any opinion about it. He also mentioned that at the age of the fish it was most difficult in his opinion to decide positively to which of the two species it belonged. I think it right to mention, that after leaving the fish with Mr. Lord I went to one of the largest fishmongers with my "Yarrell" and microscope, and was fortunate in seeing and examining three beautiful sea trout weighing from 1½ to 3½ lbs., and certainly I must confess that the teeth on their vomer corresponded exactly with those of your fish. I cannot, however, I must candidly own, make up my mind that it is a salmon trout, because if so it must have been as you well know at least 3 years and 5 months old when it was caught, and therefore ought to be half as large again as it is. You will note that Mr. Lord at first, and after a careful examination, pronounced it to be a true salmon. It was not till after a further and more extended comparison that he altered his opinion; it is, therefore, not to be wondered at if you and Mr. Allport should prove to have formed an erroneous opinion upon so difficult a point." It is a law of nature that the species and varieties of one given genus of animals resemble one another far more closely in the early stages of their existence, than they do when arrived at maturity. No birds differ more in the mature plumage than ducks, yet there are dozens of species that no naturalist could determine during the first few weeks of their lives. I do not mean to say that a Tasmanian black duck of a fortnight old could not be distinguished from an English wild duck of the same age, if they were placed in juxtaposition; but that they resemble one another so closely, that it would be next to impossible to determine to which species either belonged, if examined alone. And no reference to a fully mature duck or drake could be of any service in solving the difficulty. Amongst the large carnivora in the genus felis we find the tiger, the lion, and the panther, each perfectly distinct when full-grown, yet the cubs all exhibit the striped skin, which is only found in the mature tiger, the stripes being lost in the lion, and changed to spots in the panther. Instances might be given from every division of the animal kingdom, but to come to fish, the genus Thyrsites contains two of our commonest fish, the king-fish and barracouta, and no one who has turned his attention to the subject could have any difficulty in distinguishing between them when grown, yet both Mr. Giblin and Mr. Buckland (either of whom it would be difficult to puzzle with a Tasmanian fish), would find it hard to determine the species of one or the other when four or five inches long. From this natural law, it follows that the more closely species approach one another when mature, the more difficult is it to distinguish

between their young; and as the mature salmon more closely resembles the salmon trout than the king-fish resembles the barracouta, I should expect to find that the difficulty of distinguishing the one smolt from the other was enhanced. And if we turn to Mr. Youl s letter, we find Mr. Lord, from the outer appearance of our fish, at once pronounced it a true salmon, and, after re-examination again pronounced it a true salmon, but, after having the fish left with him, changed his opinion. Unfortunately, Mr. Lord does not tell us why he changed his opinion; but, from Mr. Youl's observations as to his own reason for thinking the fish a salmon trout, it is all but certain they were both puzzled by the presence of the vomerine teeth in our fish, and in the mature salmon trout (*Salmo trutta*) whilst such teeth were absent in the mature salmon (*Salmo salar*). And here I must trouble you with two short extracts from "Yarrell," who, at pages five and six, says:—"The teeth of the salmon are short, stout, pointed, and recurved. As stated in the generic characters, they occupy five situations at the top of the mouth: that is, a line of teeth on each side of the upper jaw, a line on each palatine bone, with one line on the vomer between the palatine bones when young; but the salmon loses a portion of the vomerine teeth during the first visit to salt water. I have observed that some specimens of the migratory or sea trout carry their vomerine teeth longer than the salmon; and those trout which do not migrate, appear to carry their vomerine teeth longer than those trout which do migrate. The teeth on the vomer of the salmon, when the fish is old, seldom exceed two or three in number, sometimes only one, and that placed on the most anterior part. The salmon has, besides these, two rows of teeth upon the tongue, and one row along the outer upper edge of each lower jaw-bone." In speaking of the teeth of the salmon trout, at page 79, Yarrell says:—"The teeth are more slender, as well as more numerous, than in the salmon or grey trout; those on the vomer extending along a great part of its length, and indenting the tongue deeply between the two rows of teeth that are there placed, one row along each side." Does not this at once reconcile the presence of vomerine teeth in our specimen with its being a true salmon smolt? The Fellows of this Society well know how much we are already indebted to Mr. Youl for his unceasing exertions in this undertaking, and the Salmon Commissioners had no right to expect him to give up more of his valuable time for their advantage, still I hope that before the season was quite over our fish may have been compared with an undoubted salmon smolt from Stormontfield which had reached the same stage of development, because I believe that vomerine teeth will be found identical in the two specimens.

Mr. Davies, in referring to a paper by Mr. Barnard (read July, 1868) on the Esparto grass, mentioned that the Hobart Town *Mercury* newspaper had been printed for several months on paper manufactured from that material; and asked if Mr. Barnard had acquired any fresh knowledge on the subject.

Mr. Barnard stated that since the paper referred to by Mr. Davies, he had laid further information on the subject before the Society (July, 1869), from which it was evident that the cultivation of the grass could not be attempted in this colony with any chance of profit or success, and he had taken no further interest in it.

Mr. M. Allport observed it was well known that no vegetable product which required cultivation could be profitably grown for the manufacture of paper. Even if the waste lands of the colony were sown with Esparto grass seed, as had been suggested, this climate would be unsuitable for the plant.

On the motion of Mr. Justice Dobson, a vote of thanks was given to Mr. Allport, Dr. Agnew, and the donors of presentations, and the meeting separated.

JULY, 1870.

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

The following gentlemen, who had been put in nomination, were, after a ballot, declared duly elected members of the Society, viz.:—G. Wilson, Esq., J.P., Hobart Town; C. Hazell, Esq., J.P., Carlton; R. V. Legge, Esq., J.P., Cullenswood; and Hon. J. Aikenhead, Esq., M.L.C., Launceston.

The Secretary submitted the following returns:—

1. Visitors to Museum during June, 629.
2. Ditto to gardens during June, 1208.
3. Plants, &c., received at gardens.
4. Ditto sent from gardens.
5. Times of leafing, flowering, &c., of a few standard plants in Botanic Gardens.
6. Books, &c., received.
7. Presentations to Museum.

Meteorological Returns:—

1. Hobart Town—From F. Abbott, Esq., Table for June.
2. Port Arthur—From J. Boyd, Esq., ditto.
3. Westbury—From F. Belstead, Esq., ditto.
4. New Zealand—From the Government, ditto for May.
5. Adelaide—From C. Todd, Esq., ditto for January.

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

1. From Mr. H. Turner—A Persian or Hindoo copper coin.
2. From Mr. W. Maum—A copper medal (apparently Masonic), found at Clarence Plains.
3. From Rev. H. D. Atkinson—A Spider Crab from Three Hut Point.
4. From Mr. Ikin—12 specimens Crustacea.
5. From Mr. A. Wood—A curious Crustacean from Blackman's Bay.
6. From Mr. Brand, Oatlands, per the Hon. J. Whyte, Esq.—A fœtal wallaby.
7. From R. C. Read, Esq, New Norfolk—A native devil (*Sarcophilus ursinus*) with three young in pouch.
8. From Mr. W. Pelham—A curious fish from beach at Kangaroo Point.

[This fish belongs to the *Lophiidæ*, and is figured and described under the name of *Chironectes politus* in the Zoology of the Erebus and Terror (*Plate IX.*, *page* 16.) Of the genus *Chironectes* Cuvier remarks:—"These fishes, from the peculiar conformation of their pectoral fins, can creep on land almost like little quadrupeds. The pectorals, by reason of their position, perform the office of hinder feet. They can live out of the water for two or three days."

9. From H. M. Hull, Esq.—Shells and corallines from Warrnambool.

The Secretary, after referring to the visitation of caterpillars with which various parts of the colony were afflicted about six months ago, mentioned that he had placed several of them under observation for the purpose of determining their future development. He now brought under the notice of the meeting the empty case of a chrysalis which formed on the 18th of January, and a moth which was produced from it on the 14th of the month following. The moth was apparently an Agrotis, and therefore the of the same genus, but probably not the same species, as the one *(Agrotis vastator)* the caterpillar or larva of which was so destructive to the crops and pastures of N. S. Wales in 1867. From the chrysalis of our caterpillar one observer (Mr. H. Nelson) has expressed his conviction that flies have in some instances been produced. If this was the case it must have been due to the parent fly depositing its ova in the chrysalis, the sub-

stance of which would afford nourishment to the strange larva, though of course it would itself be destroyed.

A paper by Mr. Legrand, on "The Land Shells of Tasmania," with a list of new species recently discovered by him was read by Mr. Stephens. At the conclusion of the paper Mr. Stephens passed a high eulogium on Mr. Legrand, for the great zeal and devotion with which he had pursued this branch of natural history, at a cost he could ill afford, and with little, if any, direct benefit to himself. If they had some kindred spirits to work out other branches of natural history, valuable specimens would rapidly accumulate, and their museum would soon be rich indeed.

Mr. Barnard read the following letter from Mr. John Walker to Mr. Nowell, the Government statistician, and its enclosed communication from Mr. Arnold Baruchson, on the manufacture of beet-root sugar:—

32, Lansdowne Road,
Notting Hill, W., London,
19th March, 1870.

My Dear Sir,—I suppose that long ago you heard of my intended trip to Tasmania, and my unfortunate voyage, as the vessel was wrecked about 100 miles from Rio de Janeiro, and eight of the passengers lost and my wonderful escape, without any serious detriment to my health. I am, however, at present determined not to attempt to take another voyage at my period of life.

I see by the newspapers the subject of beet-root sugar has engaged the attention of some of the colonists, and that James Barnard, Esq., has taken an active part, so that the members of the House of Assembly have voted a gratuity to any one who would first produce 200 tons of sugar from beet-root grown in Tasmania.

In some of the letters I wrote on the subject, I took a different view, and stated that an Act should be passed to protect the producers from any duty for a stated number of years. I think I sent a letter from Mr. A. Baruchson, of Liverpool and Magdeburg, from whom I received part of the seed I sent out, but I regret to say few tried it, and as it was a very dry season, those who did, did not succeed. I tried a little in my garden here, and it answered well. I let some grow, and it went to seed better than I expected.

I now send you a letter which I received from Mr. Baruchson on the 7th instant, and you can use it as you think best. I see by an Act of Council distillation is to be allowed. I do not think it would pay if made from malt, as one bushel of malt would cost from 8s. to 10s., and would only produce two gallons of proof spirit; and the price of the rum exported from London is from 2s. 2d. to 2s. 4d. per gallon.

As there is a considerable quantity of molasses from beet, as well as from other sugar highly refined, it might be used for distillation; but when I wrote I was aware that no distillation was allowed. I suggested that the molasses should be mixed with hay, made into chaff, as all kinds of cattle are very fond of it.

I was at Mr. Duncan's beet-root manufactory on the 3rd March, 1869, and saw his machinery at work, but as it was the first season, and the machinery not ready in time, the root was deteriorated, it should have been all used in January. The machinery was very inferior to what I saw in France and Germany.

At one "fabrick," as they call it in Stuttgart, in Germany, they rent land, and produce all, or nearly, the beet-root they require, and never dispose of the pulp, but keep it in large pits, 150 feet long and 20 feet broad, and cover the pulp with the stalks of maize, and then with earth sloped like the flat roof of a house, and sow maize on the earth, as the pits are all adjoining each other, and as the pulp ferments, the heat forces on the maize, and they get an excellent crop at an early season. They keep 200 bullocks and about 140 milch cows, and feed them with the pulp and maize stalks, and get a large quantity of excellent manure to keep the land in good order. When five or ten of the bullocks are fit for the butcher, they are sold, and their places filled up with lean beasts, purchased at a low price. The milk is sold to milkmen in the town, and as Stuttgart is a large place, there is a good demand.

It is a noble "fabrick," and the owners, Germans, remarkably civil. As my daughter lives near it, I can see it whenever I go there. (See page 5.) At Stuttgart, when I was there last year the concern was so successful that they, for an increase of capital, then formed it into a company, and all was going on prosperously. They have to pay duty on all the sugar they make, both in Germany and France, and seem to be very prosperous. At and about Douay, they have all the means and appliances in the best order, and wherever you travel you see little but crops of beet-root, and they get a full supply, and dispose of the pulp instead of keeping it to feed cattle.

You will see by the letter I enclose, that the machinery is very elaborate and expensive, and for many reasons the manufacture could not be commenced on a small scale with any prospect of success, nor is there any person in Tasmania able to make the attempt, it would require at least ten Germans who thoroughly understand the process, and as the work can only go on in the winter months, say in November, December, and January, there must be a relay of competent men for boiling and the other operations night and day for three months, as any delay would probably be at a loss of at least £500.

On the Continent they have this advantage, that the men, women,and children employed, could not procure any other work in the winter months, as the climate is far more severe than in England, and they get people at very low wages. There may be employed in large manufactories about one hundred and fifty persons in cutting off the tops, washing, and other parts of the work. A large quantity of water is required, and at least two steam engines of, say from twenty to thirty horse power, and at least four steam boilers, as the whole system is carried on by steam. The so-called coppers have copper spiral tubes in them, three inches in diameter, and are very expensive.

There must be a proper kiln for burning the limestone used in the process, and the fume from the kiln is utilised in order to cause the lime which has been added to the extract to subside to the bottom. When this has all been deposited, it is thrown out and makes excellent manure. There is also a very considerable quantity of animal charcoal (burnt bones), used to discolour the extract, and make it as pure as clean water. This is used in all sugar houses, even if the sugar is from the canes. It should be made on the premises, and reburned there also. This can be seen at Sandridge, and on a small scale at our brewery in Hobart Town.

I fear I will not ever see or hear of a beet-root sugar manufactory, during my few remaining months or years, in Tasmania.

Make any use you please with this and Mr. Baruchson's letter.

I am, my dear Sir,
Your's truly,
JOHN WALKER.

In the enclosed letter Mr. Baruchson calculates that from £60,000 to £100,000 would be required to establish in England a manufactory and distillery on a scale large enough to ensure success.

Mr. Justin Browne doubted if the beet could compete in these colonies with the cane sugar, and it was to the disadvantage of the former that it was only used in the form of lump, or refined, not as brown sugar.

Mr. Barnard stated that on his visit to New South Wales, he had seen some very good brown sugar from the beet, and had presented a sample to this Museum. He knew that Dr. Coverdale had grown a quantity of the root at the Queen's Asylum, and was now, and in order to produce the sugar, only waiting to be supplied with a machine which was found to work successfully in New South Wales, and the cost of which would be about £50. A friend of his in Sydney who has been engaged in the manufacture, was about to write on the subject, and they would probably hear something of it on the occasion of the approaching great agricultural meeting.

Mr. Stephens thought if the sugar could be manufactured profitably at all, they were in a better position than the New South Wales producer, as his climate was not equal to this for the growth of root crops, and he had

a rival in the cane at his very door. It was to be recollected that they could not hope to have any market for the sugar out of the colony.

Dr. Agnew, considering the risk and uncertainty incidental to the establishment of this industry, requiring, as it appeared to do, such a very large amount of skill, capital, and experience for its successful conduct, thought as it was being tried apparently in a very economical manner, on a small scale, in New South Wales, it would be better to wait and observe the result of that experiment. If it succeeded at all in that colony, no doubt the great superiority of this soil and climate for the growth of root crops, would make its success in Tasmania still greater in a financial point of view.

Mr. Justin Browne observed, as apropos to the present discussion on colonial enterprise, that he had received by last mail a letter from a merchant in Madras, directing his attention to the tenders just issued by that Government for Australian preserved meat for the Indian army, &c. The opening up so vast and profitable an industry as this, both in the Home, and Indian markets, was one of the happiest omens for the future of these colonies.

The proceedings closed with the usual vote of thanks to the donors of presentations.

AUGUST, 1870.

The usual monthly meeting of the Society was held on the evening of Tuesday, the 9th of August, T. Giblin, Esq., in the chair.

Among the members present were Messrs. M. Allport, Justin Browne, G. R. Napier, H. J. Buckland, C. Gould, J. M. Clarke, T. Stephens, S. P. H. Wright, L. R. Castray, Dr. Agnew, Hon. Sec., Rev. H. D. Atkinson, and Dr. E. S. Hall; Dr. H. B. Hinton, of H.M. Bengal Army, was also present as a visitor.

The Hon. Secretary submitted the usual monthly returns, viz:—

1. Visitors to Museum during July, 767.
2. Do. to gardens do., 1152.
3. Plants and seeds received at gardens—From Messrs. Taylor and Sangster, Melbourne, 26 plants. From Mr. C. F. Creswell, 24 packets imported flower seeds.
4. Plants, &c., sent from gardens:—To H. B. Laurie, Esq., Encounter Bay, Adelaide, 100 plants of white mulberry. To Messrs. Todd and Co., Dublin, 10 packets seeds. To Military Barracks, 36 sycamores. To Mr. J. Archer, for Church grounds, Longford, 14 Coniferæ. For grounds of St. Michael's Church, New Norfolk, 54 plants. For Castray Esplanade, 32 pines. For Domain, 120 plants. For Government House grounds, 50 plants.
5. Time of leafing, &c., of a few standard plants in Botanic Gardens.
6. Books and periodicals received.
7. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq. Table and summary for July.
2. Port Arthur, from J. Boyd, Esq. Table for July.
3. Melbourne, from the Government Astronomer, Tables and Notes for May and June.
4. Sydney, from the Government Observatory. Printed table for February, March, and April.
5. New Zealand, from the Government. Abstract tables from various stations for April.

The presentations to the Museum were as follow:—

1. From H. M. Hull, Esq.—Nest of white shafted fantail *(Rhipidura albiscapa.)*
2. From Mr. G. Gulliver, Melbourne—125 specimens of Australian Coleoptera, named.
3. From Captain Robinson, barque Free Trader—A sample of bituminous coal from a new seam at Newcastle, New South Wales.
4. From Mr. Spurling—A specimen of *Chimæra Australis* caught in the Derwent.
5. From Salmon Commissioners—A Salmon Parr from the breeding ponds, River Plenty.
6. From M. Allport, Esq.—Prawns taken from stomachs of Rock Cod *(Gadus sp.)*.

Mr. M. Allport exhibited a young salmon (presentation No. 5), about four years old, from the breeding ponds at the Plenty, which had never been allowed to visit the salt water, as it illustrated a peculiar circumstance in reference to the development of the fish, which was stated in detail at the meeting of the Society three months ago. It was then shown, from the proceedings of the Zoological Society of London for 1868, that some salmon parr were prevented from going to sea at their due time, that they still assumed the silvery scales of the smolt but afterwards lost them, reassuming the parr markings. This change went on for two or more years, the fish becoming during the process sickly, stunted in growth, and finally perishing. The specimen now shown was very like those

figured in the Zoological Society's Transactions, the parr markings were very distinct, and the stunted and misshapen appearance of the fish was unmistakeable.

Presentation No. 6 was interesting, as, according to Mr. Allport's observations, nothing of the kind, as far as numbers were concerned, had ever occurred till last year. Since that time large numbers had been found in the stomachs of rock cod. This was a proof of the existence of great quantities of these prawns in our waters, and a systematic search would probably secure this delicacy for our market. The same might be said as to the large edible crabs, numbers of which were formerly captured on our coasts when the whales were brought on shore for the extraction of the oil. It was to be hoped that fishing as practised at home would be tried here for both these crustaceans.

The SECRETARY called attention to the following publications lately received from London, viz. :—Proceedings of Zoological Society of London, Journal of Linnean Society, Journal of Geological Society, Journal of Royal Asiatic Society, Journal and Proceedings of Royal Geographical Society. Presented by the various societies. Also a complete set of the reports of the Paris Exhibition of 1867, the gift of the Society of Arts, per Dr. Milligan.

The following books, for which the Society subscribes, were also received in the same parcel:—Ray Society's vol. for 1868, "Vegetable Teratology," the Transactions of the Society of Arts for 1868-9, and the report of the British Association for 1868.

The Secretary read the following extracts from a letter he had received by last mail from Dr. Milligan :—

"London, 17th June, 1870.

"By the Ethel, Captain Harmsworth, you will receive a parcel containing a copy of each of the two books lately published on the Aborigines of V. D. Land by Mr. James Bonwick, formerly holding some position on the staff of the education department in Tasmania, and first known to me as an author by his having applied to me for scraps of information, touching topographical peculiarities, and geological conditions in sundry parts of the colony, which he embodied in *school geographies*, which he then brought out. I forget what I said (in a former letter) about the books which I have sent to you, but whatever it was it would scarcely be in their praise, for I consider that a spirit most unfriendly and disingenuous as regards the early colonists pervades the whole production. It is a great pity that he has not related a few of the numberless attempts which were made by the more respectable and intelligent of the early settlers to educate and improve the children of the aborigines, and the absolute failure of success in ninety-nine cases out of every hundred. This would have been *only fair*.

* * * * * * *

"In the same parcel you have three packets of seeds which I have procured for the Royal Society's gardens, from the Secretary of the Royal Horticultural Society here: the several packets are respectively contributions to the flower and kitchen departments of the gardens, and to your arboretum. Besides which I have sent one packet of seed of the plant which yields the well known and valuable fibre of which the grass cloth of China and India is manufactured. Should you succeed in maturing it, and I can perceive no natural bar to your doing so, you will confer a valuable boon on the colony, seeing that there must arise an unlimited demand for such a fabric (as grass cloth) on the continent of Australia, if indeed it does not already exist."

[This plant is now growing in the public gardens, and Mr. Abbott, the Superintendent, states that it is readily propagated from cuttings. It also

grows freely in Queensland, where, however, some difficulty has hitherto been experienced in the separation of the fibre for commercial purposes.]

Dr. Hall brought under the consideration of the meeting the desirability of procuring direct from Japan a quantity of the seeds of the Umbrella Pine, which Fortune, the Botanist, describes as such a magnificent tree for shade and the ornamentation of parks, &c. He says:—"A whole company of soldiers could bivouac under a full grown tree safe from rain and sunshine." The Society obtained some plants from England at great cost some years ago, but only one has survived. Dr. Hall had no doubt the seeds would grow better here even than in England, and stated that Mr. Assistant Commissary General Castray had informed him he could procure them for the Society direct from Japan. Mr. Castray kindly undertook to do so, as it was the wish of the meeting.

Mr. Gould read a paper on "The habits of the large crayfish (*Astacus sp. ?*) of the northern rivers of Tasmania." The principal points adverted to were the local character of its distribution, a comparison with the same of the blackfish, a discussion upon the nature of its food in regard to the supply of the latter regulating the distribution of the species, a comparison with allied forms in the Northern Hemisphere, and a citation of a few other examples of allied, identical, or representative species, found in the two hemispheres, and impressing the conviction that such species had not originated in independent centres, but mutated under equal conditions, concluding with a reference to examples of species, tending to show that Tasmania had been connected with the main land, within a late geological period, even within the term of life of existing species.

Mr. Allport observed, as to the food of this Astacus, that although large quantities of dead wood might be consumed, as noticed by Mr. Gould, he thought some animal food must also be taken.

Mr. Gould, in reply, quite agreed with Mr. Allport in supposing that they ate animal food when they could get it, but this was much seldomer than generally imagined; that in regard to the Unio, which had been supposed to be the staple article of their food, it was his belief that it was entirely absent from many of the rivers inhabited by the Astacus. Neither did he think that the crayfish was by any means so destructive to the blackfish as imagined; they must have great difficulties in capturing them, and the blackfish did not seem to exhibit any of that fear and avoidance of these crustaceans, which would naturally be induced if they had been habitually preyed on by them.

In reply to Mr. Stephens, who wished to know if the crayfish was found in rivers east of the Tamar, Mr. Gould mentioned the Piper and Forrester Rivers, being from his own personal observation well stocked with them.

Mr. T. Giblin stated that he had brought, about four years ago, from the North several living specimens of these crayfish, much larger than that now before the meeting, and had liberated them in the Derwent, about three miles above the falls at New Norfolk, but from that time he had never heard of them, and it was not possible to say with certainty whether they had succeeded or not.

Conversation having taken place as to the range of habitat of some of our fish, Mr. Giblin mentioned that the so-called cucumber fish (*Prototroctes muræna*), of New Norfolk was at one time, and probably still is, plentiful in the Yarra. Mr. Gould observed that the presence of these and other fish in the rivers on opposite sides of Bass's Straits, was another proof that at some former period Tasmania and the Australian mainland had formed one continent.

A vote of thanks to Mr. Gould, Dr. Milligan, the other donors of presentations closed the proceedings.

ON THE LAND SHELLS OF TASMANIA,

By W. Legrand.

When Woodward classed the Terrestrial Mollusks of Tasmania, with those of Australia, south of the tropic, but little was known of them. At the time he wrote the number of described species of Helix was six, two of which have since proved to be identical, and two others doubtfully Tasmanian, thus reducing the number to three.

Since that time much work has been done, the number now described numbering over fifty. Tasmania has a fauna peculiar to herself, more nearly related to that of the Northern Island of New Zealand than Australia. Take the section Videna, Australia proper does not possess a single species, while Tasmania has five, Sinclairi, Hamiltoni, Launcestonensis, dubitans, and a new species lately discovered by Mr. Gould, at the Leven, proposed to be named DuCani (next to Launcestonensis, the largest Helix yet found here.) If the doubtful species bisulcata be admitted, the number is six. New Zealand has two—Dunniæ and Greenwoodi. This is peculiarly an island section, the greater number being from the Solomon's. Our number is nearly equal to those from all other places together.

The nearest we have to the great New Zealand Busbyi (except with Albers we admit Vitrina Milligani, a classification which must have been made from the shell alone, the animal being essentially different) is fulgetrum. A shell found at Ringarooma, named by Brazier, Kingi comes very near. Victoria has one belonging to the same section—Helix atramentaria—which comes between, and is the largest land-shell yet found in that province.

New Zealand has several of the section Conulus. We have one, H. parvissima, Cox, which comes very near that, or such shells as H. alpha and beta, Pfr. Of the sections Discus. Patula and Hyalina, we have about the same proportionate number as New Zealand and Australia, and of the section Hemiplecta we have one, possibly two. This is also an island shell. Like New Zealand, the greater part of our Helices are minute.

Of the section represented by Allporti, Cox, there are six or eight species. For beauty of colouring must be noticed Tasmaniæ, fulgetrum, Juliformis, Nelsonensis, and ruga; for peculiarity of form parvissima may be mentioned; and for beauty of shape Stephensi and Kingstonensis must not be passed by.

One very fine shell (H. Daveyensis), the largest yet found

belonging to the section Discus, coming from Port Davey, deserves particular notice.

Austrinus is more noticeable from its habitat than from the shell itself, which is allied to Allporti. It comes from the extreme south of the island, near South Cape Bay.

We possess three introduced species, Morti, Sydneyensis, and Alexandræ, all from New South Wales, and most probably brought in mould with plants.

Of our two species of Bulimus, the first well known one B. Dufresni, belongs to the same section (Caryodes) as a South Australian species, Angasianus. The second B. (Mesembrinus) Tasmanicus, Pfr., is nearly allied to an Australian species, Kingi. Nothing like either of these has yet been described as from New Zealand. We have no representative of such shells as Shongi. Our two Vitrinas belong to the section Helicarion; one is also found in South Australia, and probably other parts of the continent. The other, the fine V. Milligani, is found only on the western side of the island.

Our one species of Succinea is also common to Australia.

We have neither Pupa, Pupina, or Balea, all found in North and North-eastern Australia, or Truncatella, which is very plentiful in South Australia. Angas gives us credit for a Blanfordia, I never found it or heard of it here; the shell is however so minute that it might easily be passed by.

The materials yet collected are not sufficient to fix the geographical limits of the different species. Subjoined is a list of all yet described species:—

HELIX.		HELIX.		HELIX.	
Launcestonensis	Reeve	austrinus	,,	cœpta	,,
Same shell Sinclari	Pfr.	occultus	,,	positura	,,
Same shell bombycina	,,	ruga	,,	vexanda	,,
bisulcata?	,,	marchianæ	,,	Nelsonensis	Brazier
subangulata?	,,	Stephensi	,,	dispar	,,
Diemensis	Cox	Agnewi	,,	Onslowi	,,
Le Grandi	,,	plexus	,,	neglecta	,,
Hamiltoni	,,	dubitans	,,	Curacoa	,,
Hobarti	,,	vigens	,,	Ricei	,,
lampra	Pfr.	fulgetrum	,,	ammonitoides	,,
lamproides	Cox	Juliformis	,,	rotella	,,
minima	,,	Ramsgatensis	,,	Kingi	,,
similis	,,	Halli	,,	Fordei	,,
Tasmaniæ	,,	Daveyensis	,,	DuCani	Cox
Wellingtonensis	,,	trajectura	,,	*Introduced:—*	
Allporti	,,	tranquilla	,,	Sydneyensis	,,
medianus	,,	mixta	,,	Morti	,,
helice	,,	parvissima	,,	Alexandræ	,,
cœsus	,,	Kingstonensis	,,		

BULIMUS.			VITRINA.			SUCCINEA.			
Dufresni	Leach	Verrauxi		Pfr.	australis				Fer
Tasmanicus	Pfr.	Milligani		,,					
Helix ...	...	...	...	...	...	...	52		
Introduced ...	...	...	...	...	...	...	3		
							—	55	
Bulimus ...	...	...	...	...	...	...		2	
Vitrina ...	...	...	...	...	...	...		2	
Succinea ...	...	...	...	...	...	...		1	
Total ...	...	...	...	...	...	...		60	

ON THE DISTRIBUTION AND HABITS OF THE LARGE FRESH-WATER CRAYFISH *(ASTACUS SP.)* OF THE NORTHERN RIVERS OF TASMANIA.

By C. Gould, F.G.S.

I trust that the members of this Society may be interested in a few remarks, which I have to make upon the distribution and habits of the large fresh-water Crayfish which is so common upon the north side of the island.

I am not aware that this has been specifically described by naturalists, although its unusually large size, abundance in certain localities, estimation as a delicacy for the table, added to its facility of capture and observation should long since have acquired for it that attention at their hands.

Leaving its determination, however, to those within whose province it belongs, it is my purpose, as a field naturalist alone, to offer the result of a few observations, and collate them with other facts connected with the natural history of the island.

And in the first place must be noted the remarkable representative resemblance in most points, excepting size, of this to members of the Genus *Astacus* of the Northern Hemisphere.

Here we have yet one more of the many numerous examples of a certain similarity in point of type, if not of close specific resemblance, obtaining under equivalent conditions between the forms of life at one extremity of the globe, and those existing at the other, while strongly distinctive, but often gradational peculiarities attend the forms controlled by the opposing conditions of the intermediate tropical regions. Hence the difficulty of referring the existence of such representative or affinitive types to independent acts of creation—and the apparently more sustainable solution by the theory of biological metamorphosis.

To instance 1st. The Rats and Mice among mammals; 2nd. Plovers, Eagles, Snipes, Ducks, Owls, and Thrushes amongst birds; 3rd. The Locusts and Painted lady and Admiral Butterfiles amongst insects; 4. The Ferns and Mosses among plants, will be sufficient for my present purpose.

I may next remark upon the limited nature of its distribution, as worthy of more than passing notice; occurring more or less abundantly in all the rivers upon the northern side of the island, and being entirely absent from those upon the south, it follows closely in its distribution that of the Blackfish, with which it is always associated in the rivers falling into Bass' Strait, with the one exception of the Esk, from

which, as far as my knowledge serves me, it is absent—while, on the other hand, the *Astacus* alone is met with in the tributaries of Macquarie Harbour. The range of these two then the *Astacus* and the Blackfish, is nearly the same, neither of them being found within the rivers flowing to the east or south coasts of the island. Yet there is nothing in the habits or the necessities of the *Astacus* which would explain its presence in, or absence from, respective rivers; although preferring deep still pools and reaches, in which it may shelter beneath submerged and partially decaying timber, it is also commonly found in the shallower and swift running portions, and there are few of the streams adverted to from which it is absent, which do not, as far as may be judged from appearance, offer in some portions of their course, the kind of harbour, and if one may use the expression, cruising ground to which the *Astacus* is familiar, while the myrtle shrouded waters of the higher portions of the Huon identically resemble the upper portion of the rivers to the northward, in which both the black fish and the *Astacus* abound.

As to its ordinary food much misapprehension has hitherto, in my opinion prevailed.

The eagerness with which it fastens on any animal bait, the threatening aspect of its general appearance, and the enormous crushing power of the claws with which it is armed, have induced the belief that it mainly exists upon fish which it has captured, or the large species of Unio found in some of the northern rivers, and the absence of the latter from the southern ones, were considered a sufficient explanation of its being wanting also. This, however, appears to me to be erroneous, and from my observation I have concluded that the capture of fish or other animal prey by the *Astacus* is a rarity, and that as in many instances the Unio is entirely absent from the rivers which it inhabits this as a source of its food must be entirely disregarded. Indeed, to my great surprise, I found upon dissecting numerous examples of the *Astacus*, that the contents of the stomach consisted almost entirely of crushed and torn fragments of semi-decayed wood, and I have arrived at the conclusion that the main source of its subsistence are the slowly decaying stems and snags with which the timber bordered rivers are always encumbered.

Now, as the adaptation of the *Astacus* to certain localities in consequence of the presence of especial means of subsistence is untenable, the decaying timber abounding equally in the southern with the northern rivers, it becomes imperative to seek another solution, and we are thus led in considering the reputed identity of the Blackfish of this colony with that abounding in Victoria, the close similarity of the species of

Astacus here with that found on the same continent, the existence here of certain marsupial forms (Thylacinus and Native Devil) and of fossil remains of the same in caves in New South Wales, and in deposits of a late tertiary period, coupled with many resemblances in the vegetation of the two countries, which I hope to develope and comment on fully at some future period—to recognise as a fact that at some late period, so late indeed as to be within the term of existence of an animal species, a direct connection has existed between this island and what may be termed the mainland of Australia, and the examples quoted above, and many others which might be added to them, are but the remains of a fauna and a flora once common to the whole, and that the species of *Astacus* and other forms have probably extended southwards to their present position, and been arrested in their further progress by some physical difficulty which a more extended acquaintance with the geological history of the recent formations may reveal to us.

ROYAL SOCIETY.

SEPTEMBER, 1870.

The monthly evening meeting of the Society was held on Tuesday, September 13th, Morton Allport, Esq., in the chair.

The Secretary, Dr. Agnew, brought under notice the following returns for the past month :—

1. Visitors to Museum, 957.
2. Ditto to Gardens, 1199.
3. Plants and seeds received at, and sent from gardens.
4. Tench supplied.
5. Time of leafing, &c., of a few standard plants in Botanic Gardens.
6. Books and Periodicals received.
7. Presentations to Museum.

Meteorological Returns :—

1. Hobart Town, from Mr. F. Abbott, Esq., table and summary for August.
2. Westbury, from C. Belstead, Esq., ditto, ditto.
3. Sydney, from the Government Observatory, ditto for June.
4. Melbourne, from ditto, ditto, for July.
5. New Zealand, from ditto, ditto for May.

The presentations to the Museum were as follow:—

1. From Mr. Moir, junr., specimen of Alum from a cave near Mr. Moir's house, Brown's River Road.
2. From Mr. C. A. Gresley, 5 Rock specimens from River Mersey.
3. From Mr. Gibbons, chicken with three legs.
4. From J. Forster, Esq., part of Human Skeleton dug up at Hamilton.
5. From Mr. M. Allport, specimen of Schorl from Flinders Island. A lump of resin washed on shore at the same place. [This resin is probably the produce of the Oyster Bay pine, *Callitris Australis.*]
6. From James Scott, Esq., M.H.A., the cast skin of a Snake from Ringarooma.
7. From Captain Lloyd, per Mr. O. H. Hedberg, a shingle of Macquarie Harbour pine, from the gaol at Macquarie Harbour, built in 1826. [This specimen shows in a very striking manner the great durability of the wood. Although it has been exposed to the weather for a period of 44 years it presents no appearance of decay—the saw marks even being plainly visible—and on removing the surface with a knife the wood is seen to be perfectly fresh beneath.]
8. From the Gore Browne Testimonial Committee, two photographs of the testimonial presented by the colonists of Tasmania to Colonel (now Sir Thomas) Gore Browne, C.B., on his retirement from the Government of this Island.
9. From Mr. Philip, Franklin, part of Vertebra of Whale.
10. From Mr. S. H. Wintle, 20 geological specimens from New South Wales and Victoria, collected by himself; with a descriptive catalogue.
11. From Mr. M. Allport, two fish caught in the Derwent, off Sandy Bay. [These fish were unknown to the fishermen who caught them, but closely agree with one figured and described under the name of *Emmelichthys nitidus*, by Dr. Richardson, in the "Zoology of the

Erebus and Terror," page 47, plate 29. This fish was first discovered in Western Australia by Sir G. Grey.]

12. Two fish caught off the South East Coast of Tasmania. [These are also unknown to the fishermen.]

The Secretary requested special attention to the very liberal and valuable presentation of books before the meeting, from the American Government, the Smithsonian, and other scientific institutions in the United States, comprising the following publications :—

Smithsonian Contributions to Knowledge, vol. 15, 1867.
Ditto Reports for 1866-67.
American Patent Office Reports, 1863, vols. 1 and 2.
Ditto ditto, 1864, vols. 1 and 2.
Ditto ditto, 1865, vols. 1, 2, and 3.
Ditto ditto, 1866, vols. 1, 2, and 3.
Department of Agriculture, Washington, Report of, for 1866.
Ditto, ditto, monthly ditto, 1866-67.
Boston Society of Natural History, Memoirs of, vol. 1, part 3.
Ditto, ditto, Proceedings of, vol. 11, 1866-68
Ditto, ditto, Conditions and Doings of, 1866-8.
Portland Society of Natural History, Proceedings of, vol. 1, part 2, 1869.
Ditto, ditto, 6th Annual Report of Secretary of Maine Board of Agriculture, and Reports on Scientific Survey, 1863.
Ditto, ditto, 2nd Annual Report on Natural History and Geology, State of Maine, 1861.
Ditto, ditto,Reports of Commissioners of Fisheries State of Maine, 1867-8.
Essex Institute, Salem, Massachusetts, Proceedings of, vol. 5, Nos. 5 to 8.
Museum of Comparative Zoology, Harvard College, Cambridge, Mass.
Ditto, ditto, Annual Report, 1868.
Ditto, ditto, Bulletin of, Nos. 6 and 7.
Ditto, ditto, Contributions to Fauna of Gulf Stream, by F. de Pourtales, 1867-8.
American Academy of Arts and Sciences, Philadelphia, Proceedings of, Vol. 10, Nos. 78 and 79, 1867-8.
Ditto ditto, " General Connotations of Magnetism," and " Some Remarks on the Fall of Rain as affected by the Moon," by Pliny Earle Chase.
National Academy of Sciences, Washington, Report of, 1866-67.
Cincinnati Astronomical Society, Annual Address.
Ditto ditto, Oration on laying corner stone of Observatory.
Columbia Institution for Deaf and Dumb, 10th Annual Report of.
Public Schools, Washington, 22nd Annual Report.

The Secretary, after reminding the Fellows that at the last meeting of the Society the subject of the Ramie plant *(Bœhmeria Nivea)*, from which the grass cloth of China is manufactured, had been discussed, read the following observations on it by Mr. F. Abbott, the Superintendent of the Gardens :—

" In reference to the China grass, *(Bœhmeria Nivea,)* seeds of which have been forwarded to the Society, through Dr. Milligan, it may be interesting to the Fellows to learn that the plant has already been in the garden 10 or 12 years, but no attempt has yet been made to extend its cultivation.

" It is very doubtful whether the climate of Tasmania will be found suitable for the successful cultivation of this fibre. The plant which is indigenous to China, India, Sumatra, &c., requires a rich porous soil, and warm moist climate ; under these conditions it grows rapidly and affords from two to three cuttings during the season.

" In Queensland, where the plant succeeds well, great difficulty has been experienced in extracting the fibre; this difficulty appears to have been generally experienced, as the English Government, through the Indian Office, are at present offering an award of £5000 for the invention of a machine capable of

extracting the fibre, the cost of separation not to exceed £15 per ton, and the value of the separated fibre to be not less than £50 per ton.

"In China where the plant is extensively cultivated, the fibre is separated by hand, but this mode of separation, a tedious one, is only suited to labor of the cheapest description, and could not be adopted in the colonies.

"I have planted a small bed in the gardens with this plant, with the view of proving how far it is adapted for culture in Tasmania.

"F. ABBOTT, JUN.,
"R. S. Gardens.

"12th September, 1870."

A paper, entitled "Notes of an Excursion to Cummings's Head and the Falls of the Meander, on the Western Mountains, Tasmania," by W. Archer, Esq., F.L.S., was then read by the Secretary.

Special votes of thanks having been accorded to Mr. Archer, and to the Smithsonian and other institutions in America, the meeting closed with the usual thanks to donors of presentations.

OCTOBER, 1870.

The monthly evening meeting of the Fellows was held on Tuesday, the 11th October, His Excellency, C. Du Cane, Esq., President, in the chair. The Hon Mrs. Du Cane and Mr. C. M. S. Chichester, Private Secretary, were also present, together with the following members of the Society: —Dr. Agnew, Messrs. M. Allport, J. W. Graves, L. R.Castray, S.Wright. F. Abbott. J. McC. Browne, F. Abbott, junr., H. Bilton, and Colonel Crawford.

The following gentlemen, who had previously been put in nomination, were after a ballot declared duly elected as members of the Society,viz.:— Mr. P. T. Smith, of Syndal, Ross, and Mr. J. Young, of Howrah, Bellerive.

The Hon. Secretary, Dr. Agnew, laid on the table the following returns for the past month :—

1. Visitors to Museum, 685.
2. Ditto to Gardens, 1906.
3. Seeds received at Society's Gardens.

a. From Dr. Milligan—Collection of seeds of ornamental shrubs and trees, flowers and vegetables ; from the gardens of the Royal Horticultural Society, London. A packet of seed of the China grass fibre plant (*Bœhmeria nivea*), from the Royal Botanic Society's Gardens, London.

b. From Mrs. Woodin—Seeds of Umbrella Pine of Japan (*Sciodopitys verticillata.*)

4. Time of leafing, &c., of a few standard plants in Society's Gardens.
5. Books and periodicals received.
6. Presentations to Museum.

Meteorological Returns.

1. Hobart Town—From F. Abbott, Esq., table &c., for September.
2. Port Arthur—From J. Boyd, Esq., ditto, ditto.
3. Swansea—From Dr. Story, ditto July and August.
4. Westbury—From C. Belstead, Esq., ditto September.
5. Sydney—From the Government Astronomer, ditto for July.
6. New Zealand—From the Government Observer, tables from various stations for June and July ; and from Wellington for August.
7. From Government Astronomer, Melbourne, table for August.

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

1. From Mr. Baynton, Brown's River—A small collection of Land Shells, Crustacea, &c.
2. From Mr. W. Johnston, Trinity Hill—A specimen of the Bronze-winged Cuckoo (*Chrysococcyx lucidus*), from Kangaroo Bottom.
3. From Mr. J. W. Graves—A Sparrow Hawk (*Accipter torquatus*).
4. From Mr. F. Butler—Four specimens of ore from Penguin Creek silver mine.
5. From Rev. J. Hutchison, New Town—A Hermit Crab (*Pagurus sp*).
6. From Captain Williams—A Cuttle fish from the East Coast.
7. From Mr. T. Giblin—Specimen of the paper-like bark of a species of Tea-tree (*Melaleuca sp. ?*), from New South Wales.

[The tree from which this bark was obtained is probably identical with, or closely allied to the swamp Tea-tree (*Melaleuca ericæfolia*), of this colony, in reference to which the following note appears in Hooker's "Flora Tasmaniæ," vol. 1, page 129 :—"Mr. Gunn describes this as one of the commonest inhabitants of the marshes, often forming an impenetrable scrub, most expensive to clear. Trees of it attain 70 feet, and

4-5 feet in girth; one which that naturalist has measured was unbranched for 27 feet, and was 5½ feet in girth at 3 feet above the ground. In poor sandy soil it forms a dwarf bush. Of the bark, he adds, the natives used to make the catamarans, or canoes, so admirably figured in Labillardiérés voyage, which were stitched with the bark of *Sida pulchella* and *Plagianthus sidoides.*"] (Currajong.)

8. From Mr. F. Wise, a Smolt caught with rod and line in the Derwent at New Norfolk.
9. From Dr. J. Milligan, F. L. S., a copy of "The Last of the Tasmanians," and one of "The Daily Life of the Tasmanians," by J. Bonwick, F.R.G.S.

The Secretary read some "Notes on an experiment with the fumes of sulphur, and on other methods for the destruction of rabbits in their burrows," by W. Archer, Esq., F.L.S. The fumes were forced into a burrow by means of bellows, attached to a receptacle in which the sulphur was burned; and that this was effectually done was proved by the escape of sulphurous vapour from the bolt-holes. When the burrow was afterwards opened, however, no trace of the fumes was left, nor were the animals destroyed. The experiment was recorded as a "guide or warning to others who may be induced to try further experiments with the fumes of sulphur, or with any other vapour." (Carbonic acid gas would not become condensed, and it would be fatal to animal life, but its use would probably be much too expensive).

Mr. Abbott read a paper "On the Sun and its Office in the Universe."

Some discussion of a conversational character having taken place,

Mr. M. Allport begged to call the attention of the meeting to the fish presented by Mr. Wise (presentation No. 8), on account of its high scientific importance, as furnishing a complete answer to the theory raised by Dr. Günther in reference to the salmon first sent to England. The Doctor then assumed that the fish sent was hatched from one of the eggs imported from England in 1866. This assumption was met by the statement that the fry unnaturally detained in fresh water had reached a higher state of development than the smolt sent to England, and as the fish now presented was but just assuming the smolt stage, all the arguments used in reference to the smolts first caught apply with tenfold force to this specimen. It was, moreover, fortunate that the Museum possessed one of the fry hatched from the English eggs received per Lincolnshire in 1866, and which died in the spring of 1867. Upon comparing this with the fish now caught, it would be found that they accorded with one another so closely, as to leave little doubt of their identity in species. No report had yet been received from England as to the smolt last sent, though they had heard of its safe arrival. Mr. Allport further observed that Mr. Youl, in writing to Sir Robert Officer, had expressed a wish that the Salmon Commissioners should make it publicly known that after careful examination he entirely concurred with Dr. Günther in the opinion that the specimen first sent to England was a Salmon trout (*Salmo trutta.*)

His Excellency read the following extract from a letter which he had received from F. S. Corrance, Esq., M.P., an experienced salmon fisher in Scotch, Irish, and Norwegian rivers, and who had considerable opportunities of studying the habits of the fish:—"Concerning your salmon experiment doubts will soon cease. For although a few fish would be undiscoverable in deep water, so soon as the spawning season begins they will be evident enough upon the upper fords and shallow waters. The success of the experiment will depend upon the mollusca upon the sea banks, and the absence of formidable enemies outside, more than the capabilities of the rivers themselves. And I take it that the destruction

is so great that a constant and copious artificial supply will be requisite for some time to establish the genus unless under most favorable circumstances. Whether they will rise to fly or not, is once more most uncertain. I believe it to depend entirely upon the habits in that respect acquired by the smolts before they leave fresh water. It is at all events a most interesting experiment." His Excellency stated he would, when replying to Mr. Corrance's letter, request him to examine the specimens of our smolts at the Zoological Society's Museum, London.

Mr. M. Allport remarked that Mr. Corrance's statement, that the fish would be readily detected in the spawning season at the upper fords and shallow waters of the Derwent, was undoubtedly correct, but the fact was, it would be quite impossible, with our pecuniary means, effectually to watch the hundreds of miles frontage in the upper waters of the Derwent and its tributaries. These streams run through great tracts of country uninhabited, and in places almost impassable. It was to be recollected, too, that all expense of this kind would be virtually thrown away, as the result of the experiment must necessarily soon be known in the due course of events.

In order to show how unreasonable it was to argue that the salmon experiment had not succeeded, because no large fish had hitherto been caught, Colonel Crawford read the following extract from the "Reports of the Commissioners of Fisheries of the State of Maine, 1867-8," p. 22: —"In the fall of 1850, I put into the Sandy River Ponds ten or twelve trout. For seven or eight years no indications of them were to be seen, notwithstanding thousands of people crossed those ponds every year. Since 1857, it is judged that not less than 2,000 pounds have been taken out annually."

The usual votes of thanks having been accorded to the authors of papers and to the donors of presentations, His Excellency left the chair.

NOVEMBER, 1870.

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

Among the Fellows present were Colonel Crawford, Dr. Agnew, Messrs. J. Allport, H. J. Buckland, M. Allport, H. Bilton, F. Abbott, jun., J. Roberts, J. W. Graves, L. Susman, L. R. Castray, C. M. Maxwell, A. G. Webster, Justin McC. Browne. Messrs. Curtayne and McFarlane (2) were also present as visitors.

The Secretary laid before the meeting the following returns for the past month, viz.:—

1. Visitors to Museum, 737.
2. Ditto to Gardens, 2232.
3. Time of leafing, flowering, &c., of a few standard plants in Botanic Gardens.
4. Books and periodicals received.
5. Presentations to Museum and Library.

Meteorological Returns:—

1. Hobart Town, from F. Abbott, Esq., table and summary for October.
2. Swansea, from Dr. Story, ditto for September.
3. Port Arthur, from J. Boyd, Esq., ditto for October.
4. Sydney, from Government Observatory, ditto for August.
5. Melbourne, from ditto, ditto for September.

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

1. From Mr. M. Allport.—A Black Snake *(Hoplocephalus curtus)* from near the waterworks reservoir. Length, 4 feet 6 inches. A Fox Shark, or "Thresher" *(Alopias vulpes)* caught in Adventure Bay.
2. From Captain Warren, R.E.—Pair of feet of "Cariboo Deer" of Nova Scotia, a pair of Indian mocassins made from skin of hocks of "Moose Deer" of Nova Scotia. (A note from Captain Warren, which accompanied these specimens, descriptive of the mode of preparing the mocassins, was read.)
3. From Mr. J. Young, Howrah.—A human Skull from Fiji, Jaws of a species of Shark caught in the Derwent. [The fish from which this specimen was obtained is probably identical with the Port Jackson shark (*Cestracion* Cuv.), figured in "Phillips' Voyage to New South Wales," p. 383, and is interesting as being the only known living representative of an extinct species found in the European tertiaries.]
4. From Mr. F. Allison, Sorell.—A pair of Mexican Spurs.
5. From Salmon Commissioners.—A Salmon Trout Smolt, *(Salmo trutta)* from breeding ponds, River Plenty.
6. From Rev. H. D. Atkinson.—Eleven specimens, embracing eight varieties of Echini from Three Hut Point.
7. From Mr. Richard Robertson.—A large bony mass from a horse's jaw which had been previously fractured.
8. From Mr. L. Henn.—Curious growth of Honeysuckle *(Banksia sp.)* sapling.
9. From Mr. W. H. Price, Macquarie Plains.—A Ram's head with four horns.
10. From Mr. T. Herpich, Glenora, Fenton Forest.—An Austrian note, value 1 Gulden (9d. English); two quarters of ditto; five Turkish coins, one ½ Piastre, two ¼ do., two Paras; Austrian three Kreutzers; two Skillings, Hamburg.

11. From Mr. H. M. Hull.—Butterflies from Benalla, Victoria.
12. From Mr. G. Davies.—A chick with four legs.
13. From the Government of Victoria.—Results of Magnetic Survey of Victoria, by Dr. Neumayer, 1 vol., 4to.
14. From Government of United States, per the Smithsonian Institution, Washington, United States Coast Survey for 1863-4 and 5, three vols. 4to, bound.

[The Secretary called attention to the very great value of the presentations so frequently received through the Smithsonian Institution. The books before the meeting were profusely illustrated by valuable maps, and could only have been prepared and published at a very large outlay by the American Government.]

15. From J. Barnard, Esq.—Catalogue of Sydney Intercolonial Exhibition, 1870.
16. From J. Abbott, Esq.—A specimen of Coal with its overlaying shale, from Rookwood, Three Hut Point.

[Accompanying this presentations were several printed and other documents, extending over a period of nine or ten years, in reference to the value of the coal, &c.]

In reply to a query, the Secretary intimated that he had no information as to the thickness of the seam, but he had heard a very favorable opinion given as to the quality of the coal.

Mr. Maxwell suggested that the most practical and satisfactory method of establishing its value would be by having a ton of it sent to the Gas and Steam Companies for the purpose of being tested.

17. From J. J. Butler, Esq., Bagdad.—An English Perch *(Perca fluviatilis)*, aged seven months.

Mr. Allport at the same time exhibited several young perch from a few days to three weeks old, in order to show the enormous rapidity of growth, and consequent value of these fish as an article of food.

The Secretary read a continuation of "Notes on an excursion to Cummings's Head, and the Falls of the Meander," by W. Archer, Esq., F.L.S. Also a paper by the same author, entitled "Notes on the Californian Thistle."

Mr. M. Allport read the following notes on the salmon trout *(Salmo trutta)* at the River Plenty :—"Another, and an important addition has, since our last meeting, been made to the history of the salmon experiment. It will be remembered, that in the winter of 1869, those of the salmon trout *(Salmo trutta)*, which were detained in fresh water, first spawned, and when the eggs hatched, it became a question of great interest, whether the fry would, in due season, exhibit the migratory instincts of their species in the same manner as if the parent fish had spawned after a visit to sea ; and this question became of still greater interest from the doubts entertained by scientific men in England, as to whether the fish detained at the Plenty were really salmon trout at all, some going so far as to assert that they could not be genuine because they had spawned, and that no migratory salmon ever would breed without the previous journey to sea. The Salmon Commissioners, some time since, sent to England specimens of the young fish, hatched from the first eggs laid by the salmon trout, such young fish being then seven months old, at which time they exhibited, in a marked degree, all the characteristics of the par of migratory salmon, and especially the orange-coloured fins, which are looked upon as peculiar to the par of the salmon trout. Had the experiment stopped at the time when those young fish were sent away, many people might have jumped to the conclusion that some mistake had occurred, and that these young fish were really, as Dr. Günther suggested, hybrids and not salmon trout ; but, fortunately,

we have now in the specimen on the table the most convincing proof that these young fish belong to some migratory species of salmon, and we have, therefore, no right to doubt the statement of those who sent the eggs from which the parent fish were produced, and must admit that their progeny are true salmon trout. The specimen before you (presentation No. 5) is a facsimile of some 300 others now in our large pond at the Plenty, all of which have assumed the full smolt dress of brilliant scales, which dress is not only the invariable characteristic of those which migrate seawards, but also the unerring sign that they are ready to depart. Besides the great fact of the final success of the salmon trout, which this specimen abundantly proves, there is another interesting point to which I desire to call attention. Of the two smolts caught in the estuary of the Derwent in the end of October last year (that is at the very same season at which this specimen has been taken from the pond) one was sent to England and pronounced by Dr. Günther to be an abortive salmon trout, the other was kept here, and is now before you. Upon comparing these specimens, you will find that the salmon trout smolt from the pond at the Plenty, though a healthy, well-fed, well-shaped, silvery fish, is not one-fourth of the weight of its abortive brother, and they exhibit other differences which make it difficult to believe that they are identical in species. During the last fortnight the parent salmon trout, unhappily reduced in number to 11, and which first assumed the smolt livery three years ago, have exhibited marked restlessness at their forced detention, swimming round and round their pond, seeking an outlet, and even throwing themselves out of the water at the lower grating in such a determined manner as to render it necessary to increase the height of the guard to prevent their escape."

A list, in course of publication by Mr. Legrand, of 42 new species of Tasmanian land shells, principally discovered by him, was laid on the table for inspection. Accompanying and illustrating the list was a series of lithographs, exquisitely rendered by Mrs. Forde and Miss Scott, of Sydney.

A very beautiful collection of roses, comprising thirty-two named varieties, from the Society's Gardens, was exhibited, and was examined with much interest by the Fellows. Mr. Abbott mentioned that the Gardens now contained about one hundred and fifty varieties of this flower.

After some conversational discussion, the usual vote of thanks having been accorded to the authors of papers and the donors of presentations, the meeting terminated.

NOTES OF AN EXCURSION TO CUMMINGS'S HEAD AND THE FALLS OF THE MEANDER, ON THE WESTERN MOUNTAINS, TASMANIA.

By W. Archer, F.L.S.

Accompanied by a friend and two servants I started on the morning of May 10th, 1848, for an excursion to Cummings's Head, a spur of the Western Mountains near Cheshunt, with the intention of visiting the falls of the Meander River, which I had seen before in the summer, when a mere silvery thread of water was all of them that was visible. We hoped at this season to find a large stream flowing over the dark basaltic rocks of the mountain side. Our provisions consisted of 4lb. of cold meat, 12lb. of bread, 3lb. of rice, 5lb. of sugar, and ¾lb. of tea; and we took with us an opossum-skin rug, a pair of blankets, and a light tent weighing 3¾lb.—besides the usual accompaniments of matches, knives, tomahawk, &c.

At the foot of the mountain we first passed through a gum-tree forest, with a thick underwood of "native hop" or "bitter leaf" (*Daviesia latifolia*), mixed with the "native indigo plant (*Indigofera tinctoria*), the "clover tree" (*Goodia lotifolia*), red and white Epacris (*Epacris impressa*), "prickly beauty" (*Pultenæa juniperina*), the common "fern" (*Pteris aquilina, var. esculenta*), and other less conspicuous plants, all destitute of flowers at this season; and then entered a dense thicket composed for the most part of "musk-wood" (*Eurybia argophylla*), "dog-wood" (*Pomaderris apetala*) "daisy-tree" (*Eurybia lirata*), "stink-wood" (*Zieria lanceolata*), "fern-trees" (*Dicksonia antarctica*), and the common "fern" 6 and 7 feet high—growing beneath gigantic trees of "stringy-bark" (*Eucalyptus robusta*), "white-gum" (*Eucalyptus viminalis*) "blackwood" (*Acacia melanoxylon*), and "silver wattle" (*Acacia dealbata*)—and rendered almost impenetrable by the huge trunks and branches of fallen gum-trees, and a net-work of nettles (*Urtica incisa*), with the rope-stemmed Clematis (*Clematis coriacea*) and Lyonsia (*Lyonsia straminea*), here and there, stinging our hands and faces, or tripping us up as we scrambled and cut our way through the entangled mass of vegetation. To the right of our track were some many-crowned fern-trees (*Dicksonia antarctica*), one with about thirty crowns—a wonder of the vegetable world,—and somewhat further on we came to a white-gum tree of enormous height, towering far above the surrounding forest, and rising to an altitude of some 300 feet, with a trunk about 40 feet in circumference at a height of 4 feet from the ground, tapering

very gradually up to the first branches, fully 150 feet from the base.

At the height of 500 feet from the plain—about 1,400 feet above the level of the sea—plants which grow to a height of 30 feet on the low ground are dwarfed down to shrubs. "Native box" (*Bursaria spinosa*), for example, is here a thorny little shrub a foot to 18 inches high, and the small-leaved Coprosma (*Coprosma microphylla*), is reduced from 12 to 2 feet in height. At an elevation of 2,000 feet above the sea, the character of the vegetation is altered considerably, and the gum-trees lose the straightness and slenderness of their branches, and their now spreading tops approach the ground more closely. The "waratah" (*Telopea truncata*), 3 feet high, and "wax-cluster plant" (*Gaultheria hispida*), 2 feet high, grow here among the rocks; and a little higher up the pretty little Tetracarpæa (*T. Tasmanica*) makes its appearance. Huge masses of rock, detached from the crags above, are now met with, and the shrubs and trees have a somewhat battered and straggling form, until the summit is reached, when they are found to assume a dwarfed and more compact appearance.

On reaching the summit, we rested for awhile from our labours, and ate our dinners, water being found in a little hole which I had previously dug beneath a dripping rock. Before starting again, my friend and I clambered to the very apex of Cummings's Head, where there is a little plateau of a few yards square. From this spot, situated at the brink of a terrific precipice, there is a wondrous view of the country lying to the west, north, and east, including the towns of Deloraine and Westbury in the middle distance, and the northern line of coast as far as the eye could reach to the eastward, and for a considerable distance to the westward, until shut out by Mount Roland and other intervening mountains. Wishing to get the bearings of some of the principal mountain peaks, and especially of Quamby Bluff, rising in solitary grandeur on the east, I placed my compass on one of the rocks of the plateau,—when, to my great surprise, the bearing indicated was due west instead of due east; and it turned out that the local attraction was so great that the points of the compass were all reversed as long as the compass remained in direct contact with the rock. On removing it from the rock, and raising it to the height of three feet above it, I found the bearings restored to their true position. This fact shows how careful explorers should be in availing themselves of commanding points for the purpose of fixing the positions of their camps of rest or observation; or the routes to be taken in order to reach other localities. We now

descended about 400 feet, to a plain lying between the heads or sources of two rivulets, one flowing to the east and entering the Meander, just above Archer's Sugarloaf, and the other flowing to the north-west into Dale Brook, near Gibson's Sugarloaf.

Upon this plain are found the large "mountain ranunculus" (*Ranunculus Gunnianus*), with its bright, varnished yellow flowers, purple underneath, and much-divided leaves, and the curious little "Caltha" (*C. introloba*) both found also on the Victorian Alps by Dr. Mueller,—a little yellow-flowered "Stackhousia" (*S. pulvinaris*), occurring also on the Gipps Land mountains,—a prostrate little Pultenæa (*P. fascicularis*), gathered also on the Cobberas Mounts in Victoria,—the singular little *Liparophyllum Gunnii*, belonging to the Gentian tribe, found nowhere else in the world, small large-flowered plants of the "mountain gentian" (*Gentiana montana*), found also on the mountains of Victoria, New South Wales, and South Australia,—the little *Mitrasacme Archeri*, found nowhere else,—*Euphrasia alpina*, *striata*, and *cuspidata*, the first found on Mount Kosciusko in New South Wales, and on the Cobberas Mountains in Victoria, a most singular little plant—and the last nowhere but on the Western Mountains, Mount Sorell, and Mount La Perouse in Tasmania; besides several other plants peculiar to mountainous localities, and some that are found also on the plains, such as the common "tea-tree" (*Leptospermum lanigerum*) which grows here in thickets to the height of 12 to 15 feet.

We erected our light tent—made of unbleached linen, and enclosing a space of six feet by six feet and a half—and leaving the servants to procure a large supply of dry fire-wood for consumption during the long and cold night, made our way down the valley of the eastern rivulet. After descending about 200 feet to a spot where the rocky sides of the valley rise steeply from each bank of the stream, we came to fine specimens of different species of the largest kinds of "mountain pine"—as I generally call it,—*Athrotaxis cupressoides*, *selaginoides* and *laxifolia*,—and also the "celery-topped pine" *Phyllocladus rhomboidalis*, which occurs also on the Meander near Cheshunt. Here were also many beautiful and rare mosses, clothing or fringing the rocky margins of the brook; here I found a pretty white violet,—found also in New Zealand,—*Viola Cunninghamii;* here, straggling among the rocks, is *Decaspora disticha*, with its little clusters of purplish berries. Having gazed our fill at the rare and noble trees and curious alpine plants around us, and made a collection of botanical specimens, we returned to our tent.

One side of the tent being left open towards the large fire,

we passed a comfortable night, sleeping on a bed of tea-tree branches, with our feet towards the blaze, and only waking when the diminished heat warned some one of us to put on more wood. The coldest part of the night was—to use the words of a well-known song—"2 o'clock in the *morning*," owing partly, I suppose, to the fire having died down at about that hour.

We started very early next morning in a direction nearly due south, in order to skirt a rocky gully, the hidden source of Dale Brook, and then crossed a plain in a south-easterly direction. On our way we passed through a large quantity of the mountain *Bellendena* (*B. montana*), a handsome glaucous-leaved small shrub, with pointed spikes of cream-colored flowers, followed by reddish-brown pods,—an alpine form of that very graceful branched fern, *Gleichenia dicarpa*,—the pretty and rare *Eurybia abcordata*, only found on the Tasmanian mountains, with its wedge-shaped leaves, toothed at the apex, and daisy-like flowers,—the bright "green cushions," bespangled with the disproportionately large berries of the tiny *Pernettya Tasmanica*, a plant of the heath tribe, found only on the mountains of Tasmania,—and the beautiful little *Gaultheria antipoda*, not found anywhere else in Australia, but occurring on lofty mountains of the Middle Island, New Zealand,—the cider-tree (*Eucalyptus Gunnii*),—and many other rare and interesting plants. On the plain just mentioned we found a small group of the cypress-like "mountain pines" (*Athrotaxis cupressoides*), with a ragged and broken-down appearance. Shortly after passing them we began to ascend the western end of the Ironstone Mountain range, and came upon a kind of saddle between the trigonometrical station and "West Bastion Bluff." Here we found that curious little coniferous plant, *Microcachrys tetragona*, lying, here and there, perfectly flat on greenstone rocks, whose surfaces were nearly level with the ground; and then, keeping too much to the left, we passed through or over an underwood of a dwarf pine, about four feet high,—which attains to the height of ten feet in very sheltered situations—called *Diselma Archeri*, with many straggling branches so close to the ground, that if one put one's foot between instead of on them, one's progress became slow and exceedingly laborious. My friend, who did not succeed well in making his way through them, on coming up to me, botanising while waiting for him, requested me particularly to tell him the name of the plant, "in order," as he said, "that he might hate it all his life."

Looking from the top of West Bastion Bluff we saw Lake Lucy Long—a somewhat appropriate name—extending in a

lengthened, narrow sheet of water to the westward, on the plain below. Far away to the south-west the Frenchman's Cap stood up against the horizon, and to the southward lay the Lakes Augusta and Ada, and the other waters of the Nineteen Lagoons. Turning to the left after leaving the saddle, and skirting the upper part of Ironstone Mountain, we proceeded nearly in the direction of the Split Rock trigonometrical station, passing over ground covered with *Astelia alpina*, and soon came to a small lake, which proved to be Lake Meander, the chief source of the Meander River.

Leaving Lake Meander, with its bright and pellucid water, and scrambling down the bed of a rivulet running towards the east, we soon found ourselves at the brink of a vast precipice, over the face of which the water of the rivulet was falling in a long silvery sheet, frayed at the edges into foam and liquid ravellings, and plashing into a nearly circular basin. Before us lay, in grand ruggedness and confusion of huge crags and great bare patches covered with rocks and stones, interspersed with lines and clumps of small trees and straggling shrubs fighting a hard battle of life for bare existence, the immense gorge at the bottom of which the rapid and winding Meander rushes along its sounding course to the plains below. This gorge extends upwards beyond "The Falls" for about a quarter of a mile, and terminates in a short curve where a stream runs under rocks from a pretty, little shallow lake, not far off, which I named "Lake Pediluvium," for a reason which can be as well imagined as described. From the cliff, to the westward of the end of the gorge, The Falls looked like a tiny thread of silver, suspended from the brink of the precipice above, and we could not hear the noise they produced, after our rough scramble down the rocks and through the shrubs at the end of the gorge, until we were within about fifty yards of the pool into which the water tumbled after its gigantic leap.

On viewing The Falls from the front they had the appearance of an unbroken descending line; but, on moving to the right or left, it became evident, at once, that they consisted of two parts separated by the basin which we had seen from the summit of the rocks. When standing close to the foot of the lower fall the effect was very grand, as the broken sheet of bright water, splashing, foaming, hissing, rent into a thousand fragments, then united, fell in a continuous torrent at our feet, just, in a word, as "the water comes down at Lodore."

One of my companions mounted to the summit of the lower fall, close to the basin, which we had seen from above, somewhat of a circular outline, and found it to

be about 100 feet across. From thence he let fall a stone, attached to a ball of twine, until it reached the foot of the lower fall. On measuring the length of this line afterwards I found it to be 150 feet. Judging by this ascertained height, the upper fall must have been fully 200 feet high,—making 350 feet in all.

After refreshing ourselves, and dividing our provisions into equal shares, in readiness for such emergencies as being lost, or being the victim of hungry companions, we started on our way homewards.

A little way above the Meander on the left bank, to which we had crossed immediately after leaving "The Falls," a fine specimen of the mountain pine called *Athrotaxis selaginoides* met our view. It was covered with its small cones just ripe, and afforded a rich harvest to one of my companions, who was on the look-out for such treasures. A little higher up the pretty *Pimelea sericea* occurs, a small shrub, with very pale green leaves, smooth above and covered beneath with long, silky hairs, and bearing (in December) rather large heads of flowers. Passing through a grove of small gum-trees, (?) *Eucalyptus coccifera*, and leaving the eastern bluffs of Ironstone Mountain on the left, we had to scramble across a plateau of great rocks, like those near the summit of Mount Wellington, with deep caverns beneath them into which there was much risk of falling, and then found ourselves on a plain sloping gently towards the river on our right, and dotted with small gum-trees and various shrubs. Here we pitched our tent near a bright little rill, many of which flowed across the plain.

Next morning, pursuing our way northwards, we found a large patch of *Coprosma nitida*, a kind of "native currant,"—as it is absurdly called, merely on account of the colour of its fruit,—thickly covered with its shining, crimson berries. It occurs also on the Bau-Bau Mountains of Victoria. On the plateau of the mountain above us may be found another and much smaller species, (*C. pumila*) which is found on the Bau-Bau and Cobberas Mountains of Victoria. Two much larger species,—*C. hirtella* with much larger berries and leaves, and *C. Billardieri* with berries and leaves smaller,—grow on the lower ground, the latter being very common in some localities. The berries of all the species named have a similar and by no means pleasant flavour.

By the side of a murmuring rivulet which we now crossed, were growing some beautiful plants of *Athrotaxis laxifolia* with its graceful pyramidal form, and delicate branches covered with bright yellowish-green leaves, only long and spreading enough to give the branchlets a somewhat serrated appearance, as they waved in the breeze. The *Athrotaxis* previously mentioned

(*A. selaginoides*), with longer and more spreading, prickly leaves, is more prized in England than this species; but I think this is the more elegant of the two. The third species (*A. cupressoides*) is a much more sombre tree, with smaller and blunter leaves closely appressed to the branchlets. All the species are, I believe, peculiar to Tasmania.

Among the many shrubs through which we now walked and, sometimes, struggled, may be mentioned *Persoonia Gunnii*, with its olive-shaped leaves and black sloe-like fruit,—*Orites revoluta*, *Decaspora thymifolia*, *Tetracarpæa Tasmanica*, *Eurybia pinifolia*, with its pungent leaves,—*Ozothamnus Hookeri*, and *Bœckia Gunniana*. Above us, at a height of about 400 feet, was the summit of the mountain, to which we clambered by a sinuous course over the loose stones, taking care not to move until we were all proceeding in the same direction, in order to avoid rolling down the stones on each other. Arrived at the tolerably level ground above, covered here and there with flat rocks, or with great stones among the smaller shrubs and grass, we could see Cummings's Head to the northward, while the Ironstone Range, with its trigonometrical station and its "Bastion Bluffs," lay to the south-west, behind our left shoulder.

"The cider-tree" (*Eucalyptus Gunnii*) was plentiful on the stony rises, and various alpine shrubs grew beneath its shade, or on the open ground. *Sprengelia montana* and *Cystanthe sprengelioides*,—both of the *Epacris* tribe, the latter closely resembling *Sprengelia incarnata*, but with the peculiar calyptrate flowers of the genus *Cystanthe*,—are found here. Here are the "green cushions," already mentioned, so well-known to mountain excursionists, at first sight appearing to be composed of one plant only, but proving, on examination, to combine four or five; for instance, *Scleroleima Forsteroides* and *Pterygopappus Lawrencii*, both plants of the Composite Tribe,—*Coprosma pumila*, of the Madder Tribe,—*Pernettya Tasmanica*, of the Heath Tribe, and *Oreobolus Pumilio*, a cyperaceous plant, are all found densely packed together in a green, rounded mass, dotted here and there with the drupes of the *Coprosma*, and the berries of the *Pernettya*, or powdered lightly with the tiny flowers of the various plants composing it. The little *Rubus Gunnianus*, of the Rose Tribe, with cream-coloured, bramble-like flowers, followed by blackberry-like fruit of good flavour, occurs in dry sandy spots; the common burr (*Acæna Sanguisorbæ*), of the same tribe, exhibits its patches of pretty green, wrinkled leaves, smaller and more wrinkled than those of the variety on the low ground; *Eurybia persoonioides* and *E. alpina* of the Composite or Daisy-flowered Tribe,—thrown together into one species by Bentham, but differing in some

important particulars,—are seen, often close together, with their leaves, dark green and glossy above, and covered with densely-packed hairs beneath,—the flower-heads (daisy-like flowers so-called) of the former being several together on long slender stalks, while the latter bears single, larger heads of flowers, on short, stout stalks; *Boronia rhomboidea* and *B. pilosa*, with their pretty, pinkish, four-petalled flowers, and leaves smelling like Rue; the little Mountain Sundew (*Drosera Arcturi*), found also in Australia, New Zealand, Europe, Africa, &c., with its largish, white flower,—and the tiny *Claytonia australasica*, of the Purslane Tribe, found also in New Zealand and America,—*Nertera depressa*, a very small plant of the Madder Tribe, found in Victoria on the Bau-Bau Mountains, and on the banks of the Snowy River,—*Liparophyllum Gunnii*, a little plant of the Gentian Tribe, which occurs in Europe, &c.,—*Ourisia integrifolia*, of the Foxglove Tribe, a small plant, found likewise in New Zealand,—the little Bladder-wort (*Utricularia lateriflora*),—and some other small plants are to be found in wet places; *Cryptandra alpina*, of the Buckthorn Tribe,—the curious little *Stackhousia pulvinaris*, with its stamens, abnormally, of nearly equal height,—the handsome great mountain Daisy (*Celmisia longifolia*), the large mountain Bachelor's Button (*Craspedia monocephala*),—a variety of *C. Richea*, found also in south-eastern Australia,—*Craspedia alpina*, found on Mount Buller in Victoria,—*Raoulia eatipes*, of the Daisy-flowered Tribe, in whitish tufts,—the mountain *Gnaphalium* (*G. collinum*, variety *monocephalune,*)—the minute *Mitrasacme Archeri*, the singular little *Pimelea pygmœa*, the remarkable little Rib-grass (*Plantago Archeri,*) with its minute flowers and its leaves closely appressed to the ground, and hairy on both surfaces,—all these occur, here and there, with numerous other plants, over the area between Cummings's Head and Ironstone Mountain. There is also the extraordinary little Eyebright (*Euphrasia cuspidata*), together with two other herbs of the same genus (*C. alpina* and *C. striata*)—to be found on the little plain below the summit of Cummings's Hd. to the southward. We noticed also, between and among the rocky rises farther back, plants of *Diselma Archeri*, and *Microcachrys tetragona*, together with *Podocarpus alpina*,—all belonging to the *Coniferous* or Pine Tribe.

We returned to the summit of Cummings's Head, passing through a wood of dwarfed Beeches, called Myrtle Trees, (*Fagus Cunninghamii*), a little after noon; and having eat n our dinner and refreshed ourselves with bush-tea, and enjoyed again the extensive view over the low country lying to the westward, northward, and eastward, we descended the mountain, and thus terminated a pleasant and most interesting excursion.

THE SUN AND ITS OFFICE IN THE UNIVERSE.

Read at a meeting of the Royal Society, Tasmania.

By F. Abbott, F.R.A.S., &c.

The sun, to us, is not only the largest apparent star in the universe, but also the most brilliant, and that which exercises over the earth the most dominant influences. It is from him that all the energies developed on the surface of the earth incessantly flow, and are continually and successfully carried on by the two hundred and thirty millionth part of the force radiated, which is all the earth is able to receive of the sun's rays. From him also, at epochs immensely distant from us, the planets have been thrown out successively, at first in the form of nebulous rings—agglomerations of matter which have in the end become condensed, and now form the planets of our system.

Compared with the mass of the earth, the mass of the sun is only about 355,000 times as great although its volume is 1,400,000 times larger, which indicates a less density. The matter of which the sun is composed is found to weigh but little more, volume for volume, than a quarter of that of which our own globe is formed. To express the weight of the sun in tons, by figures, would be useless—the number ranks among those which express nothing to the mind.

The light and heat received by our earth from the sun being taken as unity, the planet Mercury would be 6.673, and the planet Neptune, 0.001. Mercury is, therefore, lighted and heated nearly seven times as much as the earth; and the light and heat of the sun have an intensity 6673 times greater on the planet Mercury than at the surface of Neptune, where the apparent diameter of the solar disc is only 1min. 4sec. To compare and know correctly the calorific and luminous intensity of the sun at the surface of the different planets of our system, we must be acquainted with the nature of their atmospheres, and in what proportion the waves of light and heat are absorbed, in passing through those gaseous envelopes. Mercury, for instance, may have an atmosphere so dense that the soil does not receive more of the sun's influence than the soil of the earth.

It was in August, 1612, that Galileo wrote, in the second of his three celebrated letters, concerning the spots on the sun. "For the time to come," he says, "there will remain to physicists a field for speculations about the substance and manner of production of such vast masses as are the solar-spots, concerning which problem I would not venture to affirm

anything." It is now more than two centuries and a half since Galileo discovered the solar-spots, and astronomers and physicists have speculated, and still speculate much to explain the phenomenon.

If the body of the sun be observed with a powerful telescope, the eye being properly protected, the enlarged image of the disc will usually appear more or less sprinkled with sun-spots —moveable belongings to the surface of the sun—which spots greatly help the study of the physical constitution of our luminary. The number of these spots follows a certain periodicity, which helps to establish a most interesting correlation between sun-spots and terrestrial magnetism.

When the sun-spots are observed with care during several consecutive days, they are found to vary both in form and position, amidst which variations there is one common and progressive movement in the same direction, from which has been deduced the rotation of the solar globe round an axis passing through its centre. This movement takes place from west to east, and fourteen days is the time during which a spot remains visible, and fourteen days is also the period which elapses between the diasppearance of a spot at the western border, and its re-appearance on the eastern. A point situated on the solar equator travels with a velocity of 4,560 miles an hour, or about $1\frac{1}{4}$ miles per second.

Sun-spots consist generally of one or more dark portions called *umbræ*, which appear black in comparison with the luminous parts of the sun's disc; around this dark portion is a grey tint, furrowed with dark striæ, this forms the penumbra. The spots are frequently composed of several umbra, inclosed in one penumbra, and sometimes the penumbra is not provided with umbræ. The penumbra frequently reproduces the principal contours of the umbra, and often presents a great variety of shades when examined with high powers.

The dimensions of the spots are variable, and are sometimes enormous; Schroter measured one which he found equivalent to sixteen times the surface embraced by a great circle of the earth, equal to four times the entire superficies of our globe, or more than 29,000 miles. Sir William Herschel, in 1779, measured a spot consisting of two parts, the diameter of which was not less than 50,000 miles. In August, 1839, Capt. Davies measured a sun-spot 186,000 miles in its greatest length.

According to Sir W. Herschel the surface of the sun is made up of "corrugations." Mr. Nasmyth describes the surface as having the appearance of "willow-leaves." Mr. Daws asserts that these interstices differ greatly in form and size—some-

times resembling an ill-shaped arrow-head, at others an irregular trapezium with rounded corners, and that they vary so much in these particulars as to defy every attempt to describe them.

To try and explain the phenomena, in such a manner that they can be connected with the sun's physical constitution, has been the employment of astronomers since the time of Alexander Wilson in 1774, and the results arrived at are such as to satisfy nearly all the conditions required :—

1st. There is a dark central mass.

2nd. There is a luminous stratum, or photosphere, enclosing the former.

3rd. There is a vaporous envelope in which the two are enshrouded, and which constitutes the real atmosphere of the sun.

4th. Is an outer chromosphere, lying on the surface of the luminous photosphere, enshrouding the whole, and through which the solar-spots, of various magnitudes, can all be seen during their formation.

Solar-spots are cavities, or openings of enormous size in the photosphere, and are caused by a down-rush or in-rush of outer vapour into the photosphere—or general plane of condensation for gaseous matter in the sun—which forms a cavity from 20,000 to 40,000 miles deep. On the 29th of August last I counted 42 of these spots, in three groups, on the surface of the sun while taking a transit, and about the same period there were brilliant displays of Aurora on three consecutive nights. On the 21st September I counted upwards of 70 sun-spots, the whole of which were immersed in the penumbra, and on the same evening appeared a strong Aurora. Sun-spots are now at a maximum, and Aurora displays frequent.

On the 26th of September, in company with Mr. Roblin, I counted 43 sun-spots and penumbra, and there were auroral displays on the 23rd, 24th, and 25th; the 26th was cloudy.

The truth of Galileo's opinion that the solar-spots have some relation to the planets has been verified, first by Schwabe of Dessau, and after by Lamont at Monaco, who individually found that the maximum and minimum of solar-spots, and of the variation of the magnetic needle had each a period of about ten years.

Contemporaneously with Lamont, General Sabine—who together with Hanstein investigated terrestrial magnetism—from observations made at two opposite parts of the globe (Toronto and Hobart Town), accomplished for the perturbation of the magnetic declination, what Lamont had done for the variations was intensity, and proved that a like period of about ten years was found for both inclination and intensity.

This period, observed in all the magnetic elements, precisely corresponded with that discovered by Schwabe for the number of solar-spots.

This isochronous periodicity has been further proved by M. Gautier, of Geneva, and M. Wolfs, of Zurich, each unacquainted with the other's researches, and ignorant of the observations of Sabine, Hanstein, &c.

Since these discoveries have been made, other relations of a different kind have been found to exist between the solar-spots and the position of other planets in the system; not only the number or magnitude of the spots, but their position also is in part dependent on the places of the planets in space. The belief that the earth is a great magnet is of very ancient date, and the same power may be conceded to the other planets as being governed by the same laws. This was the opinion of Euler, Tobias Mayer, and Hanstein; next came Gaus, whose system of terrestrial magnetism was what Newton's theory was to the solar system, as the law of magnetic force varies in inverse ratio of the square of the distance—just as is the case with universal attraction. The result of M. Gaus' investigations was a close agreement between theory and experiment.

There is, however, another phenomenon recognised in the Aurora, which is found to be produced by electro-magnetism, and is connected with the spots on the sun, their maxima and minima corresponding in every case.

It will be remembered by many members of the Society that on the 14th March, 1860, I had the honour to read, in connection with Colonel Broughton, R.E., a paper on "Atmospheric Electricity." At that time solar-spots were at a maximum, and there were some very beautiful displays of Aurora Australis. In the paper referred to I ventured on the following theory, viz., that the rapid rotation of the earth on its axis engendered a large amount of terrestrial magnetism at the poles, which becoming connected with atmospheric electricity, produced the beautiful corruscations which were then seen. My observations were sent home by Dr. Milligan, and forwarded to Professor Loomis, whose investigation of these and other records of the same nature enabled him to trace a period of about ten years for the maximum of sun-spots, of terrestrial magnetism, and of auroral displays.

Soon after that paper reached London I received a complimentary letter from a scientific meteorologist, who agreed with everything it contained except the theory of the production of the Aurora. Since that time, however, and only lately (December, 1869), Mr. Balfour Stewart, Director of Kew Observatory, read a paper before the Royal Astronomical

Society, on the auroral displays, between which and terrestrial magnetism he traced a connection.

This, as a theory, however, has been known since the time of Halley, who suggested that the phenomenon might be due to the passage of magnetism, from one magnetic pole to the other.

Although electro-magnetic power is so strongly developed in the universe, science has not as yet discovered the office it holds, or the part it plays in the movements so well known to be influenced by it. The dynamical theory, according to Faraday and Professor William Thompson, rests on no physical hypothesis whatever, but on the fact that *forces* emanate from the poles of magnets in certain directions, which are called *lines of force*, and occupy a magnetic field. If any body is plunged within this magnetic field, it disturbs or modifies these lines of force according to its nature. If magnetic it concentrates the lines, or draws them towards itself; if diamagnetic it causes them to diverge—thus originating attractive movements for magnetic bodies, and repulsive ones for those that are diamagnetic.

These two forces when applied to the sun, in the same way that we apply the term "gravity," are each capable of producing the same necessary consequences, both varying according to the inverse square of the distance, a property belonging to the law of nature, and which law is capable of being expressed by other terms better known to possess forces than the one in present use. The law of universal gravitation has this inestimable advantage—it may be reduced to calculation, and by a comparison of the results with observation, gives a certain method of verifying the existence of some such force.

To use the words of Laplace, and follow this motion from the departure of a planet on its perihelion passage, "the velocity is then at its maximum, and its tendency to recede from the sun surpassing its gravity towards it, the planet's radius vector augments and forms an obtuse angle with the direction of its motion. The force of gravity towards the sun, decomposed according to this direction, continually diminishes the velocity of the planet till it arrives at its aphelion. At this point its velocity is at a minimum, and its tendency to recede from the sun being less than its gravity towards it, the planet will approach it, describing the second part of its ellipse. In this part the gravity towards the sun increases its velocity in the same manner as it before decreased it, and the planet will arrive at its perihelion again with its primitive velocity and re-commence a new revolution as before. It is

highly probable that this law extends from one planet to another, and to every distance from the sun."

To my mind this explanation of a planet's revolution round the sun requires the knowledge to be conveyed by some better term, without relying on the prestige of a name. From the various results obtained by analysis of the solar spectrum may be found the different forces produced by electro-magnetism, so abundantly provided for in the immense magnitude of, and power derived from, the sun.

Of late years a much closer relationship between the sun and the earth than was formerly supposed, has been proved by means of the Spectroscope; and we may consider that there is a still closer analogy between our own and other planets, so that as electric currents exist on the surface of the earth, similar currents exist on the surface of the other planets and of the sun. Venus, when in a crescent form, often appears to be covered with a phosphorescent light in the dark part, which indicates the presence of Auroras at the poles of that planet.

The sun is known to have a mean density equal to that of water, but not everywhere homogeneous or uniformly distributed. The radiation, therefore, to which the sun is subjected must greatly disturb the distribution of caloric, and develope a large amount of electricity, which is a perennial source of heat and light. "This heating force," says Professor Donatti, "which the sun produces through infinite space, when it comes to be confined in the bowels of the earth, is changed into that force which the magnet obeys; in this manner all motions are produced, whence arises heat, then electricity, magnetism, and light, which when combined form universal attraction, and eventually gravitation."

In solar chemistry, it is concluded with certainty, that in the sun's atmosphere, at a distance from us of 91,328,600 miles, the burning heat is produced by substances, the following of which have been found, viz.,—calcium, barium, magnesium, iron, chromium, nickel, copper, zinc, strontium, cadmium, cobalt, manganese, aluminium, titanium, and hydrogen. The lines of all these substances have their dark representatives in the sunlight, and are so characteristic and distinct as to leave no doubt of their presence. Many metals still remain undiscovered in the spectrum of the sun. There is exhibited in London a chromo-lithograph, which contains five hundred of Fraunhofer's dark solar lines, which, in all probability, have a representative in both the stellar and solar spectrum. In the former, especially in southern climes, where the atmosphere is clear, the stars are not all white; here and there may be seen, in beauteous contrast, richly coloured

gems, red, orange, yellow, blue, green, purple, &c.; many of which are double stars exhibiting beautiful phenomena of complementary colours—yellow and purple, pale green and blue, orange and sea-green, yellow and sapphire blue, &c., &c. Coloured stars are also seen, with a good telescope, in small clusters invisible to the naked eye, such as ξ Crux, the area occupied by this object is about one-forty-eighth part of a square degree, and when viewed through an instrument of sufficient aperture, the object is extremely beautiful, giving the effect of a rich piece of fancy jewellery. Another such cluster in the same neighbourhood, about half a degree from η Argus, the constituent stars of which are equally brilliant and beautiful, is entered in the Cape observations as a neat cluster, but the colours are not named. These stars, either single, double, or in groups, are amongst the most beautiful objects to be seen with the telescope in either hemisphere, and when we consider that the colours of these stars are all produced by the same substances which we are so familiar with in the earth, we are taught that our knowledge of the universe does not depend only on the power of large telescopes, but that the human intellect may become familiar with things which the human eye cannot see.

It is known from various reasons that the stars are all suns, more or less chemically composed like our own sun; many of them are variable, some are known to have disappeared, and have not been seen since. Others, which before were invisible, have appeared, and remained visible since. About two years ago, there appeared a star of the ninth magnitude in the Northern Crown that all at once put on an unusual degree of brightness, and shone equal to a star of the second magnitude. The light of this star was examined by spectrum analysis, from which it was found to have been suddenly enveloped by flames of burning hydrogen. When the hydrogen was all consumed, the photosphere became less luminous, and the star returned to its former state.

The question which concerns us is, whether our sun is likely to undergo such a sudden change. The most recent observations show us that masses of hydrogen gas, in combustion, rise from the sun's photosphere many thousand miles in vertical height, and constitute the red prominences seen in total eclipses. If such should be the case with our sun—which the prolonged stability of our system does not justify us in believing —two opposite effects might naturally ensue. Either the cause which produces the gaseous evolution may gradually diminish so as to lessen the heat radiation; or this cause may augment and increase the power of the central fire: but in either case it is not certain that life would

become extinct, although the altered conditions might gradually give rise to a new Fauna and Flora. We may then console ourselves without indulging in such flights of imagination as those so fitly pourtrayed by Lord Byron in his poem "Darkness":—

> "I had a dream, which was not all a dream.
> The bright sun was extinguished, and the stars
> Did wander darkling in eternal space,
> Rayless and pathless, and the icy earth
> Swung blind and blackening in the moonless air.
> Morn came and went—and came, and brought no day."

In concluding this brief paper I will mention a subject with which the Society is acquainted. Mr. Le Sueur, who had charge of the large Melbourne telescope, in his report to the Royal Society, London,—and contained in the President's address—makes the following statement relative to the star and Nebula η Argus:—"The Nebula around η Argus," says Mr. Le Sueur, "has changed largely in shape since Sir J. Herschel observed it; I believe the Nebula lies nearer to us than the fixed stars seen in the same field." Mr. Le Sueur also states his belief that the star η shines with the light of burning hydrogen, and thinks that the star has consumed the nebulous matter near it.

Without endorsing this opinion of Mr. Le Sueur, it is something to know that the fluctuations in the star η and its Nebula have another authority, notwithstanding there is pending a correspondence on several questions set forth on the altered features of η Argus with a view to obtain a solution, and a closer agreement between the drawings made at Hobart Town, and those made at the Cape of Good Hope, and in India; which, under the circumstances I believe to be impossible, as no two very dissimilar instruments will show nebulous matter alike—to detect small fluctuations will require patient watching over a length of time, with one and the same instrument (a standard) similar to the 18-inch reflector used at the Cape of Good Hope by Sir J. Herschel.

NOTES ON "THE CALIFORNIAN THISTLE."

By W. Archer, F.L.S.

The genus *Carduus*, as established by Linnæus, consists of what are called "True Thistles," with a hairy pappus or calyx; "Plume Thistles," with a feathery pappus or calyx.

Bentham, in his "Hand-book of the British Flora," follows Linnæus; but some botanists class the "True thistles" under the genus '*Carduus*,' and the "Plume thistles" under the genus *Cnicus* or *Cirsium*.

The "Milk Thistle" (*Carduus Marianus*) represents the "true thistles" in Tasmania, and the *Carduus lanceolatus*, or "Spear Thistle" (*Cnicus lanceolatus*, of "The British Flora," by Hooker and Arnott), the Plume Thistles. The "Spear Thistle" of England is what is called in Tasmania "The Scotch Thistle;" but it is not by any means peculiar to Scotland. (The Scotch heraldic thistle is the *Onopordon acanthium*, which is a native of central Europe and of Asia, but certainly not a native of Scotland, according to Bentham.) The "Spear Thistle" (*Carduus* or *Cnicus lanceolatus*) has a biennial root-stock, which sends up for two years, (after which it dies), annual stems, winged and prickly, with broadish, pinnatifid, prickly-lobed leaves, and large, egg-shaped flower-heads, enveloped in involucral, spreading bracts, with stiff, largish prickles. The "Creeping Thistle" (*Carduus* or *Cnicus arvensis*) has a perennial and creeping root-stock, which sends up, perpetually, annual stems, with rather narrow, pinnatifid, very prickly-lobed leaves, and dicœcious flower-heads (*i.e.*, the males on one plant and the females on another),—the male flower-heads nearly globular, and the female flower-heads egg-shaped, enveloped in involucral, appressed bracts, with small prickles.

Both the Spear Thistle and the Creeping Thistle are found abundantly in Europe and Asia. The Spear Thistle is, of course, the more easily destroyed of the two. The Creeping Thistle seems to be quite ineradicable.

The Creeping Thistle is mentioned by Professor Johnston as being called in the United States of America the "Canadian Thistle,"—probably because it travelled thither from Canada; and so, I suppose, the same thistle is called here the "Californian Thistle" because it has come to us from California. It is nevertheless the "Creeping Thistle" of Great Britain,—and it never quits a country into which it has been introduced.

METEOROLOGY FOR JANUARY, 1870.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·032	29·999	71	50	115·0	46·5	NW SE SW	1·04	
2	29·971	29·829	70	51	117·0	48·5	NW SE	1·30	
3	29·657	29·320	86	58	122·5	56·0	NW E NW	1·04	
4	29·570	29·460	83	50	108·0	47·5	SW	8·33	1·71
5	29·665	29·650	70	51	116·0	51·0	NW	1·04	
6	29·657	29·617	69	54	113·0	51·0	SW W NW	3·12	
7	29·837	29·710	67	47	107·5	44·5	NW SW	3·64	
8	29·433	29·317	68	48	110·0	46·5	NE W	10·41	
9	29·665	29·583	66	48	103·0	47·0	NW W SE	1·56	0·06
10	29·684	29·504	76	49	106·0	43·5	NW SE NW	1·30	0·02
11	29·769	29·617	73	55	116·0	52·0	NW SE W	1·04	
12	29·671	29·464	99	55	75·5	54·0	NW SE	·26	0·29
13	29·540	29·483	62	51	67·0	49·0	S SE	·52	1·53
14	29·954	29·842	64	48	108·0	46·0	SE SW	1·30	0·14
15	30·094	30·070	63	48	110·0	45·0	SW SE	1·04	
16	30·107	29·935	68	46	108·5	43·0	NE SE	1·30	
17	29·826	29·795	69	55	114·0	52·5	SE	1·04	
18	29·535	29·240	82	58	122·0	55·0	NW	26·56	
19	29·765	29·575	78	53	106·0	47·0	NW SW NW	7·80	
20	29·977	29·800	69	55	112·5	50·0	NW SW W	1·04	
21	30·090	30·049	76	45	112·0	42·5	NW SE	1·30	
22	30·076	29·891	77	53	120·0	49·0	NW SE	1·04	
23	29·810	29·683	99	58	138·0	54·5	NW W	1·04	
24	29·852	29·817	78	61	99·0	59·5	SE	1·04	
25	29·663	29·604	69	60	90·0	59·0	E SE	·52	0·74
26	29·874	29·684	67	49	109·5	46·5	S W SW	1·04	0·05
27	29·842	29·715	66	46	101·0	44·0	NW	·78	
28	29·870	29·736	67	54	95·0	49·0	SW SE	·78	
29	29·926	29·779	78	54	119·5	51·5	NW W	5·99	0·03
30	29·879	29·871	75	53	86·0	46·0	NW	3·38	
31	30·101	30·091	66	46	108·0	44·5	NW SE	1·04	
Monthly mean 29·758			62	62	107·60	49·08	Total Force ..	92·63	4·57

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

1st.—First apricot (royal) gathered.
8th.—Grevilea robusta in full flower.
9th.—Jargonelle pear ripe.
12th.—Mulberries commencing to ripen.
14th.—Veronica angustifolia in full flower.

Barometer mean, 29·758 in., being 0·031 in. above the average.
Temperature mean, 62·62°, being 0·22° below the ditto.
Solar intensity mean, 107·60°, being 2·04° below the ditto.
Dew point mean, 49·0°, being 1·55° below the ditto.
Humidity of air mean, ·64, being ·03 per cent. below the ditto.
Elastic force of vapour mean, ·361, being ·012 per cent. below the ditto.
Total amount of rain, 4·57in., being 3·21in. above the ditto.
Increase of spontaneous evaporation on rain fall, 0·23in.
Mean amount of ozone, 5·85, being 1·02 of chromatic scale below ditto.
Electricity active on the 1st, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 14th, 17th, 19th, 20th, 21st, and 29th.
Hot wind on the 3rd, followed by thunder, lightning, and rain. Hot wind on the 18th.

FRANCIS ABBOTT.

METEOROLOGY FOR FEBRUARY, 1870.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·121	29·936	82	55	121·0	54·5	NW SW SE	·78	
2	20·849	29·807	77	59	118·0	58·0	NW SE	6·25	
3	29·830	29·752	73	60	112·0	59·0	E SE E	1·04	
4	30·239	30·213	68	46	106·0	43·5	SW SE	1·04	
5	30·197	29·909	82	49	116·0	47·0	NW NE SE	1·04	
6	29·941	29·865	74	50	61·1	55·0	SE	2·82	0·03
7	30·178	30·158	65	43	105·0	40·5	NW SE	1·04	
8	30·142	30·057	70	47	110·0	45·0	NW SE	1·30	
9	30·076	30·063	65	54	89·0	50·5	NW SE	·78	
10	30·063	29·955	63	55	72·0	54·0	NW NE NW	·78	
11	29·706	29·421	82	54	120·0	52·5	NW W	10·68	
12	29·726	29·697	72	54	103·5	53·0	NW	5·72	
13	29·821	29·805	75	58	110·0	55·5	NW	1·30	
14	30·032	29·924	77	47	110·0	45·5	NW SE	1·04	
15	29·768	29·570	89	52	129·0	51·5	NW SE	1·30	
16	29·902	29·763	81	54	111·0	53·5	SE SW SE	·52	
17	29·975	29·883	68	43	108·5	39·0	NW SE	1·30	
18	29·684	29·548	81	49	114·0	47·5	NW E	1·56	
19	29·772	29·617	74	56	115·0	54·0	NW W	6·25	
20	29·917	29·821	76	52	113·0	49·0	NW SE	1·30	
21	29·879	29·520	92	54	130·5	48·0	NW	·52	
22	29·735	29·606	87	57	91·0	57·5	NW	1·30	
23	29·735	29·606	69	49	113·0	47·5	N SW NW	1·04	0·01
24	30·092	29·874	76	45	110·0	42·0	NW SE	1·30	
25	29·824	29·771	71	52	108·5	48·0	SW NW	·78	0·03
26	30·233	30·045	59	43	95·0	41·0	W SW	5·66	0·24
27	30·500	30·438	60	45	103·0	42·0	SE	1·30	0·04
28	30·455	30·361	69	42	106·0	39·0	NW SE	1·36	
Monthly mean 29·928			63	45	107·36	45·46	Total Force ..	60·88	0·35

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

1st—Kerry pippin apple commencing to ripen.
2nd—Windsor pear ditto ditto.
4th—Bon chretien pear ditto ditto.
6th—Greengage plum ditto ditto.
15th—Common ash commencing to shed seed.
18th—Common Sycamore ditto ditto.

Barometer mean, 29·928 in., being 0·097 in. above the average.
Temperature mean, 63·45°, being 1·57° above the ditto.
Solar intensity mean, 107·36°, being 0·51° below the ditto.
Dew point mean, 48·2°, being 2·35° below the ditto.
Humidity of air mean, ·62, being ·08 per cent. below the ditto.
Elastic force of vapour mean, ·355, being ·019 per cent. below the ditto.
Total amount of rain, 0·35in., being 1·34in. above the ditto.
Increase of spontaneous evaporation on rain fall, 4·97in.
Mean amount of ozone, 6·37, being 0·64 of chromatic scale below ditto.
Electricity active on the 4th, 8th, 11th, 12th, 13th, 14th, 16th, 17th, 18th, 20th, 21st, 23rd, 25th, and 28th.
Strong Aurora Australis with frequent erratic meteors on the 1st. Wind strong from N.W. and S.E. during the month.

FRANCIS ABBOTT.

REMARKS ON OBSERVATORY RECORDS, WITH HEALTH REPORT FOR JANUARY AND FEBRUARY, 1870, AND A COMPARISON OF THE VITAL STATISTICS OF 1869, WITH THOSE OF PREVIOUS YEARS. BY DR. E. SWARBRECK HALL.

The only striking variations from the usual January weather to be seen in the table are—First, the deficiency of ozone, the amount being much below the January average, and less than for any of the previous twelve years recorded; second: Windforce was much above the average with a great predominance from that point of the compass, N.W., most adverse to health; third: though the temperature mean was not in excess, the extreme range in the month was greatly so; fourth: Rainfall was most advantageously above the average, only one January in the twenty-nine years recorded having a greater fall, *i.e.*, 1849, with the small superiority of four-hundreths of an inch. On the other hand humidity mean was considerably below the average. The electrical condition of the atmosphere recorded shows nothing inimical to health, the positive indications as well as the tension, being an usually fair proportion of the whole. The Hobarton district deaths this month, so far recorded, 64, are 15 above the average of the previous 13 years, 23 more than 1869 had, and considerably higher than any year since 1860, when 72 deaths occurred. 1858, the highest of the 13, having had the maximum 74, and 1864 the minimum 24. This excessive mortality was not owing to the prevalence of any epidemic disease, and it fell heaviest on adults and very aged persons. Of the 64 deaths, 19 only were under one year old, while 1860 had 28, and 1858 had 32. From 1 to 5 years old the present January had only 3 deaths, while 1860 had 7, but 1858 had 10. From 5 to 20 years old the deaths were 3, while 1860 had 7, but 1858 3 only also. From 20 and all ages above the deaths were 33, while 1860 had only 30, and 1858 only 29. Above 60 years old January, 1870, had 17 deaths, 1860 only 9, 1858 only 8. December, 1869, however, had 6 deaths less than the December average, while December, 1859, had 17 more than the average, and December, 1857, 3 more.

The Hobarton Registration District had the smallest number of deaths, for the whole year of 1869, than any of the previous twelve, the number being only 472, while the average of the previous 12 is 568, and the least in the number, 492 in 1865. This is without reference to the increase annually of the population by excess of births over deaths. For the whole of Tasmania, too, the registered deaths, 1335, were the fewest in proportion to population, being 129 less than 1868 had, and 107 less than the average of the previous twelve years. 1869 was entirely free from epidemic diseases. Estimating the population of all Tasmania at 100,000, the death rate would be about 13½ per 1000 per annum. The death rate of England and Wales is about 22 per 1000, and the Registrar-General of England considers 17 per 1000 a nominal death rate. So favourable a condition of health cannot be expected to continue long in Tasmania, seeing how wide-spread is the neglect of vaccination and other hygienic measures, which most civilised communities elsewhere are so energetically enforcing. The homely adage, "a stitch in time may save nine," is particularly applicable to Tasmania.

The deaths in February, registered up to the 6th March inclusive, were 48, being 6 6-13ths below the February average of the previous thirteen years.

METEOROLOGY FOR MARCH, 1870.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·394	30·195	76	45	116·0	41·5	NW SE	1·28	
2	30·023	29·897	79	52	120·0	49·0	NW SE	1·28	
3	29·829	29·775	79	50	117·0	47·0	NW SE	1·28	
4	29·868	29·787	73	56	110·0	55·5	NW	1·60	
5	30·124	29·982	69	49	106·0	44·0	SW	5·72	
6	29·992	29·863	65	48	106·0	41·5	W NW	8·33	
7	30·245	30·160	66	46	105·0	44·0	NW SW SE	1·04	
8	30·380	30·344	67	40	106·0	37·0	NW SE	1·04	
9	30·317	30·184	67	43	102·0	40·0	NW SE	1·04	
10	30·184	30·124	64	56	71·5	55·5	SW SE	·78	
11	30·437	30·181	61	51	81·0	48·5	SW SE	·52	0·07
12	30·335	30·308	60	52	70·0	51·0	NW E	·52	
13	30·363	30·311	65	51	104·0	49·5	NW SE	1·04	0·04
14	30·344	30·259	73	47	115·0	44·5	NE SE	1·30	
15	30·239	30·185	72	46	112·5	41·5	NW SE	1·04	
16	30·225	30·198	72	54	108·5	50·5	NW SE	·73	
17	30·230	30·171	83	53	120·0	50·5	NW SE	10·4	
18	30·200	30·008	81	54	117·0	51·5	NW	·78	
19	29·963	29·902	76	50	74·0	52·5	NW	·26	0·75
20	30·222	30·142	75	50	94·0	49·0	SE	3·33	
21	30·293	30·267	62	51	104·0	46·5	SE	1·30	0·03
22	30·239	30·013	69	47	106·0	44·0	NW SE	1·04	
23	30·280	30·175	62	53	64·0	54·0	SE	1·30	0·03
24	30·278	30·211	64	53	97·0	50·0	NW NE	·78	
25	30·206	30·017	76	49	115·5	47·0	NW NE NW	·26	
26	29·857	29·839	80	60	115·5	47·	NW SE	·78	0·02
27	30·300	30·230	67	49	104·0	48·5	SW SE	3·64	
28	30·403	30·335	69	41	106·0	39·0	NW E	1·04	
29	30·380	30·322	74	46	108·5	40·0	NW N SE	1·56	
30	30·317	30·310	69	49	110·0	43·5	NW SE	1·04	
31	30·349	30·324	63	54	92·0	50·5	SW SE	·52	
Monthly mean 30·177			60·71		102·52	46·81	Total Force ..	47·33	0·94

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

5th—Tips of hornbeam commencing to turn brown.
10th—Coe's golden drop plum ripe.
10th—Seckle pear ditto
12th—Tips of elm turning yellow.
16th—Horsechestnuts leaves turning brown
18th—Common ash leaves commencing to fall.
20th—Oak leaves ditto. Acorns ripe.

Barometer mean, 30·177 in., being 0·322 in. above the average.
Temperature mean, 60·71°, being 0·95° above the ditto.
Solar intensity mean, 102·52°, being 0·77° below the ditto.
Dew point mean, 49·8°, being 0·58° above the ditto.
Humidity of air mean, ·68, being ·03 per cent. below the ditto.
Elastic force of vapour mean, ·360, being ·004 per cent. above the ditto.
Total amount of rain, 0·94in., being 0·73in. below the ditto.
Increase of spontaneous evaporation on rain fall, 3·48in.
Mean amount of ozone, 6·87, being 0·14 of chromatic scale below the ditto.
Electricity active on the 2nd, 5th, 6th, 7th, 8th, 11th, 13th, 20th, 22nd, 27th, 28th, 29th.
Thunder, lightning, and rain on 20th.
A rich display of Aurora on the 22nd.
Aurora and Southern lights frequent.

FRANCIS ABBOTT.

ANALYSIS OF OBSERVATORY RECORDS, WITH HEALTH REPORT FOR MARCH. BY DR. E. SWARBRECK HALL.

More enjoyable weather than existed during this month could scarcely be possible. Sunny, with moderate temperature, abundant and gentle ozone-laden sea breezes, almost cloudless clear skies, with only one day of smart rain and five others with sprinkling showers, formed altogether such genial weather, that it well deserved the epithet of "heavenly" which our numerous visitors from the Australian Continent and other less favoured climates so rapturously affixed to it. Nevertheless most of the atmospherical phenomenon varied greatly from the mean character of the month, as exhibited by the Meteorological Records of the previous twenty-nine years.

Barometrical pressure mean exceeded the 25 years adopted standard average by + ·322 of an inch. Only once before in the previous 29 years had any month of the twelve a higher mean, *i.e.*, July, 1860, with 30·193 against 30·177 of the present month. High barometrical pressure in Tasmania is usually accompanied with a high death-rate, unless when counteracted by other more favourable atmospheric influences, as it was in the present month. Moreover, the extreme range of the pressure for the whole month was only ·662 of an inch, being less than ever before recorded for March, while the minimum 29·775 was far the highest ever before registered. Only seven times during the month did the range from noon to noon exceed a quarter of an inch, the highest being a rise of + ·433 on the 27th, which has been exceeded seven times out of the previous nine years. The maximum record 30·437 on the 11th has been exceeded six times in the previous 29 years.

The *Wind-force* total, 47·33 lbs. was — 5·76 lbs. below the average for this equinoctial month, but the falling off was entirely in winds from the points of the compass (northerly) least favourable to health. Gentle health-bearing sea breezes (southerly) prevailed to an unusual extent; 5 out of the 93 records being winds from south-east and south-west, and with one strong west wind, having more than two-thirds of the total force, with only the one day referred to on which the pressure to the square foot amounted to 5·21 lbs. There were only 18 *calms* registered being — 10·22 less than the March average.

Mean Temperature, 60·71 degrees, was less than one degree + 00·95) above the March average. The extremes of the self-registering maximum and minimum thermometers were respectively only 83 and 40, which have been exceeded –in the one above, and in the other below—frequently. The highest maximum for March being 99 in 1861, and the lowest minimum 38 in 1853, 1855, 1856. The *daily range*, however, was slightly (+ 1·02) above the March average, and with high atmospheric pressure and cold dry winds caused some cases of inflammation of the air passages, catarrh, bronchitis, pneumonia and croup, and had a fatal effect on long standing cases of pulmonary consumption.

The mean of *Solar Intensity*, notwithstanding the great prevalence of sunshine and the very small average of cloudy days was slightly (— ·77) below the average; and the extreme record 120 degrees on 2nd and 17th has frequently been much exceeded in former years.

Terrestrial-radiation mean 46·81 degrees, was — 1·34 below the average.

Elastic force of Vapour, 360, was + 4 above average, ranging from 217 to 534, and therefore adverse to health.

Humidity mean, 68, was only — 3 below the average, notwithstanding the dry sunny days and small rain-fall, but then the night dews were heavy.

Rainfall, ·94 of an inch was ·73 less than the average, ·75 of it fell on one day, the 19th, with heavier thunder and more brilliant lightningt han has been experienced for a long time in Hobart Town. This down-pour had the effect of cleansing the gutters, sewers, and drains of the city, which wanted it badly. February and March of this year conjointly have had less rainfall than any February and March upon record.

Spontaneous Evaporation, 4·42, was not much in excess above the averages.

Cloud mean, 4·32, was — 1·10 less than the 25 years' average, only two years in the previous 29 years had a smaller mean.

Ozone mean, 6·87, was only ·26 below the average of the previous twelve years, no year since 1862 having had so small a mean. With such a small

rain-fall a much greater depression might have been expected, but fortunately for the public health sea breezes made amends for it.

Electricity was never absent at any of the recording hours, but negative greatly predominated.

The *Deaths* during the month were 47, being — 7 11-13ths less than the average of the previous 13 years. Only March, 1869, had a smaller number (42) and the maximum was 73 in 1864. Males were 26, females 21. Nine only were under one year old, 3 only between 1 and 5. Four were between 5 and 20. From 20 to 60 there were 14 deaths only, but from 60 to 93 there were 16. At the *Cascades* Prison and Invalid Station 8 deaths took place, aged from 40 to 79; at the *Brickfields* Invalid Station, only one, aged 93. At the *Hospital* there were 11 deaths, including two *Inquest* cases. *Consumption* caused 6 deaths, three being natives of Tasmania. No disease prevailed epidemically, but a youth of 18 died from Typhoid or Pythogenic fever, but more impressively designated "*filth-fever*" by the best sanitarians. From time to time deaths from this preventible disease are occurring in Hobart Town, and will continue to increase as the population becomes more aggregated, seeing how the excreta of the inhabitants are allowed to decompose in the middle of our habitations, and how insufficient is the system (if it deserves such an appellation at all) of sewerage. Formerly Typhoid Fever prevailed largely at the Queen's Asylum, at New Town, notwithstanding its incomparable site, sanitorily considered, but then the cloacæ were within the buildings, and their contents were removed by drains which passed beneath the buildings; now the cloacæ are away from the buildings, and their contents are removed almost daily. The dry earth conservancy would be a still greater improvement. Hobart Town, with its privy cesspools saturating the surface soil, and with its drainage channels in many places converted into receptacles for human excreta and other decomposing refuse, so valuable for manure, will ultimately become a perennial hot-bed for those zymotic diseases which prove such a drawback on the health of the towns and cities of the United Kingdom. Yet a more advantageous site for sanitary purposes, in one of the naturally healthiest climates in the world, few cities can boast of.

METEOROLOGY FOR APRIL, 1870.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·264	30·150	76	47	120·0	44·0	NW SW	·52	
2	30·211	30·183	69	49	106·0	47·0	NW SE	·52	
3	30·278	30·248	75	54	109·0	46·5	W SE	·52	
4	30·278	30·253	71	50	108·0	46·0	NW SE	1·04	
5	30·411	30·386	69	54	107·5	53·5	SW SE	1·04	
6	30·317	30·069	77	54	108·5	51·5	NW	·52	
7	30·010	29·939	78	59	109·0	57·0	NW	·78	
8	29·965	29·927	72	54	64·5	58·0	SE	·26	0·56
9	30·102	30·090	58	49	66·0	47·0	S N NW	·78	
10	29·829	29·673	71	53	107·0	50·0	NW SE	·52	0·50
11	29·918	29·724	67	54	105·0	53·5	NW	1·30	0·02
12	29·992	29·868	64	47	81·0	44·5	NW	1·04	
13	29·866	29·646	62	53	69·0	53·0	NW SE	·26	0·25
14	30·033	29·994	59	52	61·5	51·5	SE	0·	0·03
15	30·176	30·129	59	53	84·0	51·5	SE	·78	0·16
16	30·132	29·920	61	52	64·0	52·0	SE	·26	1·45
17	29·818	29·700	69	59	72·0	59·0	SE NE	·26	0·15
18	29·826	29·771	62	55	65·0	55·0	NW SE	0·	0·94
19	29·990	29·937	54	42	56·5	42·5	SE S	1·30	
20	30·060	29·998	57	46	64·0	41·0	SW SE	1·04	
21	30·136	30·087	64	45	99·0	41·5	NW SE	1·04	
22	30·061	29·830	57	43	66·0	37·5	NW NE	0·	
23	29·632	29·585	62	48	101·0	43·5	NW SE S	·52	0·02
24	29·895	29·580	56	47	94·5	42·5	SW	3·38	
25	30·300	30·216	54	40	90·0	34·5	NW SW SE	1·04	0·01
26	30·397	30·386	54	50	59 0	44·0	SW SE	·26	
27	30·371	30·305	59	49	89·0	46·5	SW SE NE	0·	0·02
28	30·247	30·126	59	45	90·0	42·5	NW SE	0·	
29	29·940	29·868	67	49	101·0	46.5	NW SE	·26	
30	30·164	30·060	59	49	72·0	44·0	SE SW	1·30	0·14
Monthly mean 30·045			57·21		86·13	47·57	Total Force ..	21·32	4·25

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

10th—Leaves of Elm (Ulmus campestris) commencing to fall.

15th—Chinese Chrysanthemum commencing to flower.

20th—Seeds of Hornbeam (Carpinus betulus) ripe; leaves of Mountain Ash commencing to fall.

25th—Ditto of Black Mulberry ditto ditto.

Barometer mean, 30·045 in., being 0·154 in. above the average.
Temperature mean, 57·21°, being 2·18° above the ditto.
Solar intensity mean, 86·13°, being 5·68° below the ditto.
Dew point mean, 49·3°, being 2·19° above the ditto.
Humidity of air mean, ·81, being ·05 per cent. above the ditto.
Elastic force of vapour mean, ·374, being ·149 per cent. below the ditto.
Total amount of rain, 4·25in., being 2·47in. above the ditto.
Increase of spontaneous evaporation on rain fall, 1·06in.
Mean amount of ozone, 7·01, being 0·02 of chromatic scale above the ditto.
A feeble amount of atmospheric electricity all through the month.
The apex of Mount Wellington covered with snow on the 23rd.
A great number of calms registered, and a small amount of wind force.

FRANCIS ABBOTT.

ANALYSIS OF OBSERVATORY RECORDS, AND HEALTH REPORT FOR APRIL. BY DR. E. SWARBRECK HALL.

In most respects the climatic character of this month has deviated widely from the normal standard, though on the whole most favorable to health and life.

Barometrical pressure mean, 30·045 was + ·154 above the mean for April. Only three times in the previous 29 Aprils has this high mean been exceeded, and that by very little. Altogether in the 30 years, the mean has only reached 30·000 and upwards eight times. At the same time the extreme range for this month was only ·826 of an inch; the extremes being 30·411 maximum on the 5th, and on the 23rd, minimum 29·585. Equable high pressure was, therefore, the character of the barometrical records. Such phenomena are generally associated with an epidemic constitution of the air, but at this time such a tendency was checked by a copious rainfall, and the unusual predominance of sea breezes.

Wind-force had only a total of 21·32 lbs., being 25·36 lbs. below the April mean. Fifty-five out of the 90 records, were winds from the southerly points of the compass, with about two-thirds of the total force. South-east winds, the healthiest point, were 40 in number, being 23 above the April average, and with an aggregate force four times greater than usual. North-west, the least healthy point, was about the average in number, but much below it in force. Calms were 37, being 7 above the average.

Mean Temperature, both by the three daily observations and the maxima and minima self-registering thermometers, accorded more closely than usual; the former being 57·21 degrees, the latter 57·02. The mean is + 2·18 above the average for April. The *daily range*, 13·97 degrees, however, was — 3·25 less than the 25 years' average. Only two years in the previous 29 had a smaller daily range; i.e., 1854 with 11·00 degrees, 1852 with 12·60. The extremes also were not great, maximum being 78 at mid-day on the 7th, minimum, 40 in the night of the 25th.

Solar Intensity mean 86·13 was — 5·68 degrees below the average, owing to the very cloudy and wet character of the month.

Terrestrial Radiation, on the other hand, was + 4·50 above the mean, being 47·57 degrees.

Elastic-force of Vapour ranged from 207 to 633, with a mean of 374, which is + 49 above the average, and would have been inimical to health, but for humidity and rain-fall.

Humidity mean, 81, was + 5 above the average.

Rain-fall 4·25 inches was + 2·47 above the April average, and fell in such a way as to be most beneficial to health and vegetation; copious enough to cleanse the sewers, water courses, &c., yet not not so heavy as to cause floods. and commencing so gently as to saturate the soil gradually. The number of wet days, 13, were only slightly (+ 1·18) above the average. Only two Aprils in the previous 29 years had a greater rain-fall, 1856 with 5·01 inches, 1852 with 4·99 inches, 1860 with 2·86 inches, was the next highest. Notwithstanding the dry character of February and March, the fall of rain on the aggregate of the first four months of this year exceeds the average by + 3·61 inches. *Snow* existed on Mount Wellington on the 22rd and 24th.

Spontaneous-evaporation, with so little sunshine and winds, and so much rain and clouds, was much less than rain-fall, *i.e.*, 3·19 inches.

Cloud mean, 7·13, was + 1·39 above the average, contrasting remarkably with the previous month of March.

Ozone mean, 7·01, barely exceeded the average, notwithstanding the heavy rainfall and frequent sea-breezes. The gentle character of the latter accounts for this.

Electricity of a positive character was very small, and nils very numerous.

There were only 34 deaths, being nearly — 10 less than the April average of the previous 13 years. Seven (7) of these were under 1 year old; two (2) from one to five, none from that to twenty-two, but between that and sixty, sixteen (16), the rest (9) were from sixty-eight to eighty-five years old. A girl aged twenty-two died from *Typhoid-fever*, and there was only one other death in the Zymotic class, a child aged three months, from *Diarrhœa*. *Consumption* caused four deaths, none of them born in Tasmania. *Scarlet-fever* of a mild type was pretty general, but without a death. *Cutaneous diseases* were very prevalent, a result no doubt of the previous long-continued dry weather.

METEOROLOGY FOR MAY, 1870.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·339	30·300	55	27	85·5	34·5	NW NE SW	·52	
2	30·310	30·286	62	37	96·0	33·0	NW SW	·78	
3	30·386	30·356	63	37	96·0	34·0	NW E	·52	
4	30·286	30·029	60	43	81·0	36·5	NW	·78	
5	29·855	29·729	58	46	62·5	45·5	NW SW	·52	
6	29·792	29·779	58	46	88·5	43·0	SW NW	·78	0·05
7	29·810	29·715	67	48	95·5	44·0	NW	1·04	0·03
8	30·015	29·948	62	45	93·0	41·0	SW	1·30	0·03
9	30·107	30·089	64	40	92·5	33·0	W NW	1·04	
10	30·161	30·150	71	45	99·0	43·5	NW W	1·04	
11	30·266	30·230	68	37	94·0	36·0	NW SE	·26	
12	30·255	30·180	67	40	94·5	37·5	NW E SE	·26	
13	30·053	29·890	53	41	53·5	37·0	NW	0·	0·02
14	29·651	29·538	59	42	87·0	40·5	NW SE	·52	
15	29·559	29·540	64	46	91·0	36·5	NW	·78	
16	29·655	29·638	60	46	76·5	41·5	NW SW	·52	
17	30·070	29·958	54	43	54·0	38·0	SE	1·30	0·39
18	30·391	30·310	57	43	86·0	37·0	SW E SE	·78	0·03
19	30·360	30·311	51	40	62·5	39·0	NW SW	·26	
20	30·309	30·291	51	45	54·0	40 0	NW SW	0·	
21	30·319	30·269	57	45	86·0	34·0	NW SW	·52	
22	30·260	30·232	64	41	95·0	39·0	NW SE	·52	
23	30·211	30·102	64	42	95·5	38·5	W NW E	·52	
24	29·956	29·874	70	43	89·0	39·0	S NW SW	·52	
25	29·653	29·477	63	44	89·0	43·0	NW	1·30	
26	29·595	29·521	63	49	83·0	46·0	NW	5·47	0·02
27	29·926	29·778	63	47	87·0	42·0	NW	1·30	
28	30·448	30·360	67	42	91·0	36·5	SW NW	1·04	
29	30·529	30·460	65	36	89·0	35·0	NW SW	·78	
30	30·321	30·162	56	38	84·5	36·5	NW	·78	
31	30·109	29·946	62	42	79·0	40·5	NW	1·04	0·2
Monthly mean 30·054			51·63		83·95	38·74	Total Force ..	27·05	0·59

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

10th—First Medlar ripe.
21st—Coronilla Glauca commencing to flower.
25th—Photinia serrulata ditto ditto.
28th—Diosma alba ditto ditto
30th—Spiræa prunifolia ditto ditto ; Alianthus sericeus ditto ditto.

Barometer mean, 30·054 in., being 00·207 in. above the average.
Temperature mean, 51·63°, being 1·35° above the ditto.
Solar intensity mean, 83·95°, being 2·08° above the ditto.
Dew point mean, 42·08°, being 1·76° below the ditto.
Humidity of air mean, ·74, being ·02 per cent. below the ditto.
Elastic force of vapour mean, ·291, being ·011 per cent. below the ditto.
Total amount of rain, 0·59in., being 1·22in. below the ditto.
Increase of spontaneous evaporation on rain fall, 1·22in.
Mean amount of ozone, 6·08, being 0·72 of chromatic scale below the ditto.
Electricity active on the 8th, 9th, 10th, 17th, 27th, 28th, and 29th.
A light fall of snow on Mount Wellington on the 8th, the apex covered with ditto on 17th, which was not totally absent till the end of the month.

FRANCIS ABBOTT

ANALYSIS OF OBSERVATORY RECORDS, AND HEALTH REPORT FOR MAY, WITH NOTE ON CENSUS OF 1870. BY DR. E. SWARBRECK HALL.

Most of the meteorological phenomena of this month deviate from the 25 years adopted standard, and though diseases of the respiratory organs prevailed extensively, the effect on the mortuary returns was but slight, the total mortality of the month being somewhat below the average of the previous 13 years, and no May of the previous six years having so small a number of deaths as the present month.

Atmospheric pressure mean, 30·054, was considerably (+ ·207) above the average, and had a wide range, with some very sudden and extensive rises and falls, within 24 hours, which told heavily on aged and enfeebled persons.

Wind-force 27·05 lbs., was — 10·80 lbs. below the May average, and north-west winds constituted nearly two-thirds of the numerical records, and more than two-thirds of the total strength.

Temperature mean. 51·63 degrees, was + 1·35 above the average, the extremes being 71 and 36.

Daily range of Temperature 18·45 degrees, was + 3·29 above the average.

Solar-intensity mean, 83·95 degrees, was + 2·08 above the average, the maximum being 99 degrees.

Terrestrial-radiation mean, 38·74 degrees, was 0·57 below the average, the minimum being 33 degrees.

Elastic force of Vapour mean, ·291, was — ·11 below the average.

Humidity mean, 74, was only — 2 below the average, though the rainfall was so small.

Rainfall, ·59 of an inch, was — 1·22 below the average, or about two-thirds less than the May mean, and the number of days on which it fell, was little more than one-half the usual rate.

Spontaneous-evaporation, 1·81 inches, was only equal to the usual rainfall for May, which of course resulted from the slight wind-force.

Cloud mean, 5.99, was + ·49 above the average.

Ozone mean, 6·08, was ·72 below the average, the natural result of the small rainfall and small force of the winds, and their predominance from the north-west quarter.

Electricity was noted "nil" only at three records. Negative greatly preponderated in frequency and strength.

Snow appeared on Mount Wellington several times during the month, but soon disappeared.

The *Deaths* amounted to 37, being — 3 7-13ths below the average of the previous 13 Mays. At and under one year old the deaths were six. From one to five there were three deaths. One of these, a child aged 4½ years, died from *traumatic tetanus*, resulting from a wound in the hand. From five to twenty there were only two deaths. From twenty to sixty the deaths were ten. At sixty and above, to ninety, there were sixteen deaths, a very large proportion indeed of the total mortality. No one disease influenced the mortality unduly, the cases being principally of a long standing chronic character.

The *Population* of the Hobarton Registration District, which includes, with the city, the Electoral Districts of Queenborough and Glenorchy, has undergone little numerical alteration on the totals between the census of 1861 and 1870. In the former the total was 24,773, in the latter 25,004. But in the constituent elements of age there has been a striking change. In 1861 all under 20 years of age amounted to 10,960 ; in 1870 the amount is 13,025. From 20 to 60 in 1861 there were 12,592. in the present year only 10,154. At 60 and all ages above there were in 1861 only 1221 ; in 1870 there were 1825. From 15 to 30, too, there has been a large increase of females, and a large decrease of males.

METEOROLOGY FOR JUNE, 1870.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	29·942	29·937	58	46	60·0	43·5	SW SE	0·	0·17
2	30·034	29·992	54	38	77·0	37·0	NW	·52	0·04
3	29·974	29·575	62	36	86·0	33·5	NW	1·56	
4	29·430	29·326	55	42	82·5	37·0	NW W	3·64	0·32
5	29·733	29·661	55	41	61·0	38·5	NW	3·12	0·06
6	30·107	30·053	60	35	84·0	30·5	NW	·52	
7	29·800	29·621	62	46	79·5	41·0	NW	1·04	
8	29·740	29·687	62	44	86·0	38·0	NW	3·64	0·02
9	29·456	29·314	53	40	81·0	37·0	SW W	7·81	0·15
10	29·430	29·338	48	40	52·5	33·5	W SE SW	10·68	5·47
11	29·853	29·650	53	42	84·0	36·0	SW	13·62	0·34
12	30·119	30·090	64	42	90.0	36·0	NW W	·52	
13	30·106	29·952	58	45	82·5	35·5	NW NE NW	4·72	0·22
14	30·369	30·349	51	43	60·0	35·0	NW SE	·26	
15	30·500	30·458	52	31	76·5	30·5	NW	·78	
16	30·500	30·360	47	31	71·0	29·0	NW	·52	
17	30·271	30·150	63	39	84·0	32·5	E NW SE	·26	
18	20·842	29·692	65	48	76·5	41·0	SE NW	·52	0·36
19	29·814	29·752	63	40	87·0	34·0	NW NE SW	·26	
20	29·882	29·865	63	40	86·0	39·5	NW	·26	
21	29·969	29·903	57	39	59·5	37·5	NW	·52	
22	29·842	29·804	55	37	82·0	34·5	NW NE	·52	
23	29·987	29·832	63	36	83·5	34·0	NW	·52	
24	29·464	29·216	51	45	58·0	38·0	NW	·52	0·03
25	29·493	29·332	55	44	72·0	37·5	NW	1·56	
26	29·738	29·642	67	48	92·0	48·0	W SE NE	3·12	
27	29·700	29·477	66	45	87·0	41·0	NW	·52	
28	29·351	29·160	57	42	50·0	40·0	NW SW SE	5·47	
29	29·503	29·370	51	42	73·0	37·0	NW	·78	0·12
30	29·620	29·348	51	44	74·5	39·0	NW	·52	0·02
Monthly mean 29·789			48·59		76·02	36·83	Total Force ..	68·18	2·32

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

15th.—Early Narcissus commencing to flower.
18th.—Maclaura Aurantiaca leaves falling.
19th.—Common Privet ditto.
20th.—Snow Flake commencing to flower.
24th.—Pyrus Japonica ditto ditto.
30th.—Black Mulberry leaves all shed.

Barometer mean, 29·789 in., being 0·092 in. below the average.
Temperature mean, 48·59°, being 1·84° above the ditto.
Solar intensity mean, 76·02°, being 1·08° above the ditto.
Dew point mean, 41·7°, being 0·46° above the ditto.
Humidity of air mean, ·78, being ·06 per cent. below the ditto.
Elastic force of vapour mean, ·265, being ·004 per cent. below the ditto.
Total amount of rain, 2·32in., being 0·49in. above the ditto.
Increase of spontaneous evaporation on rain fall, 0·79in.
Mean amount of ozone, 6·77, being 0·27 of chromatic scale above ditto.
Electricity active on the 8th, 9th, 25th, 26th, and 27th.
Mount Wellington covered with snow on the 4th, which continued through the month with frequent fresh deposits.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF JUNE, 1870. BY DR. E. SWARBRECK HALL.

"The general character of the month was not propitious to life, and the deaths of adults, and particularly old people above 60 years old, were unusually large, while in children under 10 years of age, the deaths were remarkably few. Nevertheless, there was no prevailing sickness of an epidemic character.

"Atmospheric pressure mean, 29·789, was slightly — (0·92) below the 25 years' standard average for June. The range of the barometer, however, was very great, 1·340 inches, the maximum 30·500 occurring on the 15th and 16th; and the minimum, 29·160, on the 28th. The daily perturbations were also great. On 15 days the rises and falls exceeded one-quarter of an inch, the highest being a falls of ·503 on the 18th.

"Wind force total, 68·18lbs. was + 43·68lbs. above the June average. Only June 1866 had a higher force. At 62 out of the 90 records, north-west winds prevailed. West and south-west winds, though only 15 in number, were very strong, having about two-thirds of the total force for the month. The strongest winds had 5·21lbs. pressure to the square foot, and occurred six times.

"Temperature mean, 48·59 degrees, was + 1·84 above the average. The range was great, *i.e.* from maximum 67 on the 26th, to minimum 31 on the 15th and 16th.

"Daily range of temperature, 13·90 degrees was — 1·14 below the June average. Nevertheless, there were nine days on which the range exceeded 20 degrees between the extreme shade heat of the day, and the extreme cold of the night, the greatest being 26 degrees on the 3rd.

"Solar-intensity mean, 76·02 degrees, was + 2·08 above the average, despite the numerous cloudy and wet days. The maximum, 92, was recorded on the 26th.

Terrestial-radiation mean, 36·83 degrees was only + 0·20 above the average. The coldest night was that of the 16th, when the thermometer on the grass fell to 29 degrees, the air thermometer raised about four feet from the ground being 31 degrees. A considerable thickness of ice formed on still water.

"Elastic force of vapour mean, 265, was — 4 below the average; the range being from 148 on the morning of the 16th to 431 at noon on the 18th.

"Humidity mean, 78, was - - 6 below the average.

"Rain fell to the amount of 2.32 inches, being nearly half an inch (·49) above the June average. It fell on 13 days—on some very heavily—being + 1·36 above the average. For the first six months of this year the rainfall has been very irregular, nevertheless the total fall, 13·02 inches, is + 2·88 inches above the 25 years' standard average.—Fortunately we have escaped floods, which have been so numerous and destructive on the Australian continent.

"Spontaneous-evaporation amounted to only 3.11 inches, notwithstanding the hot sunshine and strong winds.

"Cloud mean, 6·60, was + 1·09 above the average.

"Ozone mean, 6·77 was + 0·27 above the average.—Saturation (10) having been attained thrice i.e. on the 5th, 11th, 18th, with the heavy rains.—

"Electricity was weak and mostly of the negative kind, 46 out of 60 observations being so recorded, while 10 other records were *nil*, there being only 4 positives registered.

"Snow was never absent from Mount Wellington after the 4th day of the month, and on the 9th all the low hills around the City were coated with it.

"The deaths this month were 46, being a fraction above the average for the previous 13 years. Under one year old there were only five deaths. At one to five years old there was the unusually small number of one only, and the same at five to ten. At 10 to 20 the deaths were five. At 20 to 60 there were 16, being rather above the usual proportion. At 60 and all ages above, there were 18 deaths, which is a very large share indeed of the total mortality. The oldest was a man 88 years old, and two of the others were 82 each. No one disease prevailed, the deaths being principally in persons suffering from long standing disease of a chronic character. Consumption caused five deaths, one being a Tasmanian by birth, another a Russian from H.I.R.M. corvette Boyarin, two English, and one Irish. Two (2) deaths were caused by pneumonia, both in Hospital. The annual average from this disease for the last thirteen years is 35, out of a total average from all causes of 560. This is far less than the English proportion. Seven (7) inquests were held, two injured by falls, two by burns, and three apoplexy.

METEOROLOGY FOR JULY, 1870.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	29·646	29·568	55	46	84·5	40·0	W S S	·52	0·17
2	29·772	29·648	52	41	70·0	34·0	NW NE	8·33	0·03
3	29·792	29·734	56	42	80·0	36·0	NW SE W	·26	
4	29·980	29·958	57	34	78·0	30·5	NW	·26	
5	29·937	29·863	57	37	87·0	33·0	W NW N	·52	
6	29·766	29·573	67	41	91·0	39·0	NW	·78	0·02
7	29·787	29·728	57	42	72·5	39·0	W NW	·78	
8	29·957	29·930	58	44	84·0	42·5	NW	1·04	
9	30·103	30·087	64	44	88·0	40·5	NW	·78	
10	30·169	40·141	62	48	81·0	44·5	NW	·78	
11	30·341	30·183	58	44	03·0	41·0	SE E	·26	
12	30·591	30·560	50	41	60·0	38·0	NW E	0·	
13	30·610	30·558	61	45	85·5	37·0	NW NE NW	·26	0·08
14	30·534	30·464	55	36	78·0	34·0	NW	1·30	
15	30·432	30·321	57	34	80·5	32·5	W NW	1·04	
16	30·339	30·184	58	40	76·0	35·5	NW NE	·52	
17	30·219	30·102	54	38	62·0	34·5	NW	0·	
18	30·050	29·865	53	46	55·0	43·0	SE NE NW	0·	0·68
19	29·834	29·813	56	46	85·0	40·5	NW SW S	·78	0·50
20	29·930	29·922	53	46	62·0	42·0	SW S SE	·26	0·50
21	29·864	29·815	50	41	69·0	37·5	NW S	·52	0·03
22	29·858	29·848	50	42	66·5	38·0	SE S SW	1·04	0·05
23	29·992	29·966	55	40	86·0	38·0	S SE	·52	
24	30·185	30·152	59	34	84·0	30·0	SW NW	·78	
25	30·177	30·100	50	36	69·5	30·5	NW NE	5·99	
26	29·924	29·655	58	39	81·0	32·0	NW N NW	2·60	0·13
27	29·756	29·506	55	42	61·0	40·5	NW SW SE	·52	
28	30·061	30·000	58	36	88·0	32·0	NW SW	·52	
29	30·102	30·100	52	36	70·5	30·0	NW W NW	·52	
30	30·100	30·071	48	36	52·0	33·0	NW S	0·	0·26
31	30·036	30·030	48	46	50·0	40·5	SE E SE	·26	0·16
Monthly mean 30·008			48·23		74·34	36·74	Total Force ..	31·74	2·61

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.
The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Gauge. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.
The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.
The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

7th.—Arbutus unedo commencing to flower.
14th.—Garrya elliptica ditto ditto.
15th.—Morus alba commencing to break into leaf.
20th.—Common Almond in full flower.
28th.—Yellow Crocus ditto ditto.

Barometer mean, 30·08 in., being 0.164 above the average.
Temperature mean, 48·23, being 2·51 above the ditto.
Solar intensity mean, 74·34°, being 1·17° below the ditto.
Dew point mean, 39·06°, being 1·00° below the ditto.
Humidity of air mean, ·78, being ·05 per cent. below the ditto.
Elastic force of vapour mean, ·262, being ·005 per cent. above the ditto.
Total amount of rain, 2·61in., being 0·55in. above the ditto.
Increase of rain fall on spontaneous evaporation, 0·54in.
Mean amount of ozone, 6·31, being 0·78 of chromatic scale below ditto.
Electricity active on the 3rd, 7th, 10th, 13th, and 28th.
A copious amount of snow on Mount Wellington all through the month, with frequent fresh deposits.

FRANCIS ABBOTT.

NOTES ON METEOROLOGY AND MORTALITY OF JULY, 1870. BY DR. E. SWARBRECK HALL.

Though the character of the month, climatically considered, was abnormal, the deaths were much below the average, and never before were the deaths under 20 years of age so few.

Atmospheric pressure mean, 30·008, was + ·164 above the 25 years' adopted standard. Only four out of the 25 years had a mean above 30 inches, *i.e.*, 1841, 30·005; 1848, 30·003; 1850, 30·113; 1860, 30·193. In the latter year epedemic influenza prevailed, and the deaths of the month were enormous —114—the 13 years' average for July being only 56. The daily perturbations were not nearly so great as in June, neither was the month's range, 1·104, so extensive. The maximum of the barometer, 30·610, occurred on the 13th, and the minimum, 29·506, on the 27th. Only twice in the last 29 years has the maximum been higher, that is — 30·643, 1844; 30·812, 1846; the last being the highest record of the barometer for any month during all these years. Old people and invalids succumbed in great numbers to the great atmospheric pressure of this month, but it had no lethal influence on children, or young and healthy adults.

Wind force had a total of 31·74 lbs., being — 7·81 lbs. below the July average; 50 out of the 93 records were winds from the north-west, with two-thirds of the total force, therefore least favorable to health. The highest pressure to the square foot, 5·21 lbs., occurred with a north-west wind at the evening record of the 26th inst.

Temperature, by the observed thermometers, had a mean of 48·23 degrees, which is + 2·51 above the July average. By the self-registering maximum and minimum thermometers the mean was 48·16 degrees; so near a correspondence between these two sets of instruments is of rare occurrence. The maximum was 67 on the 6th; the minimum 34 on the 4th, 15th, 24th. Five times only in the 25 years was a higher maximum recorded, and the same minimum, but none higher, was only recorded five times.

The *wet-bulb* thermometer had a mean of 44·76, which is + 1·64 above the average.

Daily range of temperature mean was, 14·81, degrees being — ·30 below the average. The greatest range was 26 degrees on the 6th, the smallest 2 degrees on the 31st.

Solar Intensity mean, 74·34 degrees, was — 1·17 below the average, which is to be accounted for by the cloudy and wet character of the month. The maximum, 91 degrees, was noted on the 6th.

Terrestrial Radiation mean, 36·74 degrees, was + 1·19 above the average. On the nights of the 24th and 29th this thermometer fell to as low as 30 degrees. In June there was a record one degree colder.

Elastic Force of Vapour mean, 262, was + 5 above the average; the range in the month was from 165 to 377.

Humidity had a mean of only 78, which is — 5 less than the average, notwithstanding the excessive rainfall.

Rain occurred on 12 days which is — 1·73 less than the average, but the amount was 2·61 inches, which is + ·55 above the mean. On the three days 18th, 19th, 20th, the rain fell in large quantities, but so gently as not to cause any approach to a flood. *Snow* was never absent from Mount Wellington during the month, and received frequent copious additions.

Spontaneous Evaporation amounted to 2·07 inches only.

Cloud Mean was 7·34 being, + 1·94 above the average.

Ozone Mean 6·31, was — ·78 below the average, which is to be accounted for by the prevalence of north-west winds. Saturation was attained on two of the rainy days with southerly winds.

Electricity was 43 times out of the 62 records registered as negative, 15 times "Nil," and only 4 times positive.

The *Deaths* amounted to 39, being — 17 less than the July average of the previous 13 years, and 9 less than July 1869 had. There was only one death under 14 years of age, a child aged 6 months, from a very unusual cause—Intussusception of the bowels. From 14 to 20 there were only 2 deaths—so small a mortality under 20 years of age is without precedent in the records of Hobart Town. At all times the deaths on the average, at this period of life, are much below those of England, and the Colonies on the continent

of Australia. From 20 to 60 the deaths were 19; and from 60 to 90, there were 17. In July, 1869, the deaths under 20, were 14, and over 20, 33. Up to the 13th day of the month, there were only 9 deaths, on that day and the 19th the maximum of 3 each occurred. Before, and on the 20th, there were 7 days on which no deaths took place. After the 20th, not a day without one or two deaths, three having one and the rest two. *Consumption* caused 5 deaths, one a sailor, a native of the Sandwich Islands, the other four all Tasmanian born. Never before have there been so many deaths of Tasmanians from this disease in any single month. A death in hospital took place from *tetanus* in a man brought up from the Huon, where he had suffered a compound fracture of the bones of the leg; he survived upwards of a week in hospital; the limb was not amputated. Only one *inquest* was held during the month. In the *Zymotic* class of diseases there was not a single death, which, hitherto, is unprecedented.

METEOROLOGY FOR AUGUST, 1870.

Private Observatory, Hobart Town

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·116	30·100	48	40	65·0	36·0	SE SW	·26	
2	30·120	30·005	49	38	79·0	33·5	W SE S	·26	0·03
3	29·819	29·702	57	37	84·0	34·0	NW NE SW	·52	0·08
4	29·722	29·670	58	37	89·5	33·5	NW SE	·52	
5	29·613	29·363	56	33	85·0	31·5	NW	·52	
6	29·020	28·852	55	41	82·0	35·5	NW SW S	5·73	0·22
7	29·566	29·390	49	38	68·5	33·0	NE S SW	·26	
8	29·858	29·835	59	34	91·0	29·5	NW SW	·78	
9	29·912	29·848	52	35	69·5	30·5	W E SE	·26	0·01
10	29·808	29·712	58	32	83·0	28·5	NW	1·04	
11	29·769	29·724	69	39	90·5	31·5	NW	·52	
12	29·475	29·313	59	38	79·0	30·5	NW	·52	
13	29·375	29·212	61	44	90·0	39·0	NW	·78	0·09
14	29·278	29·049	56	46	84·0	32·0	NW	·52	0·08
15	29·123	29·007	53	40	84·5	37·0	NW	1·30	
16	29·370	29·368	58	40	82·5	37·5	NW	·52	0·13
17	29·267	29·081	63	41	90·5	36·5	NW	10·94	0·05
18	29·290	29·117	63	40	92·5	36·0	NW	·78	
19	29·485	29·375	60	36	93·0	33·5	SW W NE	·78	0·01
20	29·766	29·718	64	41	90·5	37·0	NW	1·04	
21	29·606	29·483	61	44	83·0	41·0	NW W	3·12	0·02
22	29·721	29·626	65	50	95·5	36·5	NW	·52	0·02
23	30·109	30·061	61	40	95·0	36·0	W NE SE	·52	
24	30·100	29·959	63	34	89·0	31·5	NW SE	·26	
25	30·037	30·016	68	40	96·0	34·5	NW SE	·52	
26	30·081	30·026	60	52	81·0	36·5	NW E	0·	0·14
27	30·062	30·052	56	41	74·5	40·0	NW E	·26	0·12
28	30·328	30·230	63	43	97·0	37·5	NW E SE	·78	0·02
29	30·402	30·369	62	44	91·0	40·0	NW SE	·52	
30	30·375	30·300	56	46	79·0	43·5	S NW SW	3·64	
31	30·453	30·444	63	36	95·5	31·5	NW NE E	1·04	
Monthly mean 29·723			49·17		85·65	34·98	Total force	39·81	1·02

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

10th.—Sambucus niger commencing to break.
16th.—Esculus hippocastanum ditto ditto.
,, Gooseberry ditto ditto.
20th.—Ulmus campestris commencing to flower.
26th.—Lombardy Poplar commencing to break.
27th.—Royal Apricot commencing to flower.

Barometer mean, 29·723 in., being 0·084in., below the average.
Temperature mean, 49·17°, being 1·10° above the ditto.
Solar intensity mean, 85·65°, being 10·13° above the ditto.
Dew point mean, 38·6, being 2·78 below the ditto.
Humidity of air mean, ·74, being ·06 per cent. below the ditto.
Elastic force of vapour mean, ·009 per cent. below the ditto.
Total amount of rain, 1·02in., being 0·81in. below the ditto.
Increase of rain fall on spontaneous evaporation, 0·83in.
Mean amount of ozone, 5·97, being 1·55 of chromatic scale below ditto.
Electricity active on the 1st, 8th, 9th, 11th, 13th, 17th, 18th, 21st, 23rd, 25th, and 31st.
Aurora Australis on the 21st, 22nd, and 23rd.
Snow never absent from Mount Wellington, with frequent fresh deposits.

FRANCIS ABBOTT.

NOTES OF METEOROLOGY AND MORTALITY OF AUGUST, 1870. BY DR. E. SWARBRECK HALL.

The weather this month deviated much from the normal standard, and the deaths were above the average, and embraced a due proportion in every group of ages.

Atmospheric pressure had wide, sudden, and frequent variations, though the mean, 29·724, was — ·083 below the 25 years' adopted August standard. The month's range was 1·601 inches, being the highest recorded for the last 10 years. The maximum was 30·453, recorded on the 31st. The minimum, 28·852, was registered on the 6th. Only thrice in the last 30 years have there been lower minima. Between 1 p.m. of the 5th to that of the 6th, the barometer fell — ·620 of an inch, and rose + ·607 in the following twenty-four hours. On twelve other days the rises and falls exceeded quarter of an inch.

Wind pressure was 39·81 lbs., being — 6·68 below the August average. Out of the 93 observations, north-west winds prevailed 55 times, with 24·98 lbs. of the pressure. The strongest wind was a north-west gale on the 17th, having a pressure of 10·42 lbs. to the square foot. The *calms*, 36, were a few fractions only above the average.

Temperature mean, 49·17 degrees, was + 1·10 above the 25 years' mean by the observed thermometers, and by the self-registering only + ·18 of a degree more. The maximum record was 68 degrees on the 25th, and the minimum 32 on the 10th.

The *wet-bulb thermometer* had a mean of 44·84 degrees.

Daily range of temperature mean was 18·71 degrees, being + 2·28 above the 25 years' standard. The greatest range on any day was 29 degrees, recorded on the 24th.

Solar intensity mean, 85·65 degrees, was + 3·87 above the average. The maximum was 97 degrees on the 28th.

Terrestrial radiation mean, 34·98 degrees, was — 0·82 below the average. In the night of the 10th, the temperature by this thermometer fell to 28·5 degrees.

Elastic force of vapour mean, 259, was — 9 below the average.

Humidity mean, 74, was — 6 below the average.

Rainfall, 1·02 inches, was — ·81 below the average, though the number of days on which it fell—14 —was slightly above the average.

Snow was never absent from Mount Wellington during the month, and received frequent additions.

Spontaneous evaporation amounted to 1·85 inches.

Cloud mean, 5·97, was + ·27 above the average.

Ozone mean was only 6·57, being — ·95 below the average. On the 15th only was saturation—10—recorded. With so little rain and wind, and such a predominance of winds from the worst quarter, the air could not be as pure as usual.

Electricity—There were 19 records of "positive" from 4 to 7 in strength; 39 "negative" from 1 to 7, and 4 "nils."

The *Deaths* amounted to 49, being + 3 3-13ths above the 13 years' average for August. Seven were under one year old; 1 from 1 to 5; 2 from 5 to 10; 2 from 10 to 20; 18 from 20 to 60; and 15 at all ages above 60, the oldest being two females, 84 years old each. The contrast of 16 deaths under 20 years old this month, with only 3 in July, is very remarkable. There were 4 deaths in the *zymotic* class of diseases, but no epidemic disease prevailed. One of these deaths was in a girl, 15 years old, from *typhoid-fever* with ulceration of the bowels and peritonitis, indicating exposure to local insanitary conditions, which are gradually intensifying in the city owing to want of efficient sewerage and scavenging. This fever is denominated "filth-fever" by the Registrar General of England, and ranks among his list of deaths from *preventable* causes. A death from *tetanus* (lock jaw) in a man severely burnt was remarkable. It occurred in Hospital, being the second death from this rare disease this winter, though in different wards. *Consumption* caused 6 deaths, two of them born in Tasmania. There were 4 inquests.

METEOROLOGY FOR SEPTEMBER, 1870.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·539	30·448	62	34	91·0	32·0	NW SW	1·30	
2	30·419	30·226	59	41	77·0	35·0	NW E	0·	
3	30·048	29·910	65	47	91·0	44·5	NW	·52	0·01
4	30·199	30·060	66	48	102·0	43·5	NW NE SE	·78	
5	30·336	30·313	66	39	94·0	38·0	NW	1.56	
6	30·197	29·964	67	52	79·0	46·0	NW	3·12	
7	29·924	29·847	65	56	75·0	52·5	NW	·52	0·17
8	29·533	29·230	61	53	62·0	51·0	NW SE	·52	1·75
9	29·443	29·298	55	47	60·5	42·0	SW	5·72	0·17
10	29·782	29·706	58	45	95·5	40·0	SW S SE	3·64	
11	29·844	29·837	57	43	95·0	37·5	NW SE SW	1·30	
12	29·869	29·801	64	45	103·0	40·5	W S NW	·52	
13	30·087	30·014	58	40	90·0	33·5	SW SE	1·04	0·01
14	30·186	30·079	61	38	85·5	34·0	NW SE	·52	
15	30·061	29·863	67	40	98·0	35·5	NW	8·07	
16	29·829	29·747	59	51	77·0	47·5	NW SW	·52	0·25
17	30·095	30·071	56	43	92·0	38·0	NW SE	1·30	0·09
18	30·039	29·976	63	39	98·0	32·5	SW SE	1·30	
19	30·011	29·865	68	40	98·5	36·5	NW NE SE	1·04	
20	30·126	30·022	59	43	94·5	41·0	SW SE	3·12	
21	30·172	29·865	69	35	100·0	32·0	NW	1·56	
22	29·500	29·491	59	50	83·0	47·0	NW SE	·52	0·53
23	29·970	29·864	53	39	81·5	35·0	SE SW SE	5·72	0·05
24	29·966	29·812	59	39	96·0	34·5	NW NE SE	·78	0·03
25	29·724	29·5·5	65	37	99·5	35·0	NW N	·78	
26	29·508	29·446	70	47	100·0	40·5	NW W	1·04	0·08
27	29·476	29·451	59	43	68·5	39·0	NW	·78	0·08
28	29·621	29·524	65	43	105·0	40·5	NW W	1·30	
29	29·784	29·768	58	47	75·5	41·5	NW	1·30	
30	29·650	29·472	66	49	102·0	39·9	NW	13·54	
Monthly mean 29·871			52·69	88·97		39·50	Total force	63·73	3·17

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

12th.—Ash commencing to break into leaf.
18th.—Grape vine ditto.
21st.—Oak ditto.
22nd.—Moutan peony commencing to flower.
27th.—Horsechestnut ditto.
30th.—Robinia pseudo acacia commencing to leaf.

Barometer mean, 29 871 in., being 0·110in., above the average.
Temperature mean, 52·69°, being 1·93° above the ditto.
Solar intensity mean, 88·97°, being 0·93° above the ditto.
Humidity of air mean, ·72, being ·04 per cent. below the ditto.
Dew point mean, 41·9°, being 0·27° below the ditto.
Elastic force of vapour mean, 284, being ·005 per cent. above the ditto.
Total amount of rain, 3·17in., being 1·091in. above the ditto.
Increase of rain fall on spontaneous evaporation, 0·66in.
Mean amount of ozone, 6·97, being 0·99 of chromatic scale below ditto.
Electricity active on the 1st, 4th, 5th, 10th, 11th, 12th, 13th, 15th, 20th, 21st, 23rd, 25th, 26th, 28th, 29th, and 30th.
Aurora Australis on the 21st, 23rd, 24th, and 27th.
Snow never absent from Mount Wellington, with frequent fresh deposits.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF SEPTEMBER, 1870.

By E. Swarbreck Hall.

In many respects the weather this month deviated from the September average. The barometer was considerably above the mean, and very fluctuating. The wind was in more constant motion than usual, but below the average strength. Temperature was above the average. Rainfall was considerably above the mean, though it fell on fewer days. Ozone was much below the average. Nevertheless, though the mortality was but little short of double the number that occurred in September, 1869 (which, however, was the smallest for any month in the year for the 13 years recorded), yet it was above twelve per cent. less than the average of the previous 13 years' Septembers.

Atmospheric pressure mean, 29·871, was + ·110 above the 25 years' standard average. It ranged from the maximum 30·539 on the 1st, to minimum 29·230 on the 8th. The greatest movement in any twenty-four hours was a fall of — ·494 of an inch between 1 p.m. of the 21st and 22nd. There were movements on ten other days exceeding one-fifth of an inch.

Wind force amounted to 63·73lbs. which is—8·80lbs. below the September average. *North-west* winds had 49 records out of the 90, with 35·91lbs. of the strength. *South-west* had 13 records with 16·12 of the strength. *South-east* had 18 records, with only 8·06 of the total force. *Calms*, nevertheless, were only 17 in number, being — 15·45 less than the average. The strongest wind, 10·42lbs., was noted on the last day of the month, and was from the *north-west.*

Temperature mean, 52·69 degrees, was + 1·93 above the average. The maximum was 70 on the 26th, the minimum 34 on the 1st. The *wet-bulb thermometer* mean was 47·86, being + 1·29 above the average.

Daily range of temperature mean, 18·20, was only + ·56 of a degree above the average. The greatest range on any day was 34 degrees on the 21st.

Solar intensity mean, was 88·97, only × ·43 above the average. The maximum record was 105 degrees on the 28th.

Terrestrial radiation mean, 39·50 degrees, was +1·11 above the average. Twice in the month, on the 1st and 21st, the thermometer fell to freezing point (32.)

Elastic force of vapour mean was 284 + 5 above the average. It ranged from 164 on the 1st to 453 on the 7th.

Humidity mean, 72, was + 4 below the average notwithstanding the excessive rainfall.

Rain fell to the amount of 3·17 inches, being + 1·09 above the average. On five of the days, three of which were continuous, 2·87 inches fell, yet without causing any flood in Hobarton. *Snow* was never absent from Mount Wellington during the month, and received frequent and copious additions.

Spontaneous evaporation, 2·51 inches, was considerably below the rainfall, an unusual event for the equinoctial month.

Cloud mean, 6·09, was + ·25 above the average.

Ozone mean, 6·97, was 99 below the average. Only on one day, the 9th, was saturation (10) attained ; this was the last of the three continuously wet days.

The *Electrometer* records were :—Twenty *positive* with tension from 4 to 6 ; negative, 36, with tension 1 to 7 ; and 4 "nils." On fine nights in the last eight days of the month, there were brilliant displays of the Aurora Australis.

The *deaths* in the month were 37, being 5 less than the September average of the previous 13 years, though + 15 more than September 1869 had. Four (4) were under one year old, one from 1 to 5, three from 5 to 10, none from 10 to 20, thirteen (13) from 20 to 60, and sixteen (16) at 60 and all ages above, the oldest being a spinster aged 85 years. Altogether there were eight deaths at and above 70 years old. No epidemic disease prevailed, and only 7 of the total deaths from all causes were from diseases of an acute character. *Consumption* caused three deaths, two of them natives of Tasmania, the third a Swedish sailor. No deaths occurred at the *Brickfields Invalid Station*, but four invalids died at the *Cascades Station.* The death-rates at these two

establishments differ widely. During the nine past months of this year, the Cascades has had 33 deaths of adults, ranging from 39 to 90 years old, while at the Brickfields there have been only 19, ranging from 62 to 93 years old, or, including one sent to hospital, 20. Possibly the daily average strength of the invalid paupers of the Cascades, may have been twenty to thirty more than at the Brickfields, but then the average age of the latter is so much greater. The average ages of the deaths were respectively :—For the Brickfields, a little above 76 years : at the Cascades only a trifle above 68. No doubt the reluctance of invalids to be sent to the Cascades, and the difficulty of retaining them there, may, to some extent, be explained by the comparatively excessive mortality there. On sanitary grounds, this old misplaced prison is an unfit place for invalids and children, and now that the Military Barracks are likely to become available for colonial use, they would afford cheerful, healthy, and very eligible quarters for both the afore-named classes.

METEOROLOGY FOR OCTOBER, 1870.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade	Highest in sun.	Lowest on grass	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	29·556	29·510	67	47	101·0	40·5	NW	3·38	
2	29·821	29·813	61	44	99·0	38·0	NW	10·94	
3	30·015	29·942	64	49	99·0	46·0	NW N	1·56	
4	30·160	30·109	68	52	107·0	43·0	NW	1·04	
5	30·150	29·999	74	41	110·0	37·5	NW SE	1·04	
6	29·776	29·749	75	53	110·5	46·5	NW E	10·68	0·16
7	29·897	29·879	70	49	83·0	47·0	SE E	·52	0·04
8	30.061	30·015	66	44	105·0	35·5	NW E SE	·78	
9	29·792	29·477	66	44	95·0	42 0	NW SW	2·86	0.52
10	30·087	29·858	54	42	86·0	37·0	SW SE	1·30	0.01
11	30·330	30·293	69	39	109·0	33·5	NW NE SE	1·04	
12	30·412	30·361	69	44	107·0	39·5	NW SE	1·56	
13	30·224	30·004	74	47	109·0	42·5	NW	5·72	
14	29·984	29·907	75	50	111·0	42·0	NW SE	·52	0·21
15	29·945	29·866	60	44	97·5	40·0	E NE SE	·52	
16	30·084	30·000	64	47	94·0	37·0	NW SE	1·04	0·24
17	30·258	29·230	59	43	91·0	39·5	NW SE	·52	0,01
18	30·297	30·262	64	48	104·0	41·0	SW SE	1·04	
19	30·239	30·015	64	47	103·5	39·0	NW NE	·78	0·42
20	29·465	29·256	73	62	109·0	47·5	SE NW W	·78	0·05
21	29·417	29·233	64	50	88·0	47·5	NW NE NW	1·04	0·22
22	29·787	29·418	61	47	89·5	44·0	NW W	15·62	0·29
23	30·078	30·052	71	49	110·0	38·5	NW SE	·52	
24	30·145	29·952	70	44	110·0	43·0	SE	·52	
25	29·854	29·793	74	53	99·0	51·0	NW SE NW	·78	
26	30·255	30·148	62	43	101·0	41·5	N SE	3·38	
27	30·294	29·977	71	46	103·5	45·0	NW	3·12	0·07
28	29·779	29·600	81	52	113·0	50·0	N E NW	·78	0·07
29	29·574	29·451	79	58	85·0	55·5	NW	·78	
30	30·056	29·774	71	54	114·0	50·0	SW W SE	8·33	0·03
31	30·241	30·150	72	48	109·5	42·5	NW SE	1·44	
Monthly mean 29·939			57·96		101·71	42·68	Total force	80·53	2·34

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.
The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Gauge. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.
The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.
The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

10th.—Carpinus betulus commencing to break into leaf.
19th.—Ailanthus glandulosa ditto ditto.
24th.—Tilia Europea ditto ditto.
25th.—Morus niger ditto ditto.
28th.—Seeds of Elm commencing to fall.
31st.— Melia azederach commencing to break.

Barometer mean, 29·939 in., being 0·155in. above the average.
Temperature mean, 57·96°, being 4·02° above the ditto.
Solar intensity mean, 101·71°, being 6·11° above the ditto.
Dew point mean, 46·6° being 2·2° above the ditto.
Humidity of air mean, ·68, being ·05 per cent. below the ditto
Elastic force of vapour mean, ·328, being ·028 per cent. above the ditto.
Total amount of rain, 2·34in., being 0·37in. above the ditto.
Increase of spontaneous evaporation on rainfall, 2·20in.
Mean amount of ozone, 7·10, being 0·82 of chromatic scale below ditto.
Electricity active on the 2nd, 3rd, 18th, 19th, 23rd, 26th, 30th, and 31st.
Aurora on the 12th and 25th.
More or less snow on Mount Wellihgton all through the month.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF OCTOBER, 1870.

By Dr. E. Swarbreck Hall.

On the whole the weather this month was favourable to health, the deaths being considerably below the average, and nearly half of them persons above 60 years old.

Atmospheric pressure was very high with wide ranges, and as is usual was very fatal to feeble, diseased, and aged persons. The mean 29·939, was + ·155 above the average. The extreme range was from 30·412 on the 12th to 29·256 on the 20th. On fourteen days the mutations exceeded one-fifth of an inch. On the 20th it was nearly three-fourths of an inch (·526), both days of heavy floods in Victoria, though with only a moderate rainfall here.

Wind-force, 80·53lbs., was, 19·42lbs below the October average. North-west winds had 44 out of the 93 records, with more than half of the total forces. The strongest wind, 10·42lbs. pressure to the square foot, was from the west on the 22nd. There were 18 calms, being + 2·72 above the average.

Temperature, 57·96 degrees, was + 4·02 above the mean. The maximum 81 occurred on the 28th, the minimum 39 on the night of the 11th.

Daily range of temperature mean, 29·39 degrees, was + 1·72 above the average. On the 5th the extreme range occurred being 33 degrees.

Solar-Intensity mean, 101·71 degrees, was + 6·11 above the average. The hottest day was the 30th when the thermometer in the sun rose to 114 degrees.

Terrestrial Radiation mean, 42·68 degrees, was + 0·69 above the average. The lowest temperature by this thermometer was 33·5 degrees in the night of the eleventh.

Elastic force of vapour mean, 328, was + 28 above the average. The range was from 104 on the 22nd to 581 on the 29th.

Humidity mean, 68, was — 5 below the average, notwithstanding the copious fall of rain.

Rainfall, 2·34 inches, was + ·37 above the average. It fell on 14 days which is only—·90 below the average. The greatest amount on any day was ·52 of an inch on the 9th, and the next was ·42 on the 19th. Other days also had sufficient to flush the drains and sewers, but none were heavy enough to cause floods. Health and vegetation were promoted by this genial rainfall. Snow was never absent from Mount Wellington during the month, and received frequent additions.

Spontaneous evaporation occurred to the amount of 4·54 inches, being nearly double the amount of rainfall, as might be expected with so much sunshine and wind.

Cloud mean, 5·68 was — ·02 below the average.

Ozone had a mean of 7.10 which is - ·02 below the average. The predominance of the north-west winds no doubt was the cause of this.

The *Electrometer* records were positive 19, with tension from 2·5 to 8; negative 36, with tension from 1 to 6; nils 7.

The deaths in the month amounted to 34, being—19 3-13ths less than the average of the previous 13 years, and 15 less than October 1869 had. Under one year of age there were five deaths, the oldest being only seven weeks, the other four from twelve hours to nine days. From one to five years old there were four deaths; from five to ten, one only; from ten to twenty the deaths were two; from twenty to sixty only six, while in October, 1869, there were twenty-one. At sixty and all ages above the deaths were sixteen, the oldest being a woman eighty-four years old. At all ages it is very remarkable how large a proportion were males—twenty-eight to six females. There were only three inquests, two of them cases brought to hospital from other districts; including these there were only six deaths in the public hospital. Both invalid establishments at the Cascades and the Brickfields had four deaths each, the mean age of each being respectively 59¾ and 72¼. In the *Zymotic* class of diseases there was only one death, a child aged between three and four years from *Diphtheria*. *Consumption* caused three deaths, two of them, aged ten and fifteen years, were natives of Tasmania.

METEOROLOGY FOR NOVEMBER, 1870.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In	°	°	°	°			
1	30·009	29·847	71	50	96·0	47·5	NW SE NW	1·30	0·06
2	29·860	29·784	68	49	82·0	47·0	SE E NW	1·04	0·07
3	29·945	29·915	65	44	105·0	42·0	NW SE	1·30	
4	29·907	29·810	72	45	111·0	43·5	NW SE	1 56	0·12
5	29·560	29·424	75	52	114·5	49·0	N NW SW	3·38	
6	29·648	29·620	68	46	99·5	44·5	NW	10·41	0·01
7	29·810	29·684	68	49	110·0	48·0	SE W SE	2·86	
8	29·800	29·694	73	47	106·5	40·0	NW	5·46	
9	29·910	29·875	68	51	90·5	48·0	NW W S	1·04	
10	29·847	29·805	69	47	94·0	44·5	NW	1·30	0·03
11	29·879	29·782	63	51	95·0	50·0	SE	·78	0·80
12	29·687	29·635	55	48	57·0	50·0	SE	1·30	0·60
13	29·593	29·558	52	48	51·0	47·0	S SE	3·64	0·62
14	30·009	29·903	58	45	100·5	40·0	SE	1·30	0·01
15	30·042	30·014	62	48	92·0	42·5	NW E SE	1·04	0·07
16	30·240	30·118	54	42	63·0	41·0	NW SE	1·04	0·04
17	30·339	30·324	63	48	99·0	42·5	NE SE	·78	
18	30·378	30·253	70	53	100·5	50·5	N NW NE	1·04	
19	30·195	29·969	77	54	110·0	51·5	NW E	·78	
20	29·910	29·767	77	53	113·0	51·5	NW SE	1·30	0·27
21	29·676	29·522	65	53	67·0	50·5	NE SW SE	1·04	1·92
22	29·685	29·649	57	48	70·0	45·0	SE	10·41	0·03
23	29·698	29·530	60	45	101·0	40·5	NE NW	1·30	
24	29·798	29·758	69	47	105·0	42·0	NW	1·56	
25	29·659	29·150	68	50	75·0	47·0	NW	10·68	0·13
26	29·682	29·546	67	43	97·0	40·0	NW	5·72	
27	29·929	29·890	57	39	97·5	37·5	N W SW	1·56	
28	29·876	29·796	64	45	101·0	43·5	NW SW W	1·04	0·01
29	29·834	29·655	70	50	112·0	42·0	W NW	1·30	0·02
30	29·530	29·515	66	48	91·0	45·0	N NW	3·38	0·01
Monthly mean 29·816			57·63		90·26	45·12	Total Force ..	85·59	4·82

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.
The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Guage. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.
The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.
The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

12th.—First strawberry (British Queen) ripe.
17th.—First cherry (May Duke) ripe.
20th.—Black mulberry in blossom.
25th.—Punica Granatum in flower.
30th.—First raspberry (Red Antwerp) ripe.
Ditto.—Bougainvillœa spectabilis in full flower

Barometer mean, 29·816 in., being 0·095 in. above the average.
Temperature mean, 57·63°, being 0·09° above the ditto.
Solar intensity mean, 90·26°, being 11·55 below the ditto.
Dew point mean, 47·4, being 0·93 above the ditto.
Humidity of air mean, ·70, being ·01 per cent. below the ditto.
Elastic force of vapour mean, ·329, being ·004 per cent. above the ditto.
Total amount of rain, 4·82in., being 1·98in. above the ditto.
Increase of rainfall on spontaneous evaporation on rain fall, 0·88in.
Mean amount of ozone, 6·93, being 0·63 of chromatic scale below the ditto.
Electricity active on the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 16th, 18th, 24th, 26th, 27th, 28th, 29th, and 30th.
Auroras on the 19th, 20th, and 24th.
Sky cloudy and humid all through the month.

FRANCIS ABBOTT

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF NOVEMBER, 1820.

By E. Swarbreck Hall.

Atmospheric pressure and temperature this month closely approximated to the mean of the 25 years' adopted standard, but rainfall was largely in excess, the weather on the whole being highly propitious to health and life. No November of the previous 13 years had so small a number of total deaths. More especially were the deaths of young and middle-aged people the most remarkable for their extreme rarity.

Atmospheric pressure mean, 29·816, was + 095 only above the 25 years' adopted standard mean. The maximum, 30·378, occurred on the 18th; the minimum, 20·150, on the 25th. The extreme range, 1·228 inches, has often been exceeded. On the 14th there was a rise of the barometer of + ·432 of an inch, and on nine other days movements exceeding one-fifth of an inch.

Wind-force, 85·95 lbs., was —26·74 below the average, November being on the whole the windiest month in a year. It was more continuous and steady than usual, there being only four calms recorded, which is—5·67 below the average. The strongest winds, 5·21 lbs. pressure only to the square foot, were noted five times. *North-west* winds were recorded 41 times out of the 90 observations, and had rather more than half of the total force. Winds from *south-east* to *west*, the points most favourable to health, were nearly equal to the former both in frequency and force. *North*, *north-east*, and *east* were few and feeble.

Temperature mean, 57·63 degrees, only deviated from the 25 years' mean by the scarcely appreciable difference of an excess of + 00·09. The *wet-bulb* mean, 52·06, was + 00·21 only above the mean. The maximum shade temperature of the self-registering thermometer, 77, was noted on the 19th and 20th. This is the lowest maximum since November, 1853, when 75 was recorded, and only one other year, 1846, had a lower maximum than the present, *i.e.*, 76. In 1869 it was as high as 95. The minimum, 35, was registered on the 27th. The lowest ever before was 38 in several years. The extreme range, 38 degrees, was very small, though last year had the same, but only one other, 1863, had less, *i.e.*, 37.

Daily Range of temperature had the mean of 17·17 degrees, being — 1·31 below the average; last year's was more than two degrees higher, and no year since 1855 had one so small. The greatest range for any day was 27 degrees, noted on the 4th. In 1861 the greatest range was the same, but every year since has greatly exceeded this year's.

Solar Intensity mean, 90·26 degrees, was — 11·55 below the average, and the lowest on record, which is in a great measure accounted for by the rainy and cloudy character of the month. The maximum record was made on the 5th, being 114·5 degrees.

Terrestrial Radiation mean, 45·12 degrees, was — 1·37 below the average. No other year, except 1867, had so low a mean. The lowest temperature in any night was 37·5 degrees. Many years have had lower minimums than this.

Elastic force of Vapour mean, 329, was + 4 above the average. It ranged from 225 to 494 during the month.

Humidity mean, 75, notwithstanding the excessive rain-fall was — 1 below the average.

Rain-fall amounted to 4·82 inches, being + 1·98 above the 25 years' mean; but this was twice exceeded within the previous 29 years, *i.e.*, 1849, — 8·94 inches; 1842, — 5·84 inches. There were 18 days on which the rain fell, which is + 5·18 more than the average. On the three days, 11th, 12th, 13th, the aggregate fall was 2·02 inches, but on the 24th 1·92 was registered. Still it fell so steadily that no damage of any moment was inflicted, and the thorough cleansing it gave the streets, sewers, aud rivulet was highly advantageous to health. No *snow* could be seen on Mount Wellington from the city during the month, but visitors up there on the 9th reported its presence in patches.

Spontaneous Evaporation amounted to less than the rain-fall, *i.e.*, 3·94 inches.

Cloud Mean, 7·70, was + 1·64 above the average, being the greatest on record in 30 years.

Ozone Mean, 6·93, was — ·63 below the average. On four of the wet days saturation (10) was registered.

Electricity records were 23 positive, with tension from 3·5 to 8 ; 33 negative, with tension from 1 to 8 ; and 4 nils. No thunder or lightning observed. On three nights the Aurora Australis was seen.

The *Deaths* registered were only 24, being—15 12-13 below the average of the preceding 13 years, and the smallest number for any November of the thirteen. The November average of deaths is the smallest of any month in the year. In the *Hospital* there were 8 deaths inclusive of an *Inquest* case. the only inquest in the month. All these cases were admitted from rural districts. Never before has it happened that no deaths of residents in the Hobarton Registration District took place in hospital. Of the 24 deaths 6 were respectively aged 1 day, 5 weeks, 8 weeks, 9 weeks, 3 and 4 months. Between the last and 17 years old, not a single death ! One at 17, another at 20, and a third at 22 were all that took place, until 39, at which age there was a death, and 4 more between that and 60 years old ; from 60 to 86, at which age the oldest took place, there were 10 deaths. So small a proportion of young and middle-aged persons was never before recorded. There was not a single death in the *Zymotic* class of diseases, except two babes, registered as dying from *diarrhœa and convulsions*, can be properly considered to belong to this class. There were 2 deaths from *consumption*, one a youth, aged 22, born in Hobart Town, the other a man aged 60, born in England. From the details I have given it will be seen that out of a population of 25,000 persons in the Hobart Town Registration District only 16 died, being at the rate of less than 8 per 1,000 per annum, or 192 total deaths in the year. The annual average for the previous 13 years, *including* cases brought to hospital from other districts, is 560 ; the first year of the thirteen (1857) having 581, and the last (1869) only 462. The diminished death-rate of late years, where from the changes in the ages of the population, there ought, by the ordinary laws of mortality, to have been an increased death-rate (*Vide* report for May), cannot be ascribed solely to improved climatic conditions. Local sanitary improvements must claim a considerable share in the diminution, and of these our improved water-supply, I have data to prove, has been most influential. Were our scavenging and sewerage so amended as to ensure the speedy removal of all animal and vegetable refuse, our dead no longer interred amidst the living, and the ventilation of our abodes and public places of assemblage better attended to, Hobart Town would be, as it ought to be, one of the healthiest towns in the world, its local and climatic advantages being unparalleled. No country with whose meteorological condition I have become acquainted, equals ours in the purity of its atmosphere, as tested by the ozonometer.

METEOROLOGY FOR DECEMBER, 1870.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	29·750	29·692	65	45	107·0	43·5	NW W	3·38	
2	29·885	29·788	66	51	107·0	50·0	NW SE SW	3·38	0·2
3	30·068	30·04	65	46	110·0	42·0	N SW	1·04	
4	29·867	29·665	64	48	69·0	46·0	NW	3·72	
5	29·606	29·567	68	45	109·0	41·0	NW SE E	·78	
6	29·400	29·195	86	50	125·0	50·5	N NW	18·23	
7	29·612	29·372	77	52	111·0	50·0	NW SW	3·64	0·03
8	29·742	29·647	66	46	103·0	43·0	NW W	6·23	0·12
9	29·985	29·929	67	46	98·0	42·0	NW	1·56	
10	30·063	30·019	69	46	101·0	43·5	NW NE SE	·26	
11	29·879	29·722	86	55	125·0	44·0	SE	·26	
12	30·013	29·927	68	50	110·0	47·0	E SE	1·04	
13	29·826	29 775	72	48	111·5	45·5	E SE	1·04	
14	29·676	29·563	71	50	109·0	46·0	NW	·78	
15	29·963	29·924	71	52	103·0	46·5	SW SE	1·56	
16	29·932	29·823	78	52	110·0	47·0	NW SE	·78	
17	29 675	29·625	82	57	112·0	51·5	NW	10·94	
18	30·017	29·955	74	49	112·0	46·0	SE NE	3·64	0·07
19	29·810	29·676	67	52	108·0	45·5	W SW	5·72	
20	29·910	29·767	66	44	108·0	43·0	NW	1·30	
21	29·843	29·737	66	48	112·0	43·5	W SE SW	1·30	
22	30·025	30·015	65	45	109·0	41·0	NW SE	1·30	
23	30·084	30·063	70	45	113·0	41·0	NE SE	1·04	
24	30·239	30·186	64	49	103·5	43·5	SE	1·30	
25	30·319	30·311	68	50	111·0	43·0	SW SE SW	1·30	
26	30·330	30·300	68	49	95·0	47·5	NW SE	·78	
27	30·263	30·117	75	46	115·5	43·5	NW SE	1·04	
28	30·124	29·939	75	49	115·0	47·0	NW NE	1·04	
29	29·918	29·783	81	53	121·0	49·0	NW SE NE	1·04	
30	29·763	29·558	71	58	76·0	57·0	NE	·26	0·20
31	29·774	29·567	68	52	69·0	50·0	SE	3·64	0·01
Monthly mean 29·863			61·51		106·30	4595·	Total force	85·34	0·55

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

12th.—Red currants commencing to ripen.
14th.—Common privet commencing to flower.
17th.—Black currants commencing to ripen.
24th.—Melia azederach commencing to flower.
25th.—Doyenne d'Ete pear commencing to ripen.
31st.—Juneating apple ditto ditto.

Barometer mean, 29·813 in., being 0·068in., above the average.
Temperature mean, 61·51°, being 0·39° above the ditto.
Solar intensity mean, 106·30°, being 2·33° above the ditto.
Dew point mean, 47·9°, being 1·12° below the ditto.
Humidity of air mean, ·63, being ·05 per cent. above the ditto.
Elastic force of vapour mean, ·341, being ·011 per cent. above the ditto.
Total amount of rain, 0·55in., being 1·181in. below the ditto.
Increase of rain fall on spontaneous evaporation, 3·88in.
Mean amount of ozone, 5·45, being 1·74 of chromatic scale below ditto.
Electricity active on the 1st, 3rd, 4th, 7th, 8th, 9th, 10th, 15th, 18th, 19th, 20th, 21st, 22nd, 23rd, 25th, 28th, and 29th.
Aurora Australis on the 10th, 16th, and 29th.
Much wind from S.E. and N.W.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF DECEMBER, 1870.

By Dr. E. Swarbreck Hall.

Many of the meteorological phenomena of this month approximated very closely to the standard normal mean ; others, however, differed widely from the average, but the general result was favourable to health and life.

Atmospheric pressure mean, 29·863, was +·118 above the 25 years' adopted standard mean for December. Only twice before in the previous 30 years, had December a higher atmospheric pressure mean. The maximum, 30·330, occurred on the 26th, and the minimum, 29·195, on the 6th the extreme range of the month, therefore, being 1·135 inches. In December, 1855, the range was 1·518 inches, being the only year which exceeded the present one. The greatest range of the barometer in any twenty-four hours was a fall of —·395 of an inch on the 6th. Only twice before in the previous 15 years was there a lower range in a similar period of time in the month of December. On 14 other days, however, there were variations of the barometer exceeding one-fifth of an inch.

Wind-force amounted to 85·34 lbs, being—2·08 below the average. Light sea breezes predominated in number, but north-west in aggregate force. On the 6th and 17th there were north-west *hot winds*, with a force of 10·42 lbs each. *Calms* were 15 being + 2·11 above the average.

Temperature mean, 61·51 degrees, was only + 00·39 above the mean, and the self-registering thermometers gave a much lower mean, than the observed ones. The *wet-bulb thermometer* mean, 54·26, was —·72 below the mean. The extremes of temperature were, 86 with a hot wind on the 6th, and minimum of 44 in the night of the 20th.

Daily-range of temperature had a mean of 21·65 degrees, which is + 1·74 above the average greatest range was 36 degrees on the 6th.

Solar-intensity mean, 106·30 degrees, was + 2·33 above the average. The hottest record was 125 degrees on the 6th.

Terrestrial-radiation mean, 45·95 degrees, was — 2·29 below the average, the coldest record being 41 degrees on the nights of the 5th, 22nd, and 23rd.

Elastic-force of vapour mean, 341 was 11 degrees below the average. The range was from 235 to 492.

Humidity mean, 63, was — 5 below the average.

Rain-fall amounted to only ·55 of an inch, being —1·18 inches less than the average. On only one occasion, in the night of the 30th, did sufficient fall to flush the water courses and sewers. *Snow* was never visible from the city on Mount Wellington during the month.

Spontaneous-evaporation amounted to 4·43 inches.

Cloud mean, 6·14, was + ·53 above the average.

Ozone mean, 5·45, was 1·74 below the average, and the smallest ever recorded for the month of December.

Electricity records were 30 positive, with tension from 3 to 7·5 ; negative 32, with tension from 2 to 6·5. No *thunder* or *lightning* during the month. The *Aurora Australis* seen four times.

The *deaths* this month were 36, being — 8 9-13 below the average of the previous 13 years. Out of the thirteen only 1865 had fewer (30) ; 1864 had the same in number as the present month ; all the rest had more. Under one year old there were 7 deaths ; from 1 to 5 the deaths were 4 ; from 5 to 10 no deaths ; from 10 to 15 there were 2 deaths ; and 2 also from 15 to 20. Altogether the deaths under twenty years old form an unusually large proportion of the total deaths. From 20 to 60 there were 12 deaths ; and at 60, and all ages above, 9, the oldest being 79 years old. The deaths in Hospital were 7, four of which were from other districts, and another was a sailor. The *Brickfields* and *Cascades* establishments had each 3 deaths. There were 3 *Inquests*. In the *Zymotic* class of diseases there were 5 deaths : —Four children from *Diarrhœa*, and one young woman from "*low fever.*" One of the Hospital deaths was from *Tetanus* (lock-jaw), whether traumatic or idiopathic is uncertain. It is remarkable that the boy's father died from the same disease some years ago. The boy's sufferings were greatly miti-

gated by the Hydrate of Chloral, a medicine lately introduced as a powerful hypnotic. *Consumption* caused 2 deaths, one Tasmanian born.

The total deaths in the registration district of Hobarton, during 1870, were 500. The population at the census on the 7th February, 1870, was 25,004, the death-rate therefore was 20 per 1,000. Nearly 6,000, however, of the population is extra-urban and purely rural. On the other hand 45 of the deaths are known to have been of persons not belonging to the district, and 70 others were invalids collected from all parts of the island, and concentrated within two establishments in the district. It may therefore be fairly calculated that about 400 was the actual number of deaths of persons belonging to the district, being at the rate of 16 per 1,000 per annum. The Registrar-General of England assumes 17 per 1,000 to be the normal death-rate, being that of the 65 healthiest districts of England and Wales. The average of the total deaths in the Hobarton Registration District for the 13 years, 1857, 1869, was 564 8-13, the year 1858 having the largest number, 644; and 1869 having the smallest, 462. Of the 500 deaths in 1870, January had the greatest number, 64, November the smallest, 25. No disease prevailed epidemically, and the deaths in the Zymotic class of diseases were only about one-tenth of the whole. From the records of the 13 years ending 1869, the mean mortality of each month is as follows:—January, 49 1-13; February, 54 6-13, which considering the small number of days in that month, is the most fatal month in the year; March, 54 11-13; April, 41 1-13; May, 40 7-13; June, 45 9-13; July, 56, this is numerically the most fatal month, but not so if the number of days is calculated. Moreover, an epidemic of influenza in July, 1860, when 114 deaths were recorded, principally of old people, swells the average of this month differently to any other of the months. Excluding this very fatal month, the average of the other 12 years is only 50 4-12 August, 45 10-13; September, 42; October, 43 6-13; November, 39 12-13, being the least fatal month to life; December, 44 9-13. In the year 1870 the deaths in each month under 5 years old, were:—January, 23; February, 18; March, 12; April, 9; May, 10; June, 6; July, 1; August, 12; September, 6; October, 9; November, 6; December 11; total 123. This is a very small proportion of the total deaths at all ages, according to the laws of mortality in England and Europe generally. At 60 and all ages above, the oldest being 93 years old, the deaths were:—In January, 16; February, 13; March, 16; April, 9; May, 17; June, 18; July, 18; August, 15; September, 16; October, 16; November, 11; December, 9; total, 174. The hot months are most fatal to children, the cold months to old people. By the census in February, 1870, there were 3,402 children under five years old enumerated in the Hobarton Registration District, and at 60 and all ages above, 1825. It is very remarkable that while the constituent elements of the population as to age, have year after year, been increasing in the proportionate numbers of the very young, and the very old, the total death-rate has been decreasing. By the ordinary laws of mortality it should be otherwise. This proves that our climatic advantages have heretofore been under-estimated, not exaggerated, and that the native-born have a much less death-rate than the imported inhabitants.

METEOROLOGY FOR JANUARY, 1871.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·149	30·090	57	46	92·0	43·0	E	1·56	0·05
2	30·222	30·191	63	48	99·0	45·0	NW SE	·78	
3	30·315	30·283	63	50	101·0	47·5	SE	1·56	
4	30·286	30·242	59	50	70·5	48·0	SE	1·56	
5	30·149	30·002	68	54	89·0	52·0	NW SE E	·78	
6	29·979	29·909	74	56	110·5	54·0	N SE	1·04	
7	30·065	30·054	67	55	77·5	55·0	SE	1·04	
8	29·974	29·859	72	53	114·5	50·5	NE SE E	·78	
9	29·874	29·844	73	50	107·0	49·0	NE SE	·78	
10	29·871	29·839	77	52	118·0	51·0	NW SE	1·04	
11	29·845	29·719	76	56	87·0	54·0	NW	1·04	0·19
12	29·426	29·408	80	60	120·0	59·0	NW	5·46	
13	29·484	29·381	74	58	99·0	54·5	NW W	3·12	
14	29·465	29·380	62	48	84·0	42·0	NW W	3·38	0·04
15	29·765	29·692	62	43	97·0	40·0	NW SW	3·12	0·02
16	29·857	29·807	68	48	106·0	46·0	NW SW	1·30	
17	30·130	30·086	71	43	110·5	38·5	NW SE	1·04	
18	30·169	30·033	82	48	120·0	46·5	NW SE	1·04	
19	29·987	29·875	95	63	130·0	55·0	NW NE SE	1·04	
20	30·217	30·195	73	56	111·0	50·5	SE	1·56	
21	30·194	30·073	86	54	125·0	53·0	NW SE	·78	
22	30·059	29·853	92	54	130·0	57·0	NW N	1·30	
23	29·847	29·783	89	54	120·5	59·0	NW SE S	3·64	0·71
24	29·895	29·868	68	54	72·0	49·5	SE	·78	0·02
25	29·871	29·756	81	53	123·0	50·0	NW SE	1·04	
26	29·810	29·623	86	57	120·5	51·5	NE NW SE	1·04	0·18
27	29·825	29·562	76	57	108·0	50·0	NW SW	3·64	
28	30·015	29·764	75	43	114·0	41·5	NW SE NW	1·04	
29	29·683	29·554	77	61	112·5	56·0	NW	1·30	
30	29·774	29·651	80	51	116·5	48·5	NW W SE	1·04	
31	29·734	29·689	58	56	115·5	50·0	NW	1·04	0.04
Monthly mean 29·877			64·90		106·45	49·71	Total force	49·66	1·25

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

10th.—Veronica angustifolia in flower.
11th.—First Apricot Roman) ripe.
12th.—Grevillea robusta in flower.
14th.—Jargonelle Pear commencing to ripen.
19th.—Black Mulberries ditto ditto.
Catalpa syringæflora not flowering this year.

Barometer mean, 29·887 in., being 0·160in. above the average.
Temperature mean, 64·90 , being 2·06° above the ditto.
Solar intensity mean, 106·45°, being 3·19° below the ditto.
Dew point mean, 51·2° being 0·65° above the ditto.
Humidity of air mean, ·64, being ·03 per cent. below the ditto
Elastic force of vapour mean, ·393, being ·020 per cent. above the ditto.
Total amount of rain, 2·25in., being 0·11in. below the ditto.
Increase of spontaneous evaporation on rainfall, 2·94in.
Mean amount of ozone, 5·43, being 1·44 of chromatic scale below the ditto.
Electricity active on the 1st, 2nd, 3rd, 13th, 14th, 15th, 16th, 17th, 22nd, 27th, 28th, 30th. and 31st.
14th.—The apex of Mount Wellington covered with snow.
19th.—Thunder ; 23rd, thunder, lightning, and rain; 26th, much thunder and lightning, both sheet and fork, with rain.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF JANUARY, 1871.

By E. Swarbreck Hall.

The year 1871 opened with weather of a very anomalous character, there being a considerable covering of snow on Mount Wellington, and a fresh cold south-east wind, with sprinkles of rain. Nevertheless, the mean temperature of the whole month was above the average, and nearly every other of the records departed more or less from the adopted mean. On the whole, this month —following the very dry one of December—was not very favourable to health and life, the deaths being within a trifle of the 14 years' average.

Atmospheric pressure had the mean of 29·887, being + ·160 above the 25 years' adopted standard. With the exception of 1868, when the mean was 29·918, the present year's January was the highest of 31 years now on record. The maximum, 30·315, was registered on the 3rd; the minimum, 29·380, on the 14th, the extreme range of the month being ·935 of an inch. The greatest movement of the barometer in any 24 hours, was a rise of + ·458 on the 1st, and there were only seven other days on which it exceeded one-fifth of an inch — so that, tolerably steady, but high atmospheric pressure, may be deemed characteristic of the present month.

Wind-force total was only 49·66lbs., which is—28·63lbs. less than the average for January. Both in number and force, the ozone-bearing sea breezes from the south-east to west far exceeded all from the other four points of the compass, and, no doubt, to a great extent counteracted other phenomena less favourable to health. At no one record was a stronger pressure to the square foot recorded than 2·60lbs. There were 15 *calms*, being —1·90 less than the average. The 19th, 22nd, 26th were *hot-winds*, very weak in point of wind-force, but very hot as to temperature.

Temperature mean, 64·90 degrees, was + 2·06 above the 25 years' average, and hotter than any January since 1863. The extremes of temperature were : —Maximum, 95 degrees on the 19th (only one other above 90), and minimum, 43 on the 15th, 17th, 28th. The *wet-bulb* thermometer mean was 57·56, being + 1·18 above the average.

Daily range of Temperature mean was 21·71 degrees, being + ·95 above the average. The greatest was 38 degrees on the 22nd.

Solar-intensity had the mean of 106·45 degrees, being — 3·19 below the average. This is singular enough, for the cloud mean was but a trifle above the average, and the month was not a hazy one. The maximum was 130 degrees, on the 19th and 22nd.

Terrestrial-radiation mean, 49·71 degrees, was—1·53 below the average; the coldest night being the 17th, when this thermometer fell to 38·5 degrees.

Electric-force of vapour, 393, was + 20 above the average, and the highest noted since January 1863. It ranged from minimum 245 on the morning of the 15th to maximum 592 at noon on the 25th.

Humidity mean was 64, and — 3 below the average.

Rain fell on 8 days being — ·64 below the average. The quantity gauged was 1·25 inches, being — ·11 less than the average. More than half of it (·71) fell on the 23rd, being a thunderstorm. *Snow*, to a considerable amount, covered the summit of Mount Wellington on the morning of the 1st, but did not last long. A frost deposit appeared again on the 14th.

Spontaneous Evaporation amounted to 4.19 inches.

Cloud mean was 5·89, being + ·19 only above the average.

Ozone mean, 5·43, was —1.44 less than the average. It is the lowest record ever made for January. The maximum was 8 on the 1st and 24th, with south-east breezes. The minimum was 3 on the 21st.

The *Electricity* records were, 18 positive, with tension ranging from 2 to 8; Negative 44, with tension from 1 to 6. No "nils." *Thunder and Lightning* were observed on the 23rd and 26th, both grand displays, and of rare occurrence of late years. *Lightning* only was seen on the 15th. *Thunder* only heard on the 19th.

The *deaths* in the month were 47, being — 3 2-14th less than the average of the previous 14 years, but 17 less than 1870 had. Under one year old there

were 17 deaths, many of them only a few days old. From nine months of age to 21 years, there was only one death, and that from accident to a girl 7½ years old, run over on Regatta Day. This is a very remarkable and unusual exemption at this season of the year in this group of ages. From 20 to 60 the deaths were 14 ; and from 60 and all ages above, 15, the oldest being 82. There were six deaths in hospital, four of them being from other registration districts. There were six inquests. At the Cascades invalid establishment there were two deaths, but none at the Brickfields. In the zymotic class of diseases there were 12 deaths, one from diphtheria, all the rest from diarrhœa. Pulmonary consumption caused two deaths, both aged persons, respectively born in England and Ireland.

METEOROLOGY FOR FEBRUARY, 1871.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·015	29·952	69	47	109·0	45·0	NW SE	1·04	
2	30·034	29·839	79	48	120·0	46·0	NW SE	1·04	
3	30·052	29·938	71	54	101·0	51·5	NW W SE	1·30	
4	30·148	30·107	68	52	108·0	51·0	SW SE	1·30	
5	30·071	29·970	76	55	119·5	50·0	N SE	1·04	
6	30·009	29·889	80	49	116·0	46·5	NW SE	1·04	0·15
7	29·687	29·298	72	60	73·0	58·0	NW	·26	0·41
8	29·795	29·312	70	56	94·0	48·5	NW SW SE	2·86	
9	30·065	30·057	67	47	90·0	46·0	NW SE	·52	
10	30·014	29·852	78	47	114·0	44·5	NW SE	1·30	
11	29·879	29·852	75	49	112·0	46·5	NW	1·30	
12	29·974	29·897	76	50	113·0	46·5	NW SE	·78	0·3
13	29·821	29·535	83	54	118·0	51·5	NW SE	·26	0·20
14	29·501	29·417	79	52	112·5	49·0	NW	5·72	
15	29·868	29·734	69	48	100·0	46·0	NW SE NW	1·04	
16	30·063	30·010	69	51	108·0	47·5	SE	1·04	
17	30·055	30·029	75	53	113·0	48·5	NW SE S	1·04	
18	30·098	29·931	79	53	98·0	51·5	NW NE	2·60	
19	29·787	29·525	86	52	120·0	52·5	NW	10·68	0·18
20	29·854	29·662	75	57	114·0	48·0	NW SW NW	·78	
21	30·156	30·129	75	52	113·5	50·0	NW SE	1·30	
22	30·087	29·851	78	47	114·0	45·0	NW E NE	·52	
23	29·779	29·709	80	50	118·0	47·5	NW SE	1·04	
24	29·797	29·769	79	60	117·0	55·0	NE SE	1·04	
25	29·980	29·860	72	57	73·0	56·5	SW SE	1·30	0·33
26	30·126	30·099	60	52	64·5	50·0	SE E	0·	
27	30·026	29·839	76	54	110·0	50·5	NW	1·30	
28	29·774	29·582	82	50	112·0	49·5	NW SE E	·52	0·05
Mean monthly 29·879			64.56		106·25	49·23	Total Force	.. 43·96	1·35

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.
The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Guage. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.
The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.
The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

6th—Kerry pippin apple commencing to ripen.
8th—Windsor pear ditto.

15th—Bon Chretien pear commencing to ripen.
16th—Green gage plum ditto.
25th—Common ash commencing to shed seed.
26th—Sycamore ditto.

Barometer mean, 29·819in., being 0·036in. below the average.
Temperature mean, 64·56°, being 4·80° above the average.
Solar intensity mean, 106·25°, being 2·96° above the average.
Dew point mean, 51·2°, being 1·98 above the average.
Humidity of air mean, ·65, being ·06 per cent. below the average.
Elastic force of vapour mean, ·390, being ·034 above the average.
Total amount of rain, 1·35in., being 0·32in. below the average.
Increase of spontaneous evaporation on rain fall, 2·87in.
Mean amount of ozone, 5·08, being ·193 of chromatic scale below the average.
Electricity active on the 5th, 8th, 9th, 10th, 11th, 14th, 15th, and 20th.
Hot wind on the 19th. Thunder and rain on the 28th.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF FEBRUARY, 1871.

By Dr. E. Swarbreck Hall.

The atmospherical phenomena of the month varied considerably from the 25 years' adopted standard mean for February, but were not on the whole unfavourable to health and life. The deaths were twelve less in number than the average of the previous 14 years, and six less than February, 1870, had.

Atmospheric pressure mean, 29·879, was × ·048 only above the mean. The greatest pressure on any day was, 30·156, on the 21st; and the lowest was, 29·298, on the 7th. The month's range therefore was only ·858, being less than in any February since 1863. The greatest movement of the barometer in any 24 hours was a fall of — ·448 on the 7th, which was not unusual in any respect. There were, however, 10 other days on which the variations exceeded one-fifth of an inch.

Wind-force in the aggregate amounted to 43·96 lbs., being — 13·14 less than the February average. *North-west* winds predominated over all others, both in frequency and force, and were greatly in excess of the February mean. On the other hand *north* wind was only noted once, and without force (a calm); while the February average is 14·11 in number, 8·21 in force. *South-east* winds were considerably more numerous than usual, but a trifle below the average force. The strongest winds, 5·21 lbs. in force, were noted twice on the 19th, and were north-west *hot winds*. *Calms* were + 5·33 above the February mean.

Temperature mean, 64·56, was + 2·68 degrees above the 25 years' mean, only 1866 and 1855, during the past 30 years, had higher means, *i.e.*, 65·19 and 68·00 respectively. Maximum, 86, was noted on the 19th. It has often been exceeded. Minimum, 47, was recorded four times, being the highest, with the exceptions of 1866, 1845, 1843, 1841, in the previous 30 years. The *wet-bulb* thermometer mean, 57·45, was + 1·74 above the mean.

Daily-range of Temperature mean, 22·93 degrees, was + 3·18 above the average. It was never so high since 1859, when it was 23·17, and only in three other years of the 30 had February a higher daily-range than the present month, *i.e.*, 1857, 1856, 1841. The greatest range on any day was 34 degrees on the 19th, and that has often been exceeded in former years.

Solar intensity mean, 106·25 degrees, was — 1·62 below the average. The greatest on any day was 120, recorded on the 2nd and 19th, and the lowest since 1861. It is remarkable that the sun's heat should be so low while mean shade temperature was so high, more especially as the cloud mean was below the average.

Terrestrial radiation mean, 49·23, was only — ·34 below the average. The lowest in any night was 44·5 on the 10th. In every year recorded, except 1866, when it was the same, the minima have been much lower.

Elastic force of Vapour, 390, was + 16 above the average. It ranged

from maximum 585 at noon on the 7th, to minimum 260 on the evening of the 14th.

Humidity mean, 65, was — 5 below the average.

Rain-fall amounted to 1·35 inches, being ·34 below the average. It fell on 7 days, being — 0·73 below the mean. It descended copiously on the 7th and 25th, so as to scour surface drains and flush sewers and water-courses efficiently. *Snow* was never visible on Mount Wellington during the month.

Spontaneous Evaporation amounted to 4·22 inches, being three times more than rain fall.

Cloud mean was 5·08, being — ·62 below the average.

Ozone mean was only 5·61, being — 1·40 below the average, and the lowest ever registered for the month of February.

The *Electricity* records were :—21 positive with tension ranging from 2·5 to 6; and 32 negative, ranging from 1 to 6, and 3 "nils." A short storm of *thunder*, *lightning*, and rain occurred on the last day of the month.

The month's *Deaths* amounted to 42, being — 12 less than the average of the previous 14 years, and — 6 less than 1870 had. Under one year of age the deaths were 12, being — 2 less than 1870 had. At 1 to 5 years old the deaths were 7, being + 3 more than in 1870. At 5 to 10 there were no deaths, while 1870 had 2. At 10 to 15 no deaths occurred, though 1870 had 2. At 15 to 20 there were 2 deaths, while 1870 had none. From 20 to 60 the deaths were 10, while 1870 had 13. At 60 and all ages above, the oldest being 87, there were 11 deaths, while 1870 had13, the oldest being 82. *Zymotic* diseases caused 10 deaths, all from *Diarrhœa* and *Dysentery*, the prevalent diseases always at this season of the year. There were 4 *Inquests*. At the *Brickfields Invalid Establishment* there were 2 deaths ; at the *Cascades* 3. The *Hospital* had 6 deaths, two of them from other registration districts. Pulmonary *Consumption* caused 2 deaths, one being a native of England, the other of Ireland.

REPORT

OF THE

ROYAL SOCIETY

OF

TASMANIA

FOR THE YEAR

1870.

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

1871.

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Allport, Morton, F.L.S., F.Z.S.	,,
Archer, William, F.L.S.	Cheshunt
Atherton, E.	Hobart Town
Atkinson, Rev. H. D.	Oyster Cove
Aubin, F.	Spring Bay
Aikenhead, Hon. J., M.L.C.	Launceston
Adams, R. P....	Hobart Town
Bilton, H.	Glenorchy
Barnard, James	Hobart Town
†Barry, Sir R., Puisne Judge	Melbourne
Boyd, James, Civil Commandant	Port Arthur
Butler, Francis	Hobart Town
Butler, J.	Bagdad
Bromby, Right Rev. C. H., Lord Bishop of Tasmania	Hobart Town
Bright, R. S., M.R.C.S.L.	,,
Butler Henry	,,
Buckland H. J.	,,
Browne, Justin McC.	,,
Baynton, W. E.	Kingston
Bomford, F. E.	Rheban, Swansea
Chapman, Hon. T. D., M.H.A.	New Town
Cook, Henry, M.H.A.	Hobart Town
Clarke, J. M.	,,
Creswell, C. F.	,,
Cotton, Francis	Swanport
Crawford, Lieut.-Colonel	New Town

Cruttenden, Thomas...	Woodsden
Castray, L. R., A.C.G.	Hobart Town
Davies, Ven. Archdeacon	Hobart Town
Davies, John, M.H.A.	,,
Dear, R. E.	,,
Dobson, Hon. W.L., M.H.A.	Hobart Town
Dobson, H.	,,
Dunn, J. A.	,,
Du Cane, His Excellency C.	Government House
Foster, Hon. John, M.L.C.	Hobart Town
Giblin, Thomas	,,
Gould, C., F.G.S., Government Geologist ...	,,
Gorringe, Thomas	Green Ponds
Greig, C. F.	Hobart Town
†Gunn, R. C., F.R.S., F.L.S.	Launceston
Graves, J. W....	Hobart Town
†Gellibrand, W. A. B.	River Ouse
Guesdon, W. A., jun.	Hobart Town
Hall, Dr. E. Swarbreck	Hobart Town
Harris, Rev. R. D. P., M.A.	,,
Hinsby, Henry	,,
Hunter, Henry	,,
Huston, G. F....	New Norfolk
Huybers, A.	Hobart Town
Hopkins, H.	,,
Hazell, C.	Carlton
Irving, Professor	...Melbourne University
Irvine, P.	Hobart Town
Ingle, J.	England
Isaacs, R. McIntosh	Hobart Town
Jackson, Adam	Ross
Jamieson, —	Hobart Town
Jeffery, Molesworth	Bournbank
Kennerley, Hon. Alfred, M.L.C.	Hobart Town

Knight, W., jun.	Sandy Bay
Langdon, Captain the Hon. W., R.N., M.L.C. ...	Montacute
Lewis, David, M.H.A.	Hobart Town
Legge, R. V.	Cullenswood
Maclanachan, James...	Ballochmyle
Macfarlane, James	Hobart Town
Macfarlane, J....	,,
Mather, J. B....	,,
Maxwell, C. M.	,,
†Milligan, Joseph, F.L.S.	England
Moore, J. A.	New Norfolk
Meredith, Hon. C., M.H.A.	Hobart Town
Morrison, Askin	,,
Marsh, H. J.	,,
Mace, J. C.	Clarence Plains
Mace, G.	Spring Bay
Napier, G. R....	Hobart Town
Nelson, H.	,,
Officer, Hon. Sir Robert, M.H.A., Speaker ...	New Norfolk
Pillinger, J.	Antill Ponds
Roberts, H. L.	Hobart Town
Read, R. Cartwright...	Redlands, New Norfolk.
Rule, J.	Bellerive
Salier, G., M.H.A.	Hobart Town
Sharland, W. S., M.H.A.	New Norfolk
Solomon, Joseph	Hobart Town
Stephens, T., M.A., Inspector of Schools ...	,,
Story, J. F.	Swanport
Storie, Rev. J.	Hobart Town
Susman, L.	,,
Stone, W.	,,
Swan, E. D.	,,
Scott, J., M.H.A.	Launceston

Scott, J. R., M.H.A.	New Town
Travers, S. Smith	New Town
Walch, James...	Hobart Town
Weaver, G.	,,
Weston, W. P.	Norfolk Plains
Whitcomb, G.	Hobart Town
Whyte, Hon. James, M.L.C.	,,
Wilson, George, jun....	Mount Seymour
Wilson, Hon. J.M., M.L.C.	Hobart Town
Wise, F. H.	,,
Woolley, J.	,,
Wilkins, A.	England
Webster, A. G.	Hobart Town
Wright, Stephen P. H.	,,
Wilson, George	,,
Willes, C. J., M.R.C.S. Edin.	Oatlands
Walker, F. T.	Rhodes
Young, Russell	Hobart Town
Young, James...	Bellerive

MINUTES of the ANNUAL GENERAL MEETING of the ROYAL SOCIETY OF TASMANIA, held at the Museum, Macquarie-street, at 7 o'clock p.m., on the 30th January, 1871: The Ven. Archdeacon Davies, Vice-President, in the chair.

The CHAIRMAN having read the advertisement by which the meeting had been convened, called upon the Secretary to read the report.

The Report for 1870 was then read.

It was moved by Mr. H. BILTON, seconded by Mr. J. ALLPORT, and carried, "That the Report be adopted, and printed for circulation amongst the Fellows."

Messrs. J. M. Clarke and F. Abbott, junr., having been appointed Scrutineers, the meeting proceeded to the election of four members of Council in place of those retiring.

The ballot resulted in favour of the undermentioned Fellows, who were declared duly elected :—

F. ABBOTT, ESQ.
T. GIBLIN, ESQ.
JUSTIN MCCARTHY BROWNE, ESQ.
A. G. WEBSTER, ESQ.

Messrs. F. Butler and H. Cook were, on the motion of Mr. M. ALLPORT, seconded by Mr. F. ABBOTT, Senr., re-elected Auditors of annual accounts.

The following gentlemen, who had been previously nominated by the Council, were elected by ballot as Fellows of the Society :—

Molesworth Jeffery, Esq., of Bournbank, and W. E. Baynton, Esq., of Kingston.

A vote of thanks to the Honorary Secretary,

Dr. Agnew, proposed by Mr. J. Allport, and seconded with some complimentary remarks by Mr. Stephens, was unanimously adopted.

Dr. Agnew returned thanks. He was much gratified at being able to report that the financial condition of the Society was so comparatively satisfactory, and he hoped by the invaluable assistance of their Curator, Mr. Roblin, to be able next year to state that all liabilities had been cleared off. This was much to be desired, as it was becoming a matter of necessity that some portion of the funds should be devoted to the purchase of recent books of reference, etc., and to other objects connected with the Institution.

On the motion of Mr. Belstead, seconded by Mr. J. M. Clarke, an unanimous vote of thanks was accorded to the Chairman.

The Chairman returned thanks, remarking that he considered it would be desirable to have a microscopical reunion at an early date for the special entertainment of ladies; and stating that, in conformity with a suggestion made by Mr. Giblin at the last annual general meeting, he purposed giving an address next year, should he then have the pleasure of occupying his present position.

The proceedings then terminated.

REPORT.

The Sesssion of 1870 commenced on the 8th of March, with a paper by Baron F. Von Müeller, C.M.G., F.R.S., etc., entitled "Contributions to the Phytography of Tasmania," and the following papers were read at the meetings during the year:—"Additional Observations on the changes which have taken place in the Star η Argus and its surrounding Nebula," by F. Abbott, F.R.A.S.; "On the Land Shells of Tasmania, with a list of new species," by Mr. W. Legrand; "On the habits of the large Crayfish *(Astacus sp.)* of the Northern Rivers of Tasmania," by C. Gould, Esq., F.G.S.; "Notes on an Excursion to Cummings's Head and the Falls of the Meander," by W. Archer, Esq., F.L.S.; "Notes on an Experiment with the Fumes of Sulphur, and on other methods for the Destruction of Rabbits in their Burrows," by W. Archer, Esq., F.L.S.; "Notes on the Salmon Trout *(Salmo trutta)* at the River Plenty," by M. Allport, Esq., F.Z.S., F.L.S.; "The Sun and its Office in the Universe," by F. Abbott, Esq., F.R.A.S.; "Continuation of Notes on an Excursion to Cummings's Head and the Falls of the Meander," by W. Archer, Esq., F.L.S.; and "Notes on the Californian Thistle," by the same author.

In addition to the papers read, the following subjects were brought under discussion at the monthly meetings:—"The occurrence of Gold at Port Cygnet;" "The Red Spider of the Hop Grounds;" "The Smolt captured in the Derwent and forwarded to Dr. Günther for identification of Species;" "The arrest of development of the Salmon when detained in fresh water;" "Dr.

Günther's opinion as to species of the Smolt sent to him;" "The Caterpillars by which the grain and other crops were so much injured in the early part of 1870;" "The Manufacture of Beet-root Sugar in Tasmania, with correspondence thereon;" "The capture of a Smolt by an angler at New Norfolk; "Coal from Three Hut Point;" "The rapid growth of the English Perch *(Perca fluviatilis)* in Tasmania," etc., etc.

The monthly Meteorological Tables have been regularly published, and copies of them forwarded to the Government Observatories in the neighbouring colonies, from all of which similar returns have been received. The thanks of the Society are again due to Mr. F. Abbott of Hobart Town, Mr. J. Boyd of Port Arthur, Dr. Story of Swansea, and Mr. F. Belstead of Westbury, for their trouble in keeping these important records; also to the Superintendents of the various Lighthouses and Coast Stations, who, by direction of the Marine Board, furnish monthly returns.

The Council has much pleasure in reporting that the monthly "Notes on the Meteorology and Mortality of the Hobart Town Registration District," by E. Swarbreck Hall, Esq., have been regularly supplied and printed during the year.

Our transactions have as usual been transmitted to learned Societies in various parts of the world, and the Fellows will no doubt have observed, by our acknowledgments at the monthly meetings, that very valuable presentations have been received in return.

In order to aid in the advancement of the objects of the Society, it was thought advisable to make an appeal to the public for such increased assistance as they might be enabled to afford, whether by scientific contributions, or by joining

as permanent members. The results have been such as to justify us in still keeping the subject under notice during the present year.

COUNCIL.

No vacancy has occurred during the year. The required list according to Rule XXXII., as amended at the General Meeting of 1868, has been exhibited in the Library for the last fortnight.

FINANCE.

On reference to last year's Report it will be noticed that it was expected our debt would be considerably reduced at the end of the current year. We are happy to say such has been the case, and the state of the Balance Sheet warrants us in hoping that the debt will almost be extinguished by the end of the present financial year.

The total income from all sources was as follows:—Government Grant to Museum £200; to the Gardens £400; subscriptions £127 10s.; sale of Plants, etc., £71 3s. 4d.; amounting to £798 13s. 4d. This with £30 12s. in the hands of the Superintendent of the Gardens for payment of current expenses, 9s. petty cash in hands of Curator of Museum, and £40, which we calculate will be available from arrears of subscriptions, will give a grand total of £869 14s. 4d. The expenditure and liabilities amount to £899 11s. 4d., leaving a balance to debit of £29 17s.

As the following statement shows, the current expenditure for the year has been well within the income:—

	£	s.	d.
Total Receipts from all sources	798	13	4
Total Expenditure	757	11	8
Balance for meeting liabilities	£41	1	8

GARDENS.

In the upper part of the Gardens considerable progress has been made in laying out and planting the trenched ground, through which a broad walk has also been carried. This walk will be continued round the beach as soon as the necessary tract of ground has been reclaimed by the sea wall now in process of erection. It is hoped that this wall will be completed in the course of a few months, and when the arrangements now in progress are fully carried out, this portion of the Gardens will no doubt become exceedingly attractive.

Preparations for the erection of a new boundary fence have been commenced by the Government. About two-thirds of the necessary quantity of cut timber has been received from Port Arthur, and as soon as the remainder arrives the work will be proceeded with as rapidly as possible. It is hoped that arrangements will be made at the same time for the construction of a new entrance, more in keeping with the general character of the grounds than the present one, which is most inconvenient and unsightly.

Owing to the very low state of our finances, and consequently the want of a proper organisation for the collection of suitable plants, our exchanges with Europe are gradually falling of, and the additions to our plant stock during the past year have chiefly been received from the neighbouring colonies. To Baron Von Müeller, Director of the Botanic Gardens, Melbourne, and C. Moore, Esq., Director of the Botanic Gardens, Sydney, we are indebted for many valuable additions of which the following are worthy of special notice:—A valuable collection of Tea,—Cinchona,—various Oaks, including the Cork Oak,—Coniferæ of

economic value,—Hickory and Walnut plants. The above were sent by Baron Von Müeller as test plants to prove the adaptability of Tasmania for their cultivation on a larger scale. Several new Palms, which were discovered by himself on Lord Howe's Island, were sent by Mr. Moore. Among them the *Kentia Balmoreana*, *K. Forsteriana*, *K. Canterburyana*, &c., *Panax Murrayii* (the Palm Panax), *Eucalyptus citriodora* (the Lemon-scented gum), *Laurus cinnamomum* (the Cinnamon tree), and many others equally interesting. About 250 new plants were received during the year.

The number of persons who visited the Gardens during the year is estimated at 21,444.

MUSEUM.

As will be seen by the list of presentations many specimens in various departments of Natural History have been received during the year. All of these for which room could be provided have been arranged in their appropriate sections of the collection, the remainder being placed in store until additional case room, of which we are greatly in want, has been procured.

The spirit preparations in store have largely increased, but, as our funds are not at present adequate to meet the expense of mounting them for exhibition, the most that can be done for some time will be to provide sufficient spirits of wine to preserve them.

The collection of skeletons of native animals has received many additions at the hands of Mr. Roblin, and it is hoped that the majority of these will be placed in the Museum during the ensuing year.

Conchological specimens have been received from several donors, but as they are principally

duplicates of those already in the Museum, they will be chiefly valuable for purposes of exchange. Mr. W. Legrand, to whom the Society is indebted for many additions to this department, is arranging a complete series of Tasmanian land shells, including all those recently discovered by himself, and it is his intention to present the collection when completed to the Museum.

The work necessary for the preservation of the general collection, which requires much time and care, has been carried out. Several alterations have been made in various parts of the Museum for the better display of the objects exhibited, and the work of labelling is being proceeded with as opportunities occur. Specimens have been sent to the Museum of Magdalen College, Cambridge; and Brussels, from which places we shall doubtless receive others in return.

The number of visitors during the year was 8718.

STATEMENT of the Funds of the ROYAL SOCIETY OF TASMANIA for the Year 1870.

RECEIPTS.	£	s.	d.	£	s.	d.
Annual Subscriptions from 76 Members	114	0	0			
Arrears of ditto	13	10	0			
Total Royal Society				127	10	0
MUSEUM.—Grant-in-aid from Treasury	200	0	0			
Total Museum				200	0	0
BOTANIC GARDENS.—Proceeds of Sale of Plants, Fruits, &c.	71	3	4			
Grant-in-aid from Treasury	400	0	0			
Total Botanic Gardens				471	3	4
1871.—Jan. 17.—Balance overdrawn at Commercial Bank				61	12	10
				£860	6	2

EXPENDITURE.	£	s.	d.	£	s.	d.
Balance overdrawn at Commercial Bank, as per statement for 1869				82	4	4
Interest on overdrawn account, 1870, as per Bank Book				5	10	2
ROYAL SOCIETY.—Meteorological Instruments	3	14	1			
Printing and Advertising	34	4	2			
Postage, Parcels, &c.	3	11	7			
Collector's Commission on Subscriptions received, £127 10s., at 5 per cent.	6	7	6			
Messenger for delivering Papers and Proceedings	0	15	0			
LIBRARY.—Books and Stationery	42	17	6			
Total Royal Society				93	9	10
MUSEUM.—Salary of Curator	125	0	0			
Wages of Attendant	52	0	0			
Insurance	6	7	6			
Purchase of, and preparing specimens	2	16	0			
Water Rate	3	3	0			
Fuel and Light	3	16	7			
Sundries and Petty Cash	1	5	6			
Camphor, Spirits of Wine, &c.	9	2	8			
Carriage of Specimens	0	9	6			
Fittings, Repairs, &c.	3	15	0			
Ironmongery, &c.	3	0	9			
Sweeping Chimneys	0	7	0			
Total Museum				211	3	6
BOTANIC GARDENS.—Salary of Superintendent	150	0	0			
Wages of Foreman and Labourers	276	5	0			
Tools and repair of ditto	10	6	1			
Freight and Carriage of Plants	3	4	0			
Stationery and Stamps	2	12	2			
Ironmongery	10	7	3			
Sundries	10	0	10			
Seeds	2	9	6			
Forage	2	13	6			
Total Botanic Gardens				467	18	4
				£860	6	2

Note.—Dr.—To overdrawn Balance at Bank 61 12 10

Balance of Account due Orger and Meryon, London	19	5	2			
Wheatley and Co., to 31st December, 1870 (not received) estimated at	20	0	0			
Total				100	18	0
Cr.—By Cash in hands of Superintendent of Gardens	30	12	0			
Ditto Curator of Museum	0	9	0			
Subscriptions due	40	0	0			
				71	1	0
				£29	17	0

February 2nd, 1871.

Audited and found correct { FRANCIS BUTLER / HENRY COOK } Auditors.

BOOKS PURCHASED & PRESENTED DURING 1870.

[*Presentations marked thus.**]

Arts, Journal of Society of, Vol. 17, Nos. 885 to 888 ; Vol. 18, Nos. 889 to 936 ; Nov. 5th, 1869 to Oct. 28th, 1870.
Arts, Transactions of Society of, 1 Vol., 1868-9.
Archiv fur Naturgeschichte, No. 6, 1867.
*Astronomical Observations made at Melbourne, 1866, 1867, 1868. From R. J. Ellery, Esq.
Athenæum, parts 502 to 513, October, 1869, to September, 1870.
*Agricultural Society of N.S.Wales, Journal of, current numbers.
*Academy, American of Arts and Sciences, Proceedings of, Vol. 7, page 343 to end.
*Builder, The, Nos. 226 to 237, October, 1869, to September, 1870.
British Association, Report of, 1868.
Birds of Australia, Gould's, supplement, Part 5.
*Calendar of Science and Art Department, South Kensington Museum, 1870.
*Climate of London 1818-1820—two volumes.
*Catalogue of Victorian Exhibition, 1861.
*——— of Maps of British Possessions in India.
*——— of Colonial Museum, Wellington, New Zealand.
*——— of Victorian exhibits to Sydney Exhibition.
Conchologia Iconica. Parts 282, 283.
Crayfish, On the habits of the large Freshwater, of Northern Rivers of Tasmania. From the Author, C. Gould, Esq., F.G.S.
*Essex Institute, Salem, Massachusetts, America, Proceedings of, Vol. 5, Nos. 5 to 8.
*Earthquakes, Cause and Phenomena of, by the Rev. W. B. Clarke. From the Author.
*Entozoa, Cobbold's. From the Government.
*Excursion to Cummings's Head, and the Falls of the Meander, Notes on an, by W. Archer, Esq., F.L.S. From the Author.
Florist and Pomologist, Nos. 23 to 34, November, 1869, to October, 1870.
Gardeners' Chronicle, The. Current numbers.
*——————— of New Zealand, from the author, F. Wakefield, Esq., F.L.S.
*Geological Charts of Tasmania, North East Coast. By C. Gould, Esq., F.G.S.
*Intelligencer, Walch's Literary, current numbers.
Journal, Silliman's American of Science and Art, Vol. 48, Nos. 144, 145 ; Vol. 49, Nos. 146, 147 ; vol. 50, Nos. 148, 149.
——— Practical Mechanics, pts. 56 to 60.
——— Quarterly of Science, Nos. 25 to 28.
*Museum of Comparative Zoology, Harvard College, Cambridge, America; Report of 1868, Bulletin of Nos. 6 and 7.
*Magnetism, General Connotations of. By Pliny Earle Chase, Esq. From the Author.
*Minerology of Victoria, Contributions to. By G. F. Ulrich, F.G.S. From Government of Victoria.
*Mineral Statistics of Victoria. From ditto.
*Mining Surveyors, Victoria, Reports of. From ditto.
*Magnetic Survey of Victoria, Results of. By Dr. G. Neumayer. From the author.
*Meteorological Returns, Hobart Town, monthly.
———————, Port Arthur, ditto.

*Meteorological Returns, Swansea, ditto.
———————, Westbury, ditto.
———————, Kent's Group, ditto, July, 1869 to June 1870.
———————, Swan Island, ditto, ditto.
———————, Goose Island, ditto, ditto.
———————, King's Island, ditto, ditto.
———————, South Bruni, ditto, ditto.
———————, Mount Nelson, ditto, ditto.
———————, Melbourne, monthly for 1870.
———————, Sydney, ditto, ditto.
———————, New Zealand, ditto, ditto.
Natural History, Annals and Magazine of, Vol. 4, Nos. 23 and 24 ; Vol. 5, Nos. 25 to 34.
*———————American Museum of, Report of
*Proceedings, Royal Society, London, Vol. 18, Nos. 115 to 122.
*———————— of New Zealand Institute, Vol. 2, 1869.
———————— of Geological and Polytechnic Society of W. Riding of Yorkshire, 1869.
*Patents for Preservation of Food, Victoria, two pamphlets on, by W. H. Archer, Esq. From Government of Victoria.
*Patent Indexes, Victoria. From ditto.
*Patents, Specifications of, Victoria, 1854 to 1856. From ditto.
*———— and Patentees, Victoria, Vol. 3. From ditto.
*Public Ledger Building, Philadelphia, Account of, 1 Vol.
*Report, Smithsonian Institution, Washington, 1866-1867.
————, American Patent Office, 1863 to 1866, ten volumes. From United States Government.
————, of Department of Agriculture, Washington. From ditto.
*———— of National Academy of Sciences, Washington.
*————, 10th Annual, of Columbia Institution for Deaf and Dumb, 1867.
*———— Public Schools, Washington, 22nd Annual, 1867.
*———— Maine Board of Agriculture, 1863.
*———— of Natural History and Geology of State of Maine.
*———— of Commissioners of Fisheries, State of Maine.
*———— on Paris Exhibition, 1867, 6 vols. From the Society of Arts, per Dr. Milligan.
*———— of Commissioners on ditto. From the same.
*Reports on United States Coast Survey, 1863, 4, and 5 ; 3 vols. From U.S. Government.
*Report of South Australian Institute, 1869-70.
*———— Leeds Literary and Philosophical Institution, 1869-70.
*———— New Zealand Colonial Museum.
*Rain, remarks on, as affected by the Moon. By Pliny Earle Chase. From the Author.
*Rot in Sheep, by J. B. Simonds. From R. C. Gunn, Esq.
Student, The, Nos. 22, 23, 24 for 1869 ; Nos. 1 to 4 for 1870.
*Statistics of New Zealand, 1869.
*———— Tasmania, 1869.
*———— Agricultural of Victoria, 31st March, 1870.
*Society, Zoological of London, Proceedings of, Part 3, June to December, 1868 ; Part 1, January to March, 1869.
————, Linnean, Journal of, Vol. 12.
————, ————, ————, Vol. 11, Nos. 50, 51, 52.
————, ————, ————, Vol. 10, Nos. 46, 47.
————, ————, Proceedings of, 1868-69, Page 41 to end.
————, ————, ————, 1869-70, Page 1 to 22.

*Society, Royal Geographical, Journal of, Vol. 38, 1868.
*————, ————————, Proceedings of, Vol. 13, Nos. 2, 3, 4, 5.
*————, Royal Asiatic, Journal of, Vol. 4, Part 1.
*————, Geological, Quarterly Journal of, Vol. 25, Parts 3 and 4. List of, 1869.
*————, Boston, of Natural History, Memoirs of, Vol. 1, Part 3.
————, Boston, of Natural History, Proceedings of, Vol. II., 1866-1868.
*————, ————, ————————, Condition and Doings of, 1867-68.
*————, ————, ————————, Annual of, 1868-9.
*————, Portland, of Natural History, Proceedings of, Vol. 1, Part 2.
*————, American Philosophical, Philadelphia, Proceedings of, Vol. 10, Nos. 77, 78, 79, 1867-8
*————, Cincinnati Astronomical, Annual Address to.
*————, Royal of New South Wales, Address to. By Rev. W. B. Clarke. From the Author.
*Silk, Correspondence on cultivation of. From Dr. G. Bennett, Sydney.
*Star η Argus, Additional observations on changes in, 1870, by F. Abbott, Esq., F.R.A.S. From the Author.
*Sulphur, Notes on an Experiment with the Fumes of, for destruction of Rabbits in their Burrows. By W. Archer, Esq., F.L.S. From the Author.
*Salmon Trout, Notes on. By M. Allport, Esq., F.L.S., F.Z.S.
*Sun, The, and its Office. By F. Abbott, Esq., F.R.A.S.
*Shells, Land, of Tasmania, Notes on. By Mr. W. Legrand.
**Times* newspaper, the, copy of, October 3rd, 1798, containing an account of the Battle of the Nile. From Rev. H. Kennedy.
*Tobacco, "A Breife and Accvrate Treatise, concerning the taking of the Fume of," by Tobias Venner, Doctor of Physicke, 1621. From H. Cook, Esq.
*Tasmania in 1870, by H. M. Hull, Esq. From Geo. W. Rex.
*Trade, Free Intercolonial, pamphlet. By D. Randall, Esq., Adelaide.
Teratology, Vegetable. Ray Society, Vol. for 1869.
*Tasmanians, Last of the. By James Bonwick, Esq., F.G.S. From Dr. Milligan.
*————————, Daily Life of. By James Bonwick, Esq., F.G.S. From Dr. Milligan.
*Thistle, Californian, Notes on. By W. Archer, Esq., F.L.S.

LIST OF PRESENTATIONS TO MUSEUM DURING 1870, WITH NAMES OF DONORS.

Allport, M., Esq.—Insects in spirits, from Port Arthur. Part of Skull of Tunny, from North Coast of Tasmania. A Rail *(Rallus Lewinii)*. Prawns taken from stomachs of Rock Cod. Schorl from Flinders' Island, and a Mass of Resin washed on shore at the same place. Two Fish, caught in the Derwent. [See *Emmelichthys nitidus* in Zool. of Erebus and Terror, page 47, plate 29]. A Black Snake. A Fox Shark, or Thresher.
Allison, F., Esq.—A Pair of Mexican Spurs.
Atkinson, Rev. H. D.—Specimen of *Ibacus Peronii*. A Spider Crab. Eleven specimens of Echinodermata.
Abbott, J., Esq.—Coal from Rookwood, Three Hut Point.
Bayley, Master E.—A Falcon *(Falco frontatus)*.

Butler, J., Esq., Dunedin, per J. W. Graves, Esq. A femur of the Moa *(Dinornis sp.)*

Brand, Mr., Oatlands, per the Hon. J. Whyte, Esq.—A fœtal Wallaby.

Baynton, Mr. W. E., Kingston. Land Shells, Crustacea, &c.

Butler, F., Esq.—Four specimens of Silver Ore from Penguin Creek.

Butler, J. J., Esq.—An English Perch, from Bagdad.

Crouch, Mrs. S. A collection of Weapons, &c., from Fiji, viz. :—1 Pillow, 2 Pieces Tappa Cloth, 1 Female Chief's Dress, 1 Paddle, 2 War Clubs, 1 Piece Samoan Cloth, 1 Sandwich Island Spear, 1 Spear, Skull of Porpoise, Fœtal Porpoise.

Chisholm, Mr. D.—A large Fungus from a Gum Tree.

Cole, Mr. W.—1 Spanish Silver Coin, Carolus III., 1781. 1 Half Dime, United States, 1854. 1 Brass Coin, Louis XVI. of France, 1792. 1 Silver Coin.

Chapman, Mrs.—Seeds from Borneo.

Clinch, Capt.—Jaw of Cestracion, or Port Jackson Shark.

Cook, H., Esq.—A Treatise on Tobacco, 1621.

Cearns, Mr.—Specimens of very large Oysters from North-West Bay.

Dinham, G., Esq.—Two Stone Hatchets of Aborigines of Australia and Tasmania. Portion of Skull of Aborigine from Mona Vale. A Fossil Seed from the Sandstone, Somersetshire, England, found 80 feet below the surface. A Collection of Mineral specimens from England. A copy of "The whole Workes of W. Tyndall, John Frith, and Dr. Barnes," 1573.

Degraves, C., Esq.—Four Fossils from the Limestone at Cascades.

Docksey, Mr.—Three Mineral specimens from Adelaide.

Davies, Mr. G.—Chicken with four legs.

Exton, Mr., Oatlands.—A Rail *(Rallus Lewinii)*.

Edwards, Mr., Oatlands.—A White Kangaroo.

Edwards, Mr., Kewstoke.—A very large specimen of Cornelian.

Forsyth, Captain, brig Waverley.—A Snake and a Lizard from Java.

Forster, J., Esq.—Part of Human Skeleton dug up at Hamilton.

Graves, J. W., Esq.—2 Skulls of Axis Deer from Slopen Island. A Nest of the English Sparrow. A Black Snake. A Cape Barren Goose *(Cereopsis Novæ Hollandiæ)*. A Sparrow Hawk.

Giblin, Mr. R.—A Fish said to have been caught in Mr. Walker's Mill-Race (?).

Gellibrand, T. L., Esq.—A Wedge-tailed Eagle.

Giblin, T., Esq.—A list of subscribers, with signatures, to a testimonial for presentation to Mr. Taylor, of Macquarie River, for resisting an attack on his house by escaped convicts, dated 20th July, 1824. Paper-like Bark of Tea Tree.

Gulliver, Mr. G.—125 specimens of Australian Coleoptera, named.

Gresley, Mr. C. A.—Rock Specimens from River Mersey.

Gibbons, Mr.—A Chicken with four legs.

Hedberg, Mr. O. H.—A collection of Swedish Coins and Notes.

Hopkins, H., Esq.—A fœtal Lamb, a monstrosity. Two Dories.

Hull, H. M., Esq.—Specimen of Iron Pyrites and Malachite. Shells, &c., from Warrnambool. Nest of White-shafted Fantail.

Hedberg, Mr. O. E.—Jaws of Shark.

Hutchison, Rev. J.—A Hermit Crab.

Herpich, Mr.—Three Austrian Notes. Five Turkish Coins. One Austrian and two Hamburg Coins.

Ikin, Mr.—Two Spines of Sting Rays. Twelve specimens of Crustacea.

James, Mr. R.—Part of Skeleton of Ray (?). Jaw of Cestracion.

Jeffrey, Mr. R. A.—Two very Large Mussels, from near New Wharf.

Johnston, Mr. W.—A Bronze-winged Cuckoo.

Knight, W., Esq., junior.—Samples of Cinnabar Ore from Cudgegong, New South Wales.
Leake, J. T., Esq.—A specimen of Roman Brick from St. Alban's, England (the ancient Verulamium).
Luttrell, Mr.—Specimens of Quartz from Tomahawk River and Waterhouse. Crabs from N. Coast.
Lewis, Mr. Gidley.—A Russian Silver Coin of Empress Catherine, 1796. Specimen of Handwriting of General Moreau.
Low, Mr. J. I.—A Black-cheeked Falcon.
Lloyd, Captain, per Mr. O. H. Hedberg.—A Shingle of Macquarie Harbour Pine, from the gaol at Macquarie Harbour built in 1826.
Mayson, Miss H., and Mitchell Miss J.—A Collection of Shells from East Coast, Tasmania.
Marum, Very Revd. Archdeacon.—Fossils from near the Dromedary Mountain, Tasmania.
Museum, Australian, Sydney, Trustees of.—Part of Skull of Fossil Sarcophilus from Wellington caves, N.S. Wales. Eight photographs of *Ceratodus Forsteri.*
Müeller, Baron F. Von.—Skeleton of White Swan.
Makepeace, Mrs., Swansea.—Four specimens of Echinodermata.—Egg cases of *Fasciolaria sp.*
McKenna, Mr.—Living specimens of Gordius from New Town rivulet.
Maclanachan, Hon. J., Esq., a Carolina Drake. A Peacock curiously marked.
Maum, Mr. W.—A Copper Medal, apparently Masonic.
Moir, Mr., jun.—Native Alum from near Brown's River.
Milligan, Dr.—Copies of Bonwick's "Last of the Tasmanians," and "Daily Life of Tasmania."
Nicholas, A., Esq.—Fossil Spatangus from New Zealand.
Neilson, Mr. A.—A very large specimen of the common Slug.
Nelson, Mr. H.—Sample of Coal from Greymouth, New Zealand.
Officer, Sir R.—A Platypus.
Propsting, Mr. R.—A Swamp Hawk.
Plunkett, Mr.—Mittens made by the Esqimaux of Behring's Strait.
Pybus, Mr. R., Bruni Island.—A Crown Piece of Charles II., 1677.
Paisley, Mr.—A Cuttle Fish.
Parker, Mr. T.—Auriferous Quartz from Pioneer Reef, Waterhouse.
Pearsall, Mr.—A Chestnut-faced Owl.
Pelham, Mr.—A Fish picked up on beach at Kangaroo Point.
Philip, Mr.—Part of Vertebra of Whale.
Price, Mr. W. H.—A Ram's Head with four horns.
Rex, Mr. Geo. W.—The Crop of a Fowl containing an entire Whipsnake.
Roblin, Mr. T.—Specimen of *Aplysia sp.* from Cornelian Bay.
Read, R. C., Esq.—A Native Devil *(Sarcophilus ursinus),* with three young in pouch.
Robinson, Captain, barque "Free Trader."—A sample of Bituminous Coal from a new seam at Newcastle, New South Wales.
Robertson, Mr. R.—A large bony mass from a horse's jaw, which had been previously fractured.
Smith, Mr. F.—Specimen of *Aplysia,* from Brown's River.
Smith, Mr. G. J.—Piece of Native Box Wood, *(Bursaria spinosa)* with thorns embedded in its substance.
Smith, Mr. W.—A Flounder, curiously marked.
Smith, Mr. J., Brig "Waverley."—Snakes, Lizards, &c., from China.
Serckoff, Captain, H.I.M's. Corvette "Boyarin."—A collection of Russian Coins, viz., 1 Gold, 5 Silver, and 9 Copper.

Spurling, Mr.- Specimen of the *Chimæra Australis*, caught in the Derwent.
Salmon Commissioners. A Salmon Parr from the breeding ponds, River Plenty.
Scott, J. Esq., M.H.A.—Cast skin of Snake, from Ringarooma.
Tapfield, Mr. M. A specimen of Gorgonia, with a species of *Astrophyton* attached.
Turner, Mr. H.—A Persian or Hindoo copper coin.
Weber, Mr. M. A War Club from Fiji.
Weaver, Mr. G.—A Musk Duck.
Warren, Captain R.E.—Feet of Cariboo Deer.—Mocassins made from hocks of Moose Deer.
Wintle, Mr. S. H.—Two specimens of Granite from the Tomahawk River. Fossil ripple marks in sandstone, from Southport. 20 Geological specimens from New South Wales and Victoria.
Wood, Mr. A.—A very curious Crustacean from Blackman's Bay.
Williams, Captain.—A Cuttle Fish from East Coast.
Wise, Mr. F.—A Smolt caught by an angler at New Norfolk.
Young, Mr. James.—A Spider Crab. Human Skull from Fiji. Jaws of Port Jackson Shark *(Cestracion)*.

PLANTS SENT FROM THE ROYAL SOCIETY'S GARDENS DURING 1870, CHIEFLY TO PERSONS RESIDING ABROAD.

March 15th.—To the Sydney Botanic Gardens.—One Case containing 61 plants.
March 21st.—To Mr. E. B. Heyne, Seedsman, Adelaide.—Collection Seeds and Bulbs.
March 29th.—To Mr. F. Terry, Government House, Brisbane.—Seven species Tasmanian Ferns.
June 1st.—To Mr. G. Brunning, Nurseryman, Melbourne.—Twenty-one plants, 12 packets seeds.
June 1st.—To Mr. J. Harris, Nurseryman, Melbourne.—Thirteen plants, 12 packets seeds.
June 10th.—To the Botanic Gardens, Sydney.—One Case containing 76 plants.
July 13th.—To B. F. Laurie, Esq., Encounter Bay.—One hundred Morus alba.
July 16th.—To Messrs. Toole and Co., Nurserymen, Dublin, Ireland.—Ten packets seeds.
August 17th.—To Messrs. Taylor and Sangster, Toorak Nursery, Melbourne.—Twenty-five plants, 10 packets seeds.
August 17th.—To Ferd. Von Müeller, Director, &c., Botanic Gardens, Melbourne.—29 plants, 11 packets seeds.
August 17th.—To Mr. G. Brunning, Nurseryman, Melbourne.—7 plants, 3 packets seeds.

PLANTS AND SEEDS SUPPLIED FOR THE DECORATION OF PUBLIC PLACES, DURING 1870.

April 25th.—For Castray Esplanade.—Collections of Creepers.
June 2nd.—For planting Church grounds, Bothwell.—Seventy plants.
June 3rd.—For planting Agricultural Society's grounds. Evandale.—Seventy plants, Collection Roses, 12 packets seeds.
June 14th.—For planting in the Franklin Square.—15 plants, 10 plants.
June 20th.—For planting at Hospital for Insane, New Norfolk.—Eighty plants.
June 21st.—For planting round the foundation of Public Buildings, Macquarie-street.—Seventy three plants.
June 24th.—For plantation at Cascade Factory, Upper Macquarie-street. Sixty-three plants.
June 30th.—For planting about grounds of Government House.—Fifty plants.
July 1st.—For planting avenue of Military Barracks.—Thirty-six plants.
July 11th.—Mr. J. Archer, for church grounds, Longford.—Fourteen plants.
July 12th.—For planting grounds of St. Michael's Church, New Norfolk.—Fifty-four plants.
July 12th.—For planting ground at Macquarie-street entrance to Domain.—One hundred and twenty plants
July 30th.—For planting at Castray Esplanade.—Thirty-two plants.
July 30th.—For planting about grounds of Government House.—Fifty plants.
August 5th.—For planting grounds at Colonial Hospital.—Sixty-four plants.
August 11th.—Ditto.—Thirty-three plants.
October 14th.—Mr. T. Reidy, for grounds at Gaol. Twenty plants, 36 packets seeds.

PLANTS AND SEEDS RECEIVED AT THE ROYAL SOCIETY'S GARDENS DURING 1870, CHIEFLY FROM PERSONS ABROAD.

April 25th.—From Mr. E. B. Heyne, Seedsman, Adelaide.—One hundred and thirteen packets seeds.
May 13th.—From Mr. Joseph Harris, Nurseryman, Melbourne.—One case containing 28 plants.
May 13th.—From Baron Von Müeller, Melbourne Botanic Gardens.—Three cases containing 153 plants.
May 23rd.—From the Sydney Botanic Gardens.—Two cases containing 74 plants.
May 24th.—From Mr. G. Brunning, Nurseryman, Melbourne.—One case containing 31 plants.
June 7th.—From Messrs. Toole and Co., Nurserymen, Dublin, Ireland. Twenty-four packets seeds.
June 24th.—From Mr. G. Brunning, Nurseryman, Melbourne.—Bundle containing 31 roses.
July 7th.—From Messrs. Taylor and Sangster, Toorak Nursery, Melbourne.—One box containing 26 plaints.
July 13th.—From Mr. C. F. Creswell, Hobart Town.—Twenty-four packets seeds received from Europe.

August 25th. From the Melbourne Botanic Gardens.—Seeds of a new Palm *(Ptychosperma Alexandræ)*.

September.- From Dr. J. Milligan, London.—Collection Flower and Vegetable Seeds, 68 packets.

September 30th. From Mrs. Woodin, Hobart Town.—Seeds of the Umbrella Pine received by her from China. *(Sciadopitys verticillata.)*

December 10th.—From Mr. C. F. Creswell.—Azalea and Camellia plants.

December 31st.—From the Sydney Botanic Gardens.—One Case containing 43 plants.

F. ABBOTT, JUN.,
Superintendent R. S. Gardens.

PLANTS INTRODUCED INTO THE ROYAL SOCIETY'S GARDENS DURING 1870.

Acanthus montana
Alocassia metallica
Alsophilla M'Arthurii
Alternanthera spathulata
Amaryllis reticulata
Areca rubra
Areca Baueriana
Asperula setosa azurea
Atherosperma micrantha
Bambusa stricta
Bannisteria chrysophilla
Bauhinia tomentosa
Beleperone oblongata
Berberis pallida
Blaberopus sericeus
Blandfordia flammea
Bœhimeria argenteda
Boronia megastigma
Botryodendron latifolium
Bryonopsis laciniatia
Calocasia macrorrhiza variegata
Cassia Brewsterii
Centaurea Fenzlii
Cistus lusitanicus
Cleidon verticillatum
Clerodendron Thompsonianum
Cocos plumosus
Cryptocarya oblongifolia
Cycas Preissii
Dactylis glomerata variegata
Datura Carthagenensis
Datura fastuosa
Datura humilis pl.
Dicksonia Youngiana
Dipteracanthus affinis
Dombeya mollis
Dorstenia maculata
Edwardsia chrysophilla
Elæocarpus Hinau
Elæodendron glaucum
Epacris grandiflora
Eranthemum tuberculatum
Ethionema græcum
Eucalyptus citriodora
Eucalyptus Preisiana
Eudiandra virens
Eugenia Brasiliensis
" Ventenatii
Fagus Carrownii
Ferula communis
Ficus columnaris
Ficus peltata
Flindersia maculosa
Fraxinus elliptica
Frenela cupressoides
Frenela verrucosa
Gardenia chartacea latifolia
Geranium crassifolium
Grevillea acanthifolia
Grewia denticulata
Hakea microcarpa
" pycnobotrys
" ulicina
Helicia ternifolia
Helipterum anthemoides
Hemicyclia australasica
Hibiscus Guilfoyleii
Hovea pannosa

Hydrangea japonica rosea
" japonica variegata
Incarvillea sinensis
Inga pulcherrima
Iresene Lindenii
Jambosa acida
Jasminum heterophyllum
Justicia Lindenü
Kentia Balmoreana
" Canterburyana
" Forsteriana
Lasiandra Fontanesii
Laurus Cinnamomum
Licuala peltata
Linaria tristis
Linum perenne roseum
Magnolia anonæ folia
Malpigia coccifera
Martynia proboscidea
Melathra scabra
Melicope ternata
Menyanthes trifoliata
Michellia champaca
Nephelium tomentosum
Octoclinus Macleayanus
Palava flexuosa
Panax Marrayii
Pandanus Fosterii
Pandanus spiralis
Papyrus antiquorum
Passiflora trifasciata
Pavia Californica
Pentas Kermessina
Pentstemon Jeffreyanum
Pentstemon ovatum
Phillyrea media
Phytolacca sylvestris
Phœnix sylvestris
Pinus Aucklandiana
" contorta
" Fremontiana
" Lambertiana
" palustris
" pandurata
Pittosporum Zealanicum
Plattycodon grandiflorum
Plectroma ventosa
Pleroma heteromala
Podalyria myrtifolia
Podocarpus pruinosus
Prumnopitys elegans
Pteris tricolor
Pterospermum lancifolium
Quercus bicolor
" lanata
Quintinia Sieberii
Ratonia tenax
Ruellia longifolia
Sanchezia nobilis variegata
Sansievera carnea variegata
Scolopia Brownii
Scutellaria Tranei
Stephania hernandifolia
Stipa pennata
Strobilanthus viscosus
Taxus baccata elegantissima
" umbraculifera
Tecoma grandiflora
Tarrietia Carrownii
Tatranthera ferruginea
Thunbergia javanica
Tilia argentea
Vanqueria lasiantha
Veronica diosmæfolia
Vitis capensis
" hypoglauca
Whitlavia gloxineoides
Wigandia Caracassana
Wigandia Macrophylla
Xanthorrhœa arborea
Xeranthemum purpureum
Zamia Preisseii
Rhododendron
" Gibsonii

CAMELLIA.

Aspasia
Atrorubens
Loweii

AZALEA.

Alba magna
Carininata
Duc d'Nassau
Holdfordii
Magnifica
Ponticum glauca
Refulgens
Rubra plœno
Smithii
Souvenir d'l Exposition

GERANIUM.

Bicolor
Celestial
Chief Justice
Emile Lemoin
Evening Star
Ephraim
Forestier
Madame Lemoin

Ratonia Rose Charneaux
Prince of Orange
Rebecca
Sophia Cussack
Sophia Dumeresque
Tiara
Triumph de Themesnil
Troubadour

ROSE.

Alba Carnea
Charles Verdier
Clotilde Rolland
Ernest Boncenne
Eugene Scribe
Gloire de Ducher
Horace Vernet
La France
Madame Annie Wood
" Charles Crapelet
" George Paul
" La Baronne de Rothschild
" Marie Cirodde
" Noman
" Ledoux
" Theresa Levet
Marguerite de St. Amand
Merveille d'Anjou
Miss Ingram
Model of Perfection
President Willermoz
" Lincoln
Princess Alice
" Mary of Cambridge
Sophie de La Villeboisne
Souvenir du Dr. Jamain
Vicomptesse de Vezins

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MONTHLY NOTICES

OF

Papers and Proceedings

OF THE

ROYAL SOCIETY

OF

TASMANIA,

FOR

1871.

TASMANIA:

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

1872.

Contents.

Errata.

Page 23.—Omit the twenty-ninth line, "The Secretary read the following."

Page 60.—Fifth line of fifth paragraph, for "rugs in the granite," read "vugs in the granite."

Page 61.—Second line of ninth paragraph, for "rugs," read "vugs."

ROYAL SOCIETY.

MARCH, 1871.

A monthly evening meeting of the Society was held on Tuesday the 14th March; Morton Allport, Esq., in the chair.

The following gentlemen, who had been previously nominated by the Council, were, after a ballot, declared to be duly elected as Fellows of the Society:—Mr. P. Irvine, Hobart Town; Mr. Jamieson, Hobart Town; Mr. J. Rule, Bellerive, Kangaroo Point; Mr. J. Milward, Hobart Town; Mr. John Macfarlane, Hobart Town; Mr. James Macfarlane, Hobart Town.

The SECRETARY laid on the table the following returns:—

1. Visitors to Museum during January and February, 1788.
2. Ditto Gardens ditto, 4366.
3. Plants, &c., sent from Gardens.
4. Tench ditto.
5. Books and periodicals received.
6. Presentations to Museum.

Meteorological Returns:—

1. Hobart Town, from F. Abbott, Esq., tables for January and February.
2. Port Arthur, from J. Boyd, Esq., ditto.
3. Swansea, from Dr. Story, ditto.
4. Westbury, from C. Belstead, Esq., ditto.
5. New Zealand, from the Government, ditto for 1869, and October, November, and December, 1870.
6. Sydney, from H. C. Russell, Esq., Government astronomer, table for December.
7. Melbourne, from R. Ellery, Esq., tables for December, 1870, and January, 1871.

"Notes on the Meteorology and Mortality of the Hobart Town registration district for March, 1871," by Dr. E. Swarbreck Hall.

The presentations to the Museum were as follow:—

1. From L. S. Travers, Esq., Collection of specimens illustrative of the Carboniferous system of New South Wales, with notes by W. Keene, Esq., F.G.S.
2. From Captain Williams, of the American whaler Osmanli, a collection of Shells from Fiji, also a War Club from the same place.
3. From Mr. W. E. Baynton, Land Shells from Brown's River.
4. From Mr. J. Buckland, Skin of Monitor Lizard.
5. From Master Hull, Nest and eggs of Honey Eater.
6. From Jas. Scott, Esq., M.H.A., nine stone implements made by aborigines of Tasmania, from Macquarie River (with a note).
7. From Mr. T. B. Handley, a Harpoon, much twisted, found in a nine tun whale captured off Macquarie Harbour by Captain Smith, of the Maid of Erin.
8. From Mr. Rowntree, polished specimen of Native Myrtle *(Fagus Cunninghamii).*

9. From the Hon. the Minister of Lands and Works, a sample of Stone Alum from Brooks' Creek, Black Boy.

[The SECRETARY observed that no information was forwarded with the specimen as to the quantity which could be obtained, or the expenses which would be incurred in purifying it on the spot, or in forwarding it to a shipping port for exportation to Melbourne or England, for the purpose of preparing it for the market. He had been informed by Mr. Justin Browne that purified alum was worth about 10s. 6d. per cwt. in the English market. On the whole, however, he feared from what he had occasionally learned that our supplies of alum, which occurred in various localities in the island, were not so accessible or in sufficient quantities to be of any economic value.

Mr. Justin BROWNE said the common alum was worth from 9s. to 10s. per cwt., and the refined about 56s. There were only two localities in Britain where it was prepared, Whitby and Hurlett, which furnished upwards of 4,000 tons annually. About 7,000 tons were also exported annually from China. [Full information on the subject of alum can be obtained on reference to Ure's Dictionary of Manufactures, and Muspratt's Chemistry.]

10. From Mr. Nash, Kangaroo Point, a German Lottery Ticket.
11. From R. C. Read, Esq., New Norfolk, specimen of black marble from the Florentine Valley, River Gordon.
12. From Mrs. W. Giblin, two specimens, male and female, of the Sydney Parrot, or King Lory *(Aprosmictus scapulatus.)*
13. From Mr. W. M. Campbell, Port Cygnet, a White Hawk *(Leucospiza Novæ Hollandiæ.)*
14. From Frederick T. Walker, Esq., Rhodes, a bow, 6 arrows, and a branch of coral used as a club, from Tanna, New Hebrides. Two clubs, 2 pieces of Tappa cloth, 3 mats, a pillow, 3 pieces of sponge, a sample of sugar cane, a piece of Angora root (from which the drink called Kava is made), and 2 beetles, from Fiji.
15. From the United Happy Valley Company, per M. Seal, Esq., a specimen of auriferous quartz from Christmas Reef (very rich); ditto from New Reef, Ovens, Victoria.
16. From Mr. Gates, Jerusalem, a Diving Petrel *(Puffinaria urinatrix)* caught in a corn-field at a considerable distance inland. [These birds have occasionally been found in similar situations, having probably been driven in from the coast by stress of weather.]
17. From Mr. W. Smith, Port Davey, portions of skull of Sperm Whale, 1 pelvic bone of ditto, ear bone of whale, curiously twisted saplings from Port Davey, nest and eggs of White-shafted Fantail, *(Rhipidura albiscapa.)*
18. From Captain Fisher, of the Wild Wave, portion of tusk of Mastodon, from Siberia. [This specimen was found underground in lat. 65 N., long., 167 E.; the length of the whole tusk was about 15 feet.]
19. From G. Stokell, Esq., perfect skeleton of a Sandwich Island native.
20. From Mr. J. Clark, a common rat caught by a mussel on a pile of the fish market wharf. [The mussel had closed its shell with one toe of the rat between the valves, and so held it firmly until it was observed and destroyed. The mussel retained its hold for two days after removal from the pile, and then the valves had to be prized open with the point of a knife.]
21. From Mr. Oscar Hedberg, tanned skin of a Jaquar (?)
22. From Mr. J. Tapp, ship Figaro, a Danish coin, 1 mark.
23. From Mr. F. Abbott, jun., a Blue Mountain Parrot *(Trichoglossus Swainsonii.)*

24. From A. Allison, Esq., Macquarie River, an eel of a bright golden yellow colour.
25 From Mr. M. Seal, fossil seeds from a recent tertiary formation at Haddon, near Ballarat, Victoria, found 120 feet from the surface, and about 5 feet above the sandstone or bed rock. [These specimens are of great geological interest; many of them are extremely perfect.]
26. From Mr. R. Thorne, Pittwater, two specimens of Spine-tailed Swift *(Acanthylis caudacuta.)*
26. From Mr. R. Wright, Glenorchy, one ditto.

The SECRETARY called the attention of the meeting to some packets of silk worm ova, silk cocoons, and documents containing recent information on the subject of sericiculture. These were presented to the Society by His Excellency the President. Dr. Agnew having intimated that they would lie on the table for some time, for the inspection of visitors, read the following letter, addressed to His Excellency by Dr. Wallace, of Colchester :—

"October 27th, 1870.

"His Excellency, C. Du Cane, Esq.

"SIR,—I have had the honor to write to you on former occasions in regard to sericiculture. I again take the liberty to direct your attention to the progress that industry is making in many of our colonies. Owing to the efforts of the Silk Supply Association most of our colonies have been stimulated to experiment and fresh exertions. The Cape of Good Hope, New Zealand, and part of Australia, are commencing to take up this industry on a secure basis, and I trust to hear that Tasmania will not lag behind. I expect to hear in a few days that my friend Mr. Charles Brady, of Curl Curl, Sydney, N.S.W., has received a grant from Government for his efforts during the last ten years in introducing silk culture successfully—as also that a similar grant has been made in New Zealand to the promoter there of that valuable industry—so valuable that in 1869 £300 clear profit was made off one acre in California.

"I have the honor to enclose my friend and colleague M. Teutschel's cards and circulars by this mail. He takes off my shoulders much of the active work, leaving me the foreign correspondence, experiments, &c. You will note that he offers to supply all that is wanting to intending experimenters, on receipt of draft or good reference. He also receives and disposes of, on commission, produce, such as cocoons and eggs, the latter if of good races proving most remunerative—as much as 15s. to 25s. for good eggs being paid in the Continental market.

"M. Teutschel has received, for sale, eggs from Japan, Australia, and expects others from New Zealand and the Cape. If eggs are sent, empty cocoons should be sent with them as samples to show the character of the parent stock, and the eggs guaranteed to come true to sample. He supplies reeling and mulberry-leaf cutting machines —the latter brought out by me this year is a great economiser of labour, very valuable in a colony. Sample cocoons of the races sent out by M. Teutschel this season shall be sent either *viâ* Brindisi, or by next mail. Supplies of eggs and seed may be had either direct from M. Teutschel, or, if small, on application to Mr. Charles Brady, of Curl Curl, Manly, Sydney, N.S.W., by mentioning my name, we supplying him.

"M. Teutschel has had eggs from Japan and Australia for sale in the Continental markets, and expects more in 1871, with supplies from New Zealand and the Cape.

"I trust to hear shortly of silk culture being undertaken in Tasmania, and M. Teutschel will be glad to assist by all in his power to develope the rich resources of the country as regards sericiculture.

"Will you kindly distribute his cards and circulars among those most interested in the new pursuit?

"Believe me to remain,
"Faithfully yours,
"ALEX. WALLACE, M.D."

Mr. Justin BROWNE said that, having read various papers that had been published on the propagation of the silk-worm with a view to the production of silk, he was able to state that the early numbers of the papers issued by the Silk Supply Association were now on the table of the Hobart Town Chamber of Commerce, where they could be examined by any person interested in the subject. The association was established by gentlemen in London largely interested in the silk trade, as well as by wealthy men who had retired from business. The enormous importations of silk-worms egg from Japan had supplied the Italian and French growers with grubs, but for which the culture of silk in France and Italy would have utterly failed, notwithstanding the researches of M. Pasteur, who had applied himself to the study of the cause of disease in the silkworm, and had perhaps found a remedy. A letter had lately appeared in the London *Times* directing attention to the restrictions placed upon the transmission of silkworms eggs through the post, and pointing out the injury that the silk culture of Europe would sustain if these restrictions were maintained, the Post Office having hitherto afforded a rapid and safe mode of conveyance from the East to Europe. A series of articles, written by Mr Cobb in *Morgan's Trade Circular* of July and August last, were especially worthy of notice. The writer quoting his experience in Italy stated that when the worms no longer needed mulberry leaves for food, the remaining produce of the trees was gathered and used for sheep and cattle food, the flavour of meat produced from mulberry leaf fed sheep being superior to that fed in the ordinary manner. The fruit, with some rice, formed almost the only food of the inhabitants while it was in season, and the tree grew successfully in hedge rows. The speaker went on to say that the late Mr. Stutzer had shown much more foresight than had been attributed to him, in advocating the growth of the mulberry tree, and the propagation of the silkworm, and had he remained in Tasmania, and lived to superintend the plantation made by him at the Orphan School, there would now, probably, have been some small export of silk or cocoons (for the latter are now preferred by English manufacturers) from this colony, as the product of a branch of industry carried on by inmates of that institution. The individual parcels of silk hitherto produced here were rather the result of amusement than of any attempt to open a new branch of trade.

The SECRETARY read a letter from Dr. Story, Swansea, on the desirability of introducing the cork oak, and the medicinal squill into the colony, for both of which he thought the climate very suitable.

Mr. ABBOTT remarked that a cork oak *(Quercus suber)*, about 14 ft. high, now in the Society's Gardens, flowered for the first time this year. From this a small supply of acorns will be obtainable by any one willing to plant them; but a large supply of the oak has been raised in Melbourne Botanic Gardens by Baron Von Mueller, from whom last year the Government received some young trees, which are now growing on Tasman's Peninsula. In addition to these, a few remain at the Society's Gardens for distribution. There is little doubt that Baron Von Mueller would furnish plants to any one who would bestow a sufficient amount of care on this valuable tree, as he thinks it will flourish in Tasmania.

[The medicinal squill *(Urginea scilla)* well thrives in the Gardens. Six

bulbs were planted out last year, three of which have divided into two or three bulbs each.]

Mr. M. ALLPORT read a paper entitled "Observations on the progress of the Salmon experiment."

Discussion followed, during which several of the Fellows expressed their gratification at the tangible success which had been achieved by the acclimatisation of the salmon trout *(Salmo trutta)*. As so few ova of this fish were received from England in comparison with the numbers of those of the *S. salar*, no doubt could be reasonably entertained that the introduction of the latter has been equally successful, although a specimen has not yet been caught; a circumstance at which no practical fisher, at all acquainted with the Derwent, can be astonished.

Mr. BARNARD moved, that the thanks of the meeting were due to Mr. Allport for his highly interesting paper; and to Mr. Justin Browne, to whose remarks, particularly those on the subject of sericiculture, he was happy to listen. Although Mr. Stutzer was by some deemed a visionary for his efforts to establish silk culture at the Queen's Asylum, he had little doubt these efforts would bave been crowned with complete success had their author been spared to conduct them to their issue. It was still worthy of serious consideration, if the large amount of juvenile labor at the command of Government could not be very profitably exercised in establishing an industry which was so likely to be of advantage to the colony, both by absorbing a large amount of, at present, almost useless labour, and by furnishing a new and important article of export.

The motion having been carried, and a vote of thanks accorded to the various donors of presentations, the meeting terminated.

APRIL, 1871.

The monthly evening meeting of the Fellows was held on Tuesday, the 11th April, M. Allport, Esq., in the chair.

S. Smith Travers, Esq., who had previously been put in nomination, was, after a ballot, declared duly elected a Fellow of the Society.

The Secretary, Dr. Agnew, submitted the usual returns for the past month, viz. :—

1. Visitors to Museum, 998.
2. Ditto to gardens, 2,034.
3. Leafing, flowering, and fruiting of a few standard plants in the Botanic Gardens.
4. Books and periodicals received.
5. Presentations to Museum.

Meteorological Returns :—

1. Hobart Town, from F. Abbott, Esq., table and summary for March.
2. Port Arthur, from J. Boyd, Esq., ditto for March.
3. Westbury, from F. Belstead, Esq., ditto for February.
4. Sydney and other stations in New South Wales, from the Government Observer, printed tables for January.
5. Melbourne, from R. L. J. Ellery, Esq., table for February.
6. Great Britain, from the Meteorological Office, London, Quarterly Weather Report, part 2, 1869.

The Secretary read a communication from Dr. E. S. Hall, to the effect that he had been unable to prepare his usual analysis of the meteorological records, &c., in time for the meeting, but giving instead a short abstract of the general results, and promising a full return in a few days.

The presentations to the Museum were as follow :—

1. From Lieutenant Leefe, R.N., a small collection of shells from Fiji.
2. From Mr. S. Dove, a very large Mussel shell from the Derwent, near the New Wharf.
3. From Mr. John Gage, a skull, probably of an Aborigine, found on Mount Direction.
4. From J. Maclanachan Esq., M.L.C., a Carolina Duck (*Dendronessa sponsa*).
5. From Mr. R. Giblin, a Kingfisher (*Alcyone azurea*).
6. From Mr. M. Allport, a very large specimen of the Mantis, from North Coast of Tasmania.
7. From Sir Robt. Officer, a geological map.

The following letter from Mr. McIntyre was read in continuation of the subject, Alum, which was discussed at the last evening meeting.

"Sir,—Allow me to refer to the observations made at the last meeting of your Society, respecting the sample of stone alum from Brook's Creek, which I forwarded a few weeks back to the Hon. the Minister of Lands and Works. I find that the members present were at a loss as to the quantity of the mineral which could be obtained, the expenses incurred in preparing it for the market, and the expenses attending exportation to Victoria or England. The following I submit is an approximate of the cost :—Raising and crystallizing, 15s. ; transit to Launceston, 40s. ; freight to England, 20s. ; extra commission, &c., 5s. ; total, £4 per ton, and as to quantity thousands of tons are open to view. The quotations in England by last mail are £7 5s. and £8 10s., which would leave a handsome margin to exporters. I may, however, remark that I have written by this mail to several drysalters in Manchester, and when

I receive authentic information, I shall take the liberty of supplying you, on behalf of the Society, with the information I receive.

"I am yours respectfully,

"PETER MCINTYRE.

"Launceston, 29th March, 1871."

The SECRETARY read a paper from the Rev. H. D. Atkinson, of Three Hut Point, entitled, "Some Remarks on the Geology of Bruni Island."

Mr. M. ALLPORT doubted if anything mentioned in the paper warranted the inference that there had been any long geological period of separation between the island and the mainland of Tasmania. The Flora, indeed, indicated a somewhat recent junction, that of South Bruni was identical with that on the opposite shore; the same was generally the case with North Bruni, and no special Flora whatever existed on the island. As to the carnivorous Marsupials he had been told by Mr. Graves and others that the Native Devil *(Sarcophilus ursinus)* had been seen in considerable numbers on South Bruni.

Mr. J. DAVIES corroborated Mr. Allport's statement as to these carnivora, as he had himself seen them in the locality indicated.

The SECRETARY called the attention of the meeting to the collection of fruit sent in from the Society's gardens, comprising about 108 varieties of apples, 60 of pears, and 4 of late plums.

Discussion of a conversational character ensued, and the business terminated with a vote of thanks to the Rev. H. D. Atkinson for his paper, and to the donors of presentations.

MAY, 1871.

The monthly evening meeting of the Society was held on Tuesday, the 9th May, M. Allport, Esq., F.L.S., F.Z.S., in the chair.

The following returns were brought under notice, viz. :—

1. Visitors to Museum during April, 817.
2. Visitors to Gardens during April, 2,050.
3. Time of leafing, flowering, &c., of a few standard plants in Botanic Gardens during April.
4. Books and periodicals received during April.
5. Presentations to Museum during April.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., table for April, with summary of observations.
2. Westbury, from F. Belstead, Esq., tables for March and April.
3. Swansea, from Dr. Story, table for March.
4. Port Arthur, from J. Boyd, Esq., table for April.
5. Sydney, from the Government Observatory, printed tables for February. Abstract of Meteorological Observations made in New South Wales, to end of 1869, by H. C. Russell, Esq., B.A., Government Astronomer.
6. Melbourne, from R. J. Ellery, Esq., table for March.

"Notes on the Meteorology and Mortality of the Hobart Town registration district for May, 1871," by Dr. E. Swarbreck Hall.

The presentations to the Museum were as follow :—

1. From Rev. Mr. Whitmee, two Mats as worn on festive occasions by women of Samoa.
2. From Mr. Barwick, Tea Tree, a specimen of Eyton's Duck (*Leptotarsis Eytoni*, Gould) found dead near Richmond.

[The occurrence of this bird in Tasmania is remarkable, and difficult to be accounted for, it being an inhabitant of the north-west coast of Australia. Gould states that "the farthest south it was afterwards met with was on the Albert River, in the Gulf of Carpentaria, in latitude 18° S."]

3. From Mr. W. Holmes, Jerusalem, a Parrot unusually marked.
4. From Mr. G. Whitcomb, a fine specimen of Kauri gum, from New Zealand.
5. From Mr. W. B. Watchorn, a Spider Crab.
6. From Mr. Lukin Boyes, a pair of Musk Ducks (*Biziura lobata*) shot at Austin's Ferry ; a small Bat.
7. From Master A. Haywood, a Portuguese copper Coin, 1814.
8. From Sir R. Officer, a Land Rail (*Rallus pectoralis*) shot at New Norfolk.
9. From Mr. Robert Gatenby, Macquarie River, a male specimen of the Native Tiger (*Thylacinus cynocephalus.*)

The SECRETARY read the following letter from Mr. Ellery, President of the Royal Society of Victoria, and Government Astronomer :—

Royal Society of Victoria,
Victoria-street, Melbourne, 22nd April, 1871.

SIR,—A proposition has been brought before this Society for a joint expedition from the several Australian colonies to Cape Yorke Peninsula, to observe the total eclipse of the sun, which will take place on the 12th December next.

The scientific interest of this phenomenon is very great, and the points to be determined are important. As far as is known there will be no further

total eclipse of the sun readily accessible from Australia during the remainder of the present century.

The proposal is that a steamer should be chartered to start from Melbourne about the 20th November, and touching at intermediate ports, to convey such persons as may desire to witness the eclipse.

It is expected that the total cost will not exceed £25 per head of those who form the party.

It is proposed that the expedition should be under the charge of the Government Astronomer, so far as the control of the steamer is necessary to prevent undue delay.

A committee of this Society has been appointed to make preliminary enquiries, and I have to request that you will have the goodness to make the proposal known, and to inform me how many gentlemen from Hobart Town are likely to join it.

I have the honor to be,
Sir,
Your most obedient servant,
ROBERT L. J. ELLERY,
President of the Royal Society of Victoria.

To the President of the Royal Society,
Hobart Town.

Mr. M. ALLPORT, in reference to the question of carnivorous marsupials on South Bruni, mooted at last meeting, begged to say he had recently been informed by Mr. Bennett (of Sandy Bay toll bar), that he had not only seen the native devil on Bruni, but had actually shot one when residing there some ten years ago. At that time, at least, they were pretty numerous, and appeared to haunt a portion of the shore where they could obtain portions of seal and whale flesh, left after the process of "trying out" the oil.

Mr. GRAVES had never actually obtained a carnivorous animal from South Bruni, but about 18 months ago he had seen from a boat a number of small animals like black rabbits on the shore there. He was puzzled at their appearance, and soon afterwards visited the spot again to make further examination. He could find no traces whatever of rabbits, but afterwards meeting with Mr. Bennett, he was informed by him that the animals were native devils, which was proved by the fact of his having shot one.

Mr. ALLPORT had himself seen one small carnivorous marsupial on South Bruni, the *Antechinus leucopus*, which also occurs in considerable numbers on Partridge Island. This too was an animal which must have been indigenous, and not introduced by the natives.

Mr. F. ABBOTT read a long and interesting astronomical paper, the subject being that of η Argus and its surrounding nebula, which was listened to with great attention.

Discussion of conversational character having taken place, a vote of thanks was accorded to Mr. Abbott for his paper, and to the donors of presentations, after which the meeting broke up.

OBSERVATIONS ON THE PROGRESS OF THE SALMON EXPERIMENT.

By Morton Allport, F.Z.S., F.L.S.

Since our last evening meeting several large fish have been taken by a fixed net in the Derwent, immediately below the mouth of the Plenty, which fish differed so materially from the trout caught in the Plenty and those retained in the ponds, as to induce a belief that a veritable grilse had at length been caught. The first of these fish, a female weighing $4\frac{1}{2}$ lbs., was taken on the 26th December last, and is now before you. On a casual inspection, Judge Francis, Mr. J. Buckland, and I, each took this specimen to be nothing more than a well fed and exceedingly handsome river trout (*Salmo fario*), but upon careful examination of the teeth and fin rays, and comparing them with the descriptions given by Yarrell, I found that the teeth on the vomer were reduced to a single line, extending but a short distance back as they are found in the salmon trout (*Salmo trutta*), instead of being placed in a double alternating row, and extending far back, as they are found in the river trout (*S. fario*), whilst the numbers of the fin rays corresponded exactly with those of the salmon trout, and differed materially from those of the river trout. Yarrell gives such minute directions for counting the fin rays that it is scarcely possible to be mistaken in the number where the fish is as large as this specimen; but to guard as much as possible against error, Judge Francis kindly consented to check my figures by a separate examination, and arrived at the same result, as did Mr. Buckland on a subsequent occasion. As it was determined by the Commissioners to present this specimen to the Royal Society for preservation, I availed myself of the able assistance of our Curator, Mr. Roblin, and dissected out the pyloric appendages, the numbers of which seem to be relied upon as a good specific test by Dr. Günther, who gives 36 as the number for the river trout, whereas this fish has 42. The roe was found well developed, each egg being about the size of No. 4 shot. The next specimen, caught two days afterwards, was a female weighing $1\frac{3}{4}$ lbs., exhibiting the same characters as that last described, the vomerine teeth being those of a migratory salmon after its first trip to sea. The third specimen was a magnificent female fish, over 7 lbs in weight, identical in character with the first. This fish was in such excellent condition, and so much larger than we could exhibit in spirits, that the Commissioners determined to send it to His Excellency the Governor, that it might be put to what is after all the most practical test of its value to this colony, and his report of it was that

it was little inferior to salmon in quality. The fourth specimen was a female rather over 2 lbs. in weight, which was sent to Captain Montgomerie, of H.M.S. Blanche; and the fifth and last is the small specimen now on the table, also a female, which differs slightly from the others, and the roe of which is not nearly so far advanced. It has been frequently noticed in English rivers that the first salmon trout which ascend from the sea to the fresh water are almost invariably females, and the whole five taken here being females would of itself furnish strong presumptive evidence that they belong to a migratory species. I must now revert once more to an earlier part of the experiment. It will be remembered that the last of the salmonoids, caught in the estuary of the Derwent in December, 1869, was sent to the Zoological Society of London for identification, because I believed that it had passed the smolt stage, and had attained such maturity as to render its classification no longer a matter of uncertainty. That specimen Dr. Günther at once declared was a true salmon (*S. salar*). I have already given my reasons for believing that this fish was spawned in this colony, and need not go over the same ground again; but will now refer to the two small specimens sent to England by the same opportunity, and which were hatched in September, 1869, from eggs deposited by the salmon trout (*S. trutta*), which had been unnaturally detained in fresh water. These two fish were parr about 8 months old, and in reference to them Dr. Günther wrote to Mr. Youl the following letter :—

British Museum,
14th November, 1870.

My Dear Sir,—According to my promise I examined the two small salmonoids about which I was in doubt the other day.

I shall shortly state the result of my examination. *Externally*, they agree with each other in every detail; they have the large scales on the tail of a *salmon*-parr (11-12 above the lateral line); and they agree also in all the other external characters with salmon-parr, and are very different from young trout, or sea trout.

Internally, they differ from each other: in one of the specimens (*yours*) I find 54 pyloric appendages of the length usually seen in salmon-parr. In the other specimen there are only 36, and they are very short; such a number I have hitherto found in the common river trout only.

I remain,
Yours very truly,
(Signed) A. GÜNTHER.

To J. A. Youl, Esq.

We will throw over the one specimen which has the short number of pyloric appendages, and referring to the other we can only arrive at one of three conclusions—1st.—Salmon and salmon trout up to the smolt stage cannot be dis-

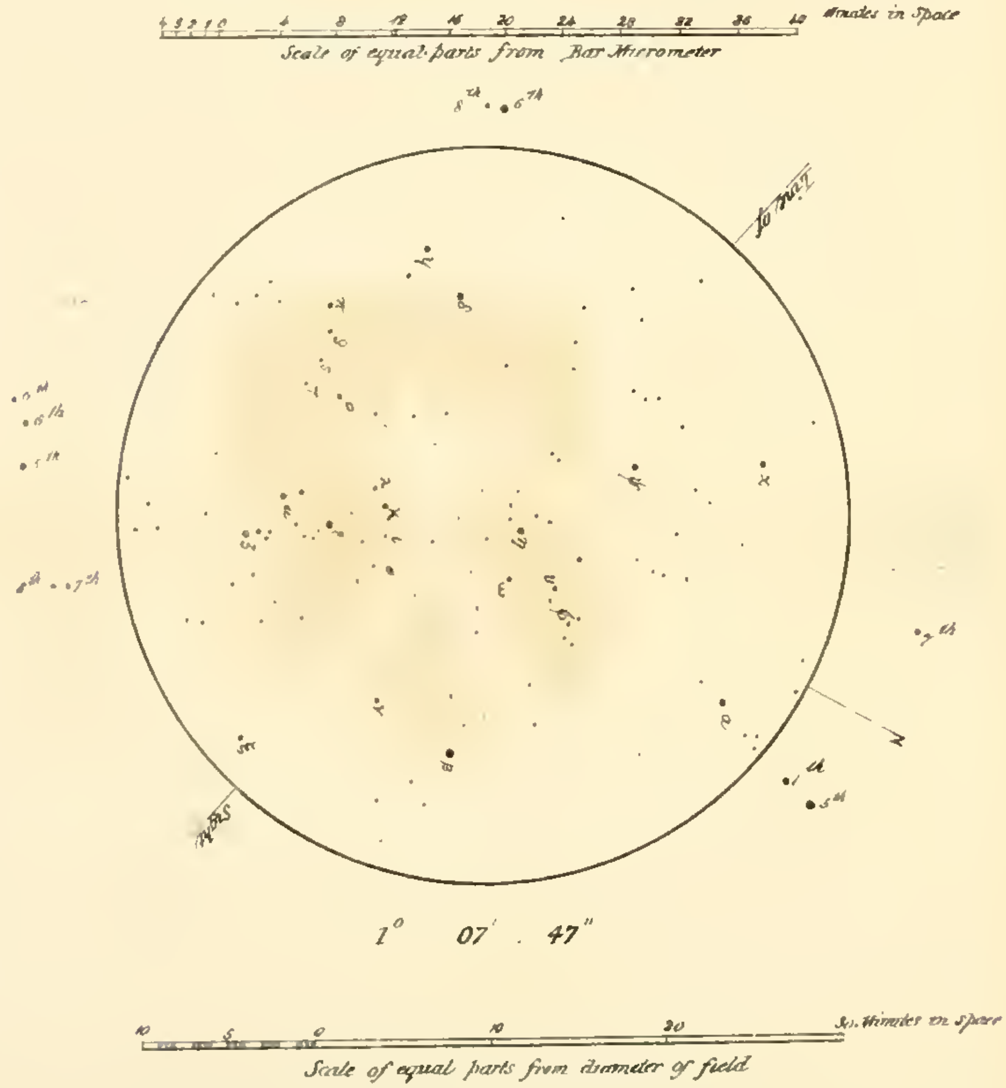
tinguished from one another by any scientific process at present known ; or 2nd.—Salmon trout detained unnaturally in fresh water have spawned, and produced a true salmon ; or 3rd.—We have accidentally, without our own knowledge, detained true salmon in fresh water, which, contrary to all former experience, have thriven and bred. Of these conclusions, the first seems the best, as it is borne out by the further progress of the experiment. One of the eleven parent fish was lately accidentally killed, and has been preserved. It is most certainly a salmon trout, and a beautiful specimen, exhibiting none of the deformity which is always apparent in these specimens of true salmon (*S. Salar*), which have been detained from sea for more than four years. A large number of the brethren of the parr, described by Dr. Günther, assumed the smolt dress in October last, and exhibited the usual restlessness, travelling round the pond seeking an outlet to get to sea, and one which jumped out and died on the bank is now before you. As time passed on these smolts did not (as true salmon smolts invariably do) revert to the parr markings, but grew apace, and assumed all the appearance and markings of the parent fish so completely as to leave not a shadow of doubt as to their species. Two beautiful samples are now on the table. Surely proof could not be stronger that the salmon trout can be detained in fresh water and reared in myriads with certainty. The parent fish, the smolt, and one of the young ones which has passed the smolt stage, will be sent to the Zoological Society by next mail, and will form one of the most interesting and practically useful exhibitions of pisciculture that the world has ever seen.

by Sir John Herschel when stationed at the Cape of Good Hope in the year 1837. It is quite impossible to say what, if any, alterations may have taken place in the nebula before

APPROXIMATE DISTANCES AND MAGNITUDES OF THE

PRINCIPAL STARS AND NEBULA SURROUNDING η ARGUS

TAKEN AT HOBART TOWN FEBY 1871.



REFERENCE.

	Magnitude	Distance from η
α	6th	29′ 30″
β	6th	26′. 00″
γ	6½	32′ 00″
δ	8½	26′ 30″
ε	7th	22′ 30″
ζ	7th	31′ 20″
η	7th	—
θ	7½	16′. 15″
ι	7½	15′ 45″
κ	7½	16′ 30″
λ	7½	17′ 30
μ	8th	27′ 25″
ν	8th	25′ 30′
ξ	8th	40′ 00
ο	8th	25′ 30″
π	8½	32′ 25″
ρ	8½	30′ 20″
s	8½	29′ 15″
τ	8½	29 40″
υ	4½	08′ 20″
σ	8th	12′ 00
χ	8½	26′ 40″
ψ	8½	13′. 50″
ω	8½	06′ 30″

η ARGUS AND ITS SURROUNDING NEBULA, &c.

By F. Abbott, F.R.A.S., &c.

Read at a meeting of the Royal Society of Tasmania, 9th May, 1871.

In the last paper I had the honour on bringing before the Society I referred to a correspondence which was then pending on the star η, and the attached nebula, in the constellation Argo-Navis. It will be fresh in the minds of many of the members of this Society that authorities, previously quoted, have confirmed the alterations which have been recorded in this object. E. B. Powell, Esq., of Madras, writing to the Royal Astronomical Society some observations on the binary star α Centauri, has a concluding note thus:—"I have to observe that to Mr. Abbott must be ascribed the first publication of the fact that η is no longer in the dense portion of the nebula, where it was seen by Sir John Herschel."—(*Vide Monthly Notices R.A.S., Vol.* 24, *p.* 172.)

It was in March, 1865, that I first pointed out the fluctuations in this object, through the Melbourne equatorial, to Mr. Ellery at the Observatory, when the star η was out of the nebula, and the altered figure of the dark space was filled with 12th magnitude stars, richly coloured as described in Monthly Notices R.A.S., Vol. 25, p. 192.

Notwithstanding this in connection with all other evidence, strong opposing influences have been brought to bear against the movements which have been observed, although it is well known to every astronomer that there is nothing stationary in the universe. The distance of such objects as the nebula about η Argus is in all cases so immensely great, their position in the sky often unfavourable, and convenient times for observing so far apart, that any alteration or physical change may for centuries remain unknown.

The late Sir William Herschel writes, and is followed by Sir John, thus: "Gravitation still further condensing and so absorbing the nebulous matter, each in its immediate neighbourhood might ultimately become stars, and the whole nebula finally take on the state of a cluster of stars," &c.—(*Vide Outlines of Astronomy, 5th edition, p.* 640.) Mr. Procter considers that an increased or decreased distance in space may account for the fluctuations.

The present object was observed and faithfully recorded by Sir John Herschel when stationed at the Cape of Good Hope in the year 1837. It is quite impossible to say what, if any, alterations may have taken place in the nebula before

that time, but it is certain that changes have taken place both in the star and in the nebula since 1854; and these fluctuations have been so great and unusual as to raise a doubt in the mind of Sir John Herschel as to their reality. This opinion, coming from such an authority, has influenced many others, who, notwithstanding all evidence, and without a single observation of their own, have refused to credit these recorded facts. Some also, who have but lately commenced observing, contrary to all scientific rule, ignore all previous observations made by others, in order to make an opening for their own.

To decide certain points of difference which are said to exist between the drawings made by Sir John Herschel, Lieut. Herschel, and myself respectively, referees have been appointed by the Council of the R.A.S. The present paper has relation to the observations made for, and the reply sent to, the referees, in answer to their queries on the points alluded to.

In carefully looking over the drawings taken at Bangalore by Lieut. Herschel, with the object, η Argus, 15° above the horizon, and also the *reversed* copy of Sir J. Herschel's, and on consideration of the discussion given with the drawings, I do not think that Lieut. Herschel's observations tend to disprove any one of the alterations which I have previously communicated to the Society. The present drawing, and the answers given to the referees, will, I think, render this clear.

The present observations have been made with the same instrument as the former ones, the object in the same position—approximately 80° above the horizon. The measures were taken with a bar micrometer by Cook and Sons, the bars being carefully traced in pencil on the drawing paper, in such a manner as to exactly fill the field of the telescope. All the stars visible were dotted down, the distances from η of the 6th, 7th, and 8th magnitude stars were lettered, measured, and catalogued from a scale of equal parts, after which the micrometer pencil lines were rubbed out, and the nebula inserted.

The first question put by the referees relates to a comparison of the positions of the principal stars and smaller groups as shown in my two drawings, which are said to have a sufficient general agreement with each other, considered as eye drafts, while they are irreconcilable with both Sir John's and Lieut. Herschel's configurations. A simple inspection of my drawing of 1870 with the reversed drawing of Sir John Herschel (*A.A., plate 4, in the Monthly Notices R.A.S.*) will show that the following principal stars hold a relative position considered as eye drafts, but not with the Cape Monograph as expressed

in the letter, D.D., C.C., (β), (κ), B.C., (E.), 522, 558, 640, 337, 383, 415, (γ), (λ), &c., &c. There are many other stars in my copy of 1870 that are not laid down in plate 4, pricked off from Lieutenant Herschel's drawing.

The other question of note refers to my "having placed within $11\frac{1}{2}$ (on the scale of my drawing of (η) five stars of magnitude at least equal to η, that is, the 7th magnitude, while in Sir J. Herschel's monograph only one star of that magnitude (marked C.) occurs within that distance;" and continues, "can you give any elucidation of the cause of the discrepancy?" also "if you would furnish some instrumental determination of the difference of R.A., and P.D., between η and other stars of equal magnitudes."

In my acknowledgment of this letter to Mr. William Huggins, F.R.S., &c., I mentioned that it was not my intention or desire to dispute either Sir John's or Lieutenant Herschel's configurations, but to call the attention of the astronomical world to the altered features of both the star and the nebula, with a view of obtaining a solution of the changes seen in this most remarkable object. I further stated that the above question was of a physical nature, and could only be answered as such.

On reference to my former papers it will be seen that mention is made, more than once, of the fact that the increase of stars of the same magnitude as η render it difficult to know that star from others, but by its position, and a marked difference in the *light*. The present drawing will show a still greater and more remarkable number of stars of a similar magnitude.

It is to this cause I have so frequently referred the increase of light, which I think is now clearly confirmed by a comparison of Lieutenant Herschel's description with that of Sir John. At one of the monthly meetings of the Society, Sir John Herschel considered the increase of light in the object, as recorded, very strange, and remarked "when I was at the Cape the nebula could not be seen at all with the naked eye." Lieutenant Herschel, when at Bangalore, compared the increased light, when the object was only 15° above the horizon, to that of Pleiades in Taurus.

Mr. Le Sueur, in his report on the Melbourne reflector, says "the nebula around η Argus has changed largely in shape since Sir J. Herschel was at the Cape. The star shines with the light of burning hydrogen," and in his opinion "has consumed the nebula."

At the monthly meeting of the Royal Society of Victoria, held on the 13th March, 1871, Mr. Fairie McGeorge, who has now charge of the reflecting telescope at the Melbourne Obser-

vatory, read a paper in which he referred to some observations made with that instrument on the star η Argus, and the nebula; and stated "that the object had evidently undergone great changes since Mr. Le Sueur made his sketches of it. It was now beyond a doubt that enormous physical changes were still taking place."

The catalogue accompanying my present drawing, made for the referees, and laid on the table, will show that there are now in the same field two stars of the 6th, two $6\frac{1}{2}$, three 7th, four $7\frac{1}{2}$, four 8th, and nine of the $8\frac{1}{2}$ magnitude, and it is literally crowded with others of from the $8\frac{1}{2}$ to the 12th magnitude. Those lying outside the field and occupying an area of about $1\frac{1}{2}^{\circ}$, have their magnitudes attached. The small cluster I take to be Sir. J. Herschel's 3276, described as "a fine, bright, rich, not very large cluster," if so it is now a beautiful cluster of richly coloured stars, quite equal to κ Crucis.

It is almost impossible to define the boundary of the nebula, as it appears to be gradually fading away, and is not so distinct in outline as formerly.

The finest nights have always been selected for observing, and no delineation of the object has ever been given, but what was an accurate representation of its appearance through the telescope.

The following is an extract from a letter addressed by Mr. Severn, of Melbourne, to the Astronomer Royal, and printed in the Monthly Notices, Royal Astronomical Society, for April, 1870:—"I may say that I cannot confirm the new position given to η Argus in respect to the nebula. I have watched it for 14 years, and it is just where it was; of course much less brilliant."

A letter dated 21st June in the same year, which I received from Mr. Severn contains the following passage:—"My present motive is to draw your attention to the injustice *done* you in the η Argus business; I have of course read all your letters in the Monthly Notices of the R.A.S. on the subject. *You must* not allow the *Spectator*, or Mr. Le Sueur, or any other man to deprive *you* of your discovery; *you* have at least done, and *that* years ago, what the 4ft. Cassegranians and Mr. Le Sueur *are* claiming as their discovery. *I can't* stand this, and therefore if you don't defend yourself, by writing to our papers, *I must.* I send you a *Leader* with my paper in it, also another *re* η."

On reading these two extracts, which are dated about the same time, it will appear that the writer must have very suddenly changed his mind.

In June, 1869, I visited Melbourne for the purpose of seeing the new large reflecting telescope, and must confess to being

much surprised on seeing the object η Argus in such a small field with so large an instrument. Mr. Le Sueur thought at the time that he saw a faint shadow of a lemniscate; and what I saw was a dark path across the nebula, not unlike that portion of Eridanus, occupied by 188 and 198 l. C. and not far from the star Achernar. The object was only seen between passing clouds, and although the best speculum was in the instrument at the time the definition was not good.

In June, 1862, I brought before this Society a copy of the drawing made from observations on that beautiful cluster of coloured stars known as κ Crucis, the original drawing, &c., of which was at the time remitted to the Royal Astronomical Society, with notes on the variation of both colour and position when compared as eye draft, with Sir John Herschel's observations made at the Cape of Good Hope. *(Vide Monthly Notices, R.A.S., Vol. 23, p. 32.)*

As the instrument used at the Cape was in every respect different from the one used in Hobart Town, and the effect of colour varying, as it does, so much in different persons, I discontinued observing to allow time for other changes to become known, and have now waited nearly nine years, in order to compare the object with the previous drawing by the same optical means. Sir John Herschel estimated this cluster to be formed of from 50 to 100 stars; in the drawing of 1862, a copy of which now lies on the table, there were laid down 75 stars to which the colour of each was given. It is now known that certain alterations have taken place since 1862, but a series of cloudy nights has prevented the possibility of preparing a sequent to the former drawing in time for the present meeting.

ROYAL SOCIETY.

JUNE, 1871.

The monthly evening meeting of the Society was held on Tuesday, 13th June, Justin McC. Browne, Esq., in the chair.

William A. Kermode, Esq., of Mona Vale, who had previously been nominated by the Council, was after a ballot declared duly elected a Fellow of the Society.

The SECRETARY laid on the table the following returns for the month of May:—

1. Visitors to Museum, 775.
2. Ditto to Gardens, 2315.
3. Plants received at Gardens:—From Dr. Schomburgh, Director of Botanic Gardens, Adelaide, 29 Plants. From J. Miller, Esq., Mayor of Port Elizabeth, Cape, per J. W. Graves, Esq., a collection of Bulbs from South Africa.
4. Plants sent from Gardens. To M. J. Linden, Brussels, 5 large Fern Trees.
5. Tench supplied. To Rev. Canon Sharpe, 24 Tench, for Bathurst, N. S. Wales.
6. Times of leafing, flowering, &c., of a few standard plants in Botanic Gardens.
7. Books and Periodicals received.
8. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., Table, &c., May.
2. Westbury, from F. Belstead, Esq., Ditto.
3. Swansea, from Dr. Story, Ditto for April.
4. Melbourne, from R. L. J. Ellery, Esq., Notes for April.
5. Sydney, from H. C. Russell, Esq., B. A., Printed tables for March.

The SECRETARY read the following:—

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

1. From Master F. G. Bailey—A few very beautiful Butterflies from Ceylon; a purse made by natives of Ceylon, the material of which the article is manufactured being paper prepared in such a manner as to be readily mistaken for leather.
2. From Mr. Alexander Reid, Ratho—An albino variety of the common Quail.
3. From Mr. Blacklow, Brighton—A wedgetailed Eagle *(Aquila fucosa)*.
4. From Dr. Huston—A Paradise Duck.
5. From Sir R. Officer—A Rail *(Rallus pectoralis)* from New Norfolk.
6. From Mr. F. S. Edgar—The shell of a large Turtle.
7. From Master C. Allport, four copper coins and tokens.
8. From Captain Gourlay, two very fine specimens of shells of the Pearl Oyster, measuring 9½ inches in length, by 8½ inches in width.

[In a note which accompanied this presentation Captain Gourlay stated that the shells were, he believed, brought from the Solomon Island Group, in the Pacific. A cargo of 70 tons of these shells was sold in Sydney about three months ago, and fetched about £150 per ton; the pearl being considered superior to any previously taken to that port.]

9. From Mr. J. W. Graves, a photographic copy of the deed of conveyance of Franklin Island, by Lady Franklin, in favour of the Tasmanian Acclimatisation Society.

10. From the author, Mr. M. Allport, a short History of the introduction of the Salmonidæ to Tasmania, being a paper read before the Zoological Society of London.
11. From Mr. Justin Browne, Journals of House of Commons, 1644.

Mr. BROWNE remarked that he presented these papers both because they were, he thought, new to the colony, and had reference to a period of great historical interest. Mention is made of Lieutenant-General Cromwell, Lord Fairfax, and other characters. The original resolutions as to the supply of armour, arms, and ammunition to the army, raising of troops and loan money may be noticed, with many other matters of interest to the student of the history of the day.

Mr. DAVIES fully agreed with Mr. Browne in thinking these parliamentary papers possessed very great interest, and thought the Society was much indebted for a presentation of such value. He took this opportunity also of proposing that the photograph of the deed of gift from Lady Franklin (Presentation No. 9) should be framed and hung up in the Museum as a memento of a lady who had done so much in the interest of the Society, both during her residence amongst us, and long subsequent to her departure.

Mr. GOULD cordially seconded. He thought we could not do too much to indicate our appreciation of such a friend as Lady Franklin had always shown herself to be to the cause of science in Tasmania.

The motion was unanimously agreed to.

A paper by Mr. F. ABBOTT, Superintendent of the Society's Gardens, on the Sugar Beet lately grown by him was read. Discussion ensued when it was suggested that Mr. Abbott might further extend the notice of the root by making observations on its cultivation, value of crop, its immunity or otherwise from the attacks of insects which are so fatal to the Turnip, or Brassica tribe.

Mr. ABBOTT undertook to do so, and Mr. Davies promised to give the paper as much publicity as possible in *The Mercury*.

It will be recollected that information on this subject has already been laid before the Society by Mr. Barnard and Mr. J. Walker. By the former in reference chiefly to the extraction of sugar by private individuals, and in an inexpensive manner in New South Wales; by the latter as to the mode of extracting alcohol and sugar on a large scale in extensive manufactories in England and on the Continent. (See Monthly Notices for June and August, 1869, and July, 1870.)

The SECRETARY read the following communication on the growth and preparation of cork-wood (for which the Society is indebted to Mr. Justin Browne) from Mr. W. H. Reynolds, of Otago, who had been formerly extensively engaged at home in the cork trade :—

"The Cork Tree is grown chiefly in the provinces of Catalonia, Estremadura, and Andalusia in Spain; in Alemtejo, Estremadura, and Beira in Portugal; in the south of France, the island of Sicily, and Algeria in Africa. The tree is naturally of slow growth, but grows faster in rich and sandy, than in rocky soils; the best cork, however, is procured from trees grown in the latter. When from 12 to 18 feet high, the trunk, including the cork, generally measures about one foot diameter. At about this stage the tree may be stripped of the cork. The first strip is useless as an article of trade, and can only be utilised as a material for the floats of fishing nets. Cork may be stripped without detriment to the tree, and the proper time for the operation in Europe is between the end of April and the beginning of October. The tree possesses a bark under the cork, and care must be taken in stripping not to take off or materially injure this under bark. The only tool used in stripping is an American axe having a straight handle of the ordinary

thickness, the end of which requires to be cut to the shape of a wedge. A ring is cut with the axe round the foot and top of the trunk of the tree, and then straight lines are cut along the whole trunk at a distance from each other of about two feet, so as to connect the two rings ; this done the wedge is inserted in the straight line towards either the top or the bottom ring, and the cork-wood is gently pressed off. In the case of a small tree, say, of one foot diameter, with much care it will come off in one piece.

"The tree also produces cork on its branches, which may be stripped in the same way whenever they (the branches) reach one foot in diameter. After the tree is stripped nothing is to be done to it. When the cork-wood is taken off the under bark is of the colour of the human skin, but gradually gets darker until it becomes the colour of chocolate, and sometimes of dark lead. No sooner is the tree stripped of the cork-wood than it again puts forth its functions to acquire a new inner bark and form a new covering of cork. The cork *(Epiphlœum)* is formed between this new and the old bark, and takes from six to ten years before it is ready again for stripping, that is, until it reaches the thickness of about an inch. By examining the head of a common wine cork, lines are distinctly visible, between each of these lines indicates one year's growth. The older the trees are the better the cork gets ; being of slower growth it is less spongy, and firmer in texture than that procured from young trees.

"The Cork Tree grows to a large size, and like the English oak is a long liver. Cases have been known where one tree, including its branches, has yielded nearly half a ton of cork-wood.

"In Spain and Portugal the cork forests have been planted. The acorns, so soon as they drop from the trees, begin to sprout ; they should be put in the ground as soon as they fall. The young trees do not like transplanting.

"After the second and following crops of cork-wood are stripped from the trees the sheets or planks of cork ought to be laid on the ground for about a week or so, bark upwards, as if the inside is exposed to a hot sun for the first few days after stripped it is likely to curl and crack when straightened. Up to some 40 years ago all cork-wood was subjected to fire within a week or two after stripping. The object of this was to burn off the outer bark *(Epidermis)* and soften the texture, but of late years it has been submitted to a steaming process which softens the cork and improves the texture. The bark is then scraped off with a tool almost similar to a three-cornered ship's scraper ; this done, the cork is faced, sorted into different qualities, and packed in bundles ; it is then ready for the market. The firm of Thomas Reynolds and Sons, in their several manufactories in Spain and Portugal, during the height of the season, had occasionally in their employ between 1200 and 1500 hands.

"The value of cork-wood varies very considerably, ranging from about £8 to £150 per ton. The best description is obtained chiefly from the forests in Spain and the south of France. That obtained from Portugal is of quicker growth, and consequently more spongy. The quantity obtained from Sicily and Africa some 21 years ago was very trifling ; the quality, however, was good. Of late years the duty on made corks has been taken off in England, consequently, large manufactories have been established in France, Spain, and Portugal for supplying England with the corks instead of the cork-wood."

On discussion several members expressed a doubt if a tree which required a growth of 25 to 30 years before becoming useful could or would be planted with a view to profit. On the other hand, it is to be recollected that after the first returns are obtained the process of stripping

may be continued every eight or ten years for several centuries, and that the quality of the bark, instead of becoming deteriorated, improves according to the age of the tree.

Mr. Justin BROWNE read, as supplementary to some former publications by the Society on silk culture, the following remarks on the management of the mulberry tree in China and Japan :—" In China mulberry trees grow on the hills in places unsuitable for ordinary agricultural purposes. A temperate and cool climate produces the best silks. The *Morus alba* contains in the greatest proportion both the nutritive and silk forming substances. The *Morus multicaulis* produces in greater abundance a large leaf, which may be given to the worms in their earlier stages, but, being watery, is not so nourishing as the smaller leaf of the *Morus alba*, which has more resinous or silk-forming quality. Mulberry trees grown in temperate or comparatively cold climates produce more substantial leaves than those grown in tropical countries. A soil of humid gravel and sand is best. The tree if planted in rows should be two yards distant, and the rows four or five yards apart. Stripping should be deferred till the tree is three years old ; it may then be thinned and pruned to the extent of four-fifths of the leaves. Avoid tearing off needlessly leaves and young branches, which bleed the tree. A young tree will yield five or six pounds of leaves ; in eight or ten years from thirty to forty pounds per tree. The value of young leaves is 4s. per cwt., and in their prime 10s. per cwt. In Japan mulberry trees are planted along the borders of the fields, sometimes in rows across them at such intervals from each other as not to interfere with the other crops. In one district large fields are planted on ridges in lines at a distance of over 2 feet from each other, the ridges being more than 3 feet apart ; as a rule the tree is kept in a dwarf state, the stumps being only 10 to 18 inches above ground. Sometimes they are allowed to attain a height of 4 or 5 feet, especially when grown in the middle of a field, the few full-grown trees seen were in the vicinity of dwellings. The Japanese state that dwarf trees produce leaves softer and better adapted for feeding silk worms, they say also that trees raised from suckers or layers are preferred, because they yield large leaves and a small quantity of fruit, while trees raised from seed yield plenty of fruit and small leaves. The Japanese manure their trees several times in each year, and use manure prepared from a liquor from the rice plants."

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

JULY, 1871.

The monthly evening meeting of the Society was held at the Museum on Tuesday, the 11th July, M. Allport, Esq., Vice President, in the chair.

Mr. F. G. Salier, who had been previously put in nomination, was after a ballot declared duly elected as a Fellow of the Society.

The following returns for the month of June were laid before the meeting :—

1. Visitors to Museum, 805.
2. Ditto to Gardens, 1652.
3. Plants and seeds received at Gardens :—

A. From Melbourne Botanic Gardens, 33 plants, chiefly of economic value.

B. From Dr. Hooker, Royal Gardens, Kew, 88 packets Asiatic, 177 ditto American, and 234 ditto of European seeds, in all 499 varieties.

4. Books and periodicals received.
5. Presentations to Museum.

Meteorological Returns :—

1. Hobart Town, from F. Abbott, Esq., table and summary for June.
2. Port Arthur, from A. H. Boyd, Esq., table for May.
3. Sydney, from the Government Observer, table for April.
4. The Secretary read the "Notes on the Meteorology and Mortality of the Hobart Town Registration District during the month of June, 1871," by Dr. E. Swarbreck Hall.

The presentations to the Museum were as follow :—

1. From Mr. T. A. Shone, Back River, a curious horny growth from the haunch of a sheep.
2. From Mr. G. Dinham, a crown-piece of the "Gun Money" of James II., 1690 ; struck during the war in Ireland.

[This coin is one of those originally struck as half-crowns, but metal becoming scarce they were afterwards called in and re-struck as crowns. The first impression is still partly legible on the coin now presented. Information on the subject was read by the Secretary from "Ruding's Coinage of Great Britain," vol. 2, page 27.]

3. From Mr. B. Webb, a bronze coin, a copper do., (Guernsey 1834.)
4. From Mrs. J. Allport, a collection of Ferns from Madras.
5. From Mr. H. Gomolka, an extensive and valuable collection of New Zealand Birds (80) Fishes (13), Crustaceans (27), Shells (36), European Mammals (5), Birds (12) ; and South Australian Birds (7), Shells (33.) These specimens were all collected, prepared, and mounted by the donor.

The following remarks "On a new Genus of Freshwater Mollusks," by Mr. W. Legrand, were read by Mr. Allport :—

"Some time since Mr. Maddock, of Dunrobin, sent some freshwater shells to the Museum. One of them at the time struck me as being new ; to be certain of the matter I sent specimens to Mr. Hanley, of London, that gentleman's answer is as follows :—'One of your fresh water species is quite a novelty, it is even of generic importance. It is almost a *Gundlachia*, but merits distinction. I propose for it the name of *Legrand a* in honour of the discoverer.'

"The shell mentioned in some respectsre sembles an *ancylus*, the finest specimens that I have seen are those from Dunrobin, I have also received some of a smaller size from between New Norfolk and Hamilton. I propose for it the specific name *Maddocki*. A description with

figures will appear in my monograph of Tasmanian freshwater shells now in course of preparation."

An elaborate and interesting paper on "Sheep-Breeding" was read by Mr. S. Smith Travers. Conversational discussion, in which several of the Fellows took part, ensued. Some of the points referred to in the paper, however, required much time for consideration, the tabular details could not at once be followed, and no very definite expression of opinion was therefore to be expected, It is probable another opportunity will be taken for re-opening the discussion.

It was agreed that the paper should be published in the proceedings of the Society, the subject being one of general interest. A vote of thanks was given to the author, and to the donors of presentations.

The SECRETARY begged to call the special attention of the Fellows to the presentation by Mr. Gomolka. It was needless for him to say anything as to the value of such an acquisition to the Museum, and he would therefore propose that a special vote of thanks should be accorded to the donor. This was cordially and unanimously agreed to, and the meeting terminated.

AUGUST, 1871.

The monthly evening meeting was held on Tuesday, the 8th August, Morton Allport, Esq., in the chair.

The following gentlemen, who had been previously nominated by the Council, were after a ballot declared duly elected as Fellows of the Society :—The Rev. Brooke Bailey, A. Riddock, Esq., and John A. Jackson, Esq.

The following returns were laid before the meeting :—

1. Visitors to Museum during July, 809.
2. Ditto to Gardens during July, 1,662.
3. Seeds received at Gardens—From Royal Gardens 499 packets of shrub and three seeds (referred to at last meeting), 300 of which are of species not yet under cultivation at the Gardens. Of the balance about 100 varieties will be valuable for exchange.
4. Plants supplied for planting public places.
   (a.) For Bothwell Church grounds 100 plants.
   (b.) For Catholic Cathedral grounds, Harrington-street, 192 ditto.
   (c.) For New Norfolk Asylum grounds 61 ditto.
   (d.) For Longford Church grounds 80 ditto.
   (e.) For Cascade Asylum grounds 140 ditto.
5. Time of leafing, &c., of a few standard plants in Botanic Gardens.
6. Books and periodicals received.
7. Presentations to Museum and library.

Meteorological Returns.

1. Hobart Town—From F. Abbott, Esq , table and summary for July.
2. Port Arthur—From A. H. Boyd, Esq., table for June.
3. Westbury—From C. Belstead, Esq., ditto.
4. Swansea—From Dr. Story, ditto.
5. Melbourne—From R. J. L. Ellery, Esq., notes for June.
6. Sydney—From H. C. Russell, Esq., printed tables for May, and "Results of observations for 1870."
7. Queensland—From the Rev. R. D. Harris, report of meteorological observations for 1869.
8. The SECRETARY read the "Notes on the Meteorology and Mortality in the Hobart Town Registration District during the month of July, 1871," by Dr. E. Swarbreck Hall.

The presentations were as follow :—

1. From Mr. J. Kelly, 2 Chinese coins, and 1 Persian ditto.
2. From Mr. Schofield, shells from Wreck Reef.
3. From Mr. W. Josephs, Clarence Plains, a curious fish washed on shore in that locality.

[This fish bears considerable superficial resemblance to the *Chætodons* (beautiful tropical fish). They seem extremely rare in Tasmania, and Mr. Allport stated that he had seen but one other specimen, which was procured on the North Coast by Mr. J. L. Smith, and is now in the Museum.]

4. A Whip Snake *(Hoplocephalus coronoides)* found alive in a hollow log of firewood.
5. From Mr. H. Gomolka, a mineral specimen from Dun Mountain, New Zealand.
6. From Meteorological Department, Board of Trade, London, Quarterly Weather Report, parts 3 and 4, 1869, and Barometer Manual, 1871.
7. From the author, M. Allport, Esq., F.Z.S., &c., additional notes, in continuation of the history of the introduction of the Salmonidæ into Tasmania, from proceedings of the Zoological Society of London.

The SECRETARY remarked that the question as to the best method of destroying rabbits on runs had become one of extreme importance, not only to the sheepowners of the colony, but to the public in general; it was one, too, which lay strictly within the scope of the aims and actions of the Royal Society. He had recently learned that Mr. John Bisdee had been very successful in destroying rabbits which had been particularly numerous on his runs; and he also had been informed by Mr. Maclanachan that he had adopted Mr. Bisdee's method with very excellent results. On communication with Mr. Bisdee on the subject, he (the Secretary) had been favoured with the following observations which he would proceed to read to the meeting. *(See page 46.)*

Discussion ensued, in which Mr. W. Gellibrand, Mr. Justin Browne, Mr. J. Davies, Mr. Webster, Mr. Barnard and others took part. It having been remarked that rabbits could readily be exterminated if all sheepowners acted in concert, it was suggested it might be necessary to obtain a compulsory Act of Parliament for the purpose of securing united action. It was observed, however, that even this would scarcely be effectual, as it could not readily be brought to bear in the case of Crown lands where the rabbits would still continue to breed.

The SECRETARY intimated that he expected to hear from Mr. Maclanachan on the same subject before next meeting, and he hoped that others also who may have tried experiments in the destruction of rabbits might give him the results of their experience for the purpose of bringing them under the notice of the Society, and thus securing for them due publicity.

Mr. Morton ALLPORT read a paper on the Salmon Trout *(Salmo trutta)* lately sent to England, and a letter, received by last mail, from Dr. Günther on the same subject.

A vote of thanks to the authors of papers, and the donors of presentations, closed the proceedings.

THE SUGAR-BEET.

By F. Abbott, Jun., Superintendent Botanic Gardens.

Read 13th June, 1871.

It may be remembered that in 1869 a plot of ground in the Society's gardens was planted with the Silesian sugar-beet, for the purpose of testing the suitability of the colony for the culture of this plant. The intention at the time was to have endeavoured to manufacture a small quantity of beet sugar, not only with the view of ascertaining the probable percentage obtainable, but also because it was thought it might have the effect of stimulating the industry, if it could be proved that sugar was obtainable in paying quantities.

Owing to various causes, among others the want of proper appliances and funds, to carry the experiment to a successful issue, no attempt was made to extract sugar from the roots at the proper time, I therefore thought it advisable to select the best roots for the production of seed, of which there now is about 10 bushels on hand. It would be very desirable that this seed should be distributed to persons willing to give the root a fair trial; as the season for sowing is now at hand no time should be lost in the distribution.

It may not, perhaps, be generally known that the Silesian beet is much more nutritious as cattle food than the common mangold. According to recent analysis by Dr. Voelcker, 1 ton of sugar-beet is equal to at least $1\frac{1}{2}$ tons of common mangold. The weight of roots produced per acre is generally about 20 tons, but 30 and even 40 may be secured by good cultivation, so that apart from the value of this crop for the production of sugar, it is worthy to be more generally grown for feeding purposes. It enjoys as great an immunity from insect pests as the mangold.

The following remarks bearing on its cultivation may not be without interest to intending planters:—The proper time for sowing the seed in Tasmania is about the middle of August; in the midland districts a little later, say about the beginning of September. It should be dibbled in, a foot or fifteeen inches apart, or it may be sown in prepared beds, and transplanted with as little risk as the mangold. From 10 to 15lbs. of seed will be found sufficient for an acre of ground. The soil must be in good condition, it should have been well worked, and if not in good heart manured in the autumn. Unless the soil is in a finely pulverised state, the roots cannot properly develope themselves. It is essential that the root be well imbedded in the soil; if this is not the case the amount of saccharine matter is greatly diminished, as in both man-

golds and sugar-beet the portion above ground contains little else than scouring salts, and would be rejected as worthless by the manufacturer. Analysis proves that the portion farthest removed from the light contains most sugar. Heavy dressings of manure near seed sowing or transplanting time should be avoided. Freshly manured and new land are not favourable for the production of sugar, and, although under such circumstances the roots grow to a large size, the amount of saccharine matter is but small; roots from $1\frac{1}{2}$ to $2\frac{1}{2}$ lbs. weight are found to be richer than those of a larger size.

The after culture is very similiar to that for the common mangold, and consists of thinning the crop and hoeing from time to time, taking the precaution while hoeing to work the soil round the tops of the roots, in order to bury any portion that may chance to be exposed to the light. These are the only operations necessary until the plant is sufficiently ripe for harvesting, which may be known by the leaves having a flabby, yellow appearance, when care should be taken that the plants do not make a second growth, which they will be apt to do should rain fall at this period. Should the autumn be dry the roots may remain longer on the ground than if warm and moist, but they should be harvested before frost sets in; both second growth and frost would greatly diminish the amount of sugar. The leaves should not be stripped from the plants during their growth, because if this be done the light will have free access to the tops of the roots, causing them to turn green, and diminishing the saccharine matter.

Should the weather be fine and dry when the crop is taken, it is a good practice to allow the roots to remain on the ground for a day or two, covering them with leaves to shelter them from the direct rays of the sun; by thus exposing them, they part with a portion of their moisture, and are in better condition for stacking. When carted from the field the roots should be stacked in ridges, covering them but slightly at first, in order that more moisture may pass off and heating be prevented. So soon as all danger of heating has passed, the heaps may be sufficiently covered with soil to exclude frost; beating it well down that rain may also be thrown off.

There can be little doubt but that the climate of Tasmania is admirably suited to the requirements of this plant. With an autumn sufficiently long and dry to thoroughly mature the roots, the quantity of saccharine matter should be great. In England and on the Continent this varies greatly, in some cases being only 3 and in others as much as 15 per cent.; the average appears to be from 10 to 12 per cent.; 8 per cent. can be profitably manufactured into sugar, but all over this materially increases the profits of the manufacturer.

The most essential point for us to ascertain at present, is the precentage actually yielded by roots grown in different parts of Tasmania under different conditions. This most desirable information once obtained, would be the key to all future success in the cultivation of sugar beet in the island, whether for the production of spirits, sugar, or for feeding stock only.

The profits arising from the manufacture of spirit and sugar, both in England and on the Continent, depend greatly upon the amount invested; the greater the amount invested in the industry, the greater the profit. From 15 to 30 per cent. is said to be realised from the manufacture of sugar; the profits arising from distillation are said to be much greater; according to recent continental returns from 30 to 60 per cent. of clear profit is said to be netted.

At Lavenham, Mr. Duncan realised last year a profit of 15 per cent. on the manufacture of beet-sugar, although he could not obtain sufficient roots to keep his machinery in full work; in addition to which he had to pay a duty of 8s. per cwt., chargeable on English made sugar.

The object in penning the above lines being to draw the attention of agriculturists to the importance of sugar beet culture, sufficient has, I trust, been said to that end. I would only add, that the more the root becomes cultivated the greater the probability of manufactories being started in the colony. It is not to be expected that capitalists will embark in such an undertaking until the raw material is forthcoming to warrant the importation and employment of skilled labour and machinery.

SHEEP-BREEDING.

By S. Smith Travers.

Read 11th July, 1871.

In the remarks on sheep-breeding which I am about to submit to you, I must beg you to understand that I do not profess to be able to offer you the results of any experiments of my own, nor any theory founded on the experiments of others.

I cannot find, indeed, that any experiments have ever been made upon any scientific principle, and upon such a scale as to arrive at any defined and certain laws, such as must underlie and govern the science of artificial selection, whilst on reference to those authorities who have written on the subject, I find discordancies of opinion, coupled with vagueness of technical phraseology, that must leave every one in doubt as to whether indeed we do know *scientifically* more of breeding now than we did one hundred years ago.

And if what we do know be not scientifically known, and proved and arranged, I must contend that it is not really known, and does not really belong to us. It is true that owing to the attention of a very great number of highly educated men to the subject, the most extraordinary improvements in our various breeds of sheep and cattle have been effected. But if these distinguished breeders were to be taken away, where should we find, or be able to lay down any of the principles on which they have proceeded? It is very well to point to Mr. Bakewell, who in the middle of last century originated the Dishley Leicesters, and to the MacArthurs, Learmonths, Coxes, Mr. Bailey, and others to whom we owe our Australian breeds; but the question is what are the principles of selection on which they have proceeded? Had they any?

The reply, I suspect, would be that the principle, the only principle governing their selection, was to choose the finest ram, and put it to the finest ewe or ewes, according to the individual judgment. If we could ascertain the truth, we should find that these celebrated breeders depended entirely on their natural gifts of hand and eye, and upon some intuitive sense of harmony, symmetry, and perfection which has enabled them to choose and artificially select, till in a certain number of years, the same eye and hand and intelligence always presiding at the drafting yard, they have culminated in certain flocks of surpassing excellence. The question therefore remains—have these breeders, either in England or Australia, anything in common in their plan of action? Can we

ascertain if, apart from their individual genius and aims, they obey or seem to obey one common law?

The English sheep-breeder—from reasons easy to comprehend, aims at carcase rather than wool—the Australian at wool rather than carcase. In these different objects do we find them both adhering to one practice. Is the path by which each seeks to obtain perfection but a different bye-way of the one high road?

I believe the answer to be that all intelligent breeders pursue and have pursued one common route, though their paths may differ. They all breed, or try to breed, in-and-in.

Their aim may be for carcase or for wool; and again, amongst wool-breeders for combing or for clothing wools. But all experience shows that speciality and excellence in any one quality is to be obtained only by breeding in-and-in; by breeding like with like. And though not a part of my subject, I may remark parenthetically, that with cattle and horses the same general law is accepted.

This point, the necessity of in-and-in breeding, I am compelled to assume; it would take me too long to bring before you evidence in support of what I assert, and I doubt if it be necessary.

But it is curious and illustrative of our scientific ignorance of breeding, that whilst every celebrated horse, or bull, or cow, or sheep, is invariably the result of in-and-in breeding, the wide and fixed popular prejudice is against it, and is in favour of cross-breeding. And whilst every farmer or squatter, if he wish to improve his breed, will give an extravagant price for an animal, which is the triumphant proof of what in-and-in breeding in certain hands can achieve, yet as a rule, you will find he declines to breed in-and-in himself, generally alleging that he has tried it and that it does not pay.

At present what is the practice, or what is I believe the practice? It is to confine on one station so many thousand sheep of both sexes. If not to breed together absolutely hugger-mugger fashion, yet subject to the selection of the drafter, who culls and rejects all inferior specimens, to let the rest breed together, fathers, mothers, sons, and daughters promiscuously, and regardless of all shades of affinity.

But I argue that this is illogical. If affinity considered in the gross has worked such wonders—if the mere shutting out all foreign strains of blood has done so much for breeding—what might not be effected if the principle were carried out, and applied in the minor shades scientifically?

Might not this law, if applied *scientifically*, save the expense and time wasted and lost in breeding the animals, which after all have to be culled and sent to the butcher? Not that the

breeder's judgment and experience would be less wanted, but his time, the time of the station, now wasted in breeding useless varieties, might be saved, and instead of its taking thirty years to bring a flock or a brand to perfection it might be that ten years or less would suffice.

My object therefore is to examine, if I can, this said system of in-and-in breeding, this breeding like with like, and by symbolising the relations that arise amongst sheep on those stations, where in-and-in breeding is observed, I hope to suggest a method by which to classify and arrange the various degrees of affinity into groups, as a preparatory step towards those experiments, which will I believe, if made by competent persons, and on a sufficient scale, enable us to lay down and define the laws governing the art of selection.

I know that my method is crude and deficient in many respects, wanting in the accuracy so necessary to scientific research. I regard it entirely as the suggestion of an unscientific person to men more capable, who may be able to discern the truth, if there be any in it, and who in that case may give precision to the symbolisation I propose to use.

My proposal is to regard the organisation of the individual, its race, its blood, or whatever is understood by these generalisations, as a quantitative quality, and to treat it quantitatively.

Thus if I call the ram A, and the ewe B, I term the product of their union AB for the male issue, and BA for the female. If I marry A the father with BA the daughter, I call their issue A^2 B if a ram lamb, and BA^2 if a ewe lamb. If, again, I marry AB the son with his mother, I call the progeny AB^2 if male, and B^2A if female. If I marry AB the son with BA the daughter, I call the issue A^2 B^2 if male, B^2 A^2 if female.

By this method I hope to make the changes in the shades of affinity apparent and tangible.

In the sketches of pedigrees appended to the paper, and which I now lay before you, I assume that the ewes produce 100 per cent., and an equal proportion of sexes. This for convenience.

Pedigrees No. 1 and No. 4 show the breeding of a ram with his daughters, grand, and great granddaughters, and if we examine the practice of every station where in-and-in prevails, it will be found that the results of this plan of breeding, and the strain it produces, must be the prevailing strain, and the action in that direction progressively increasing in force.

It is true that the stud rams are each year recruited with a small accession from their sons. But the number of sons

breeding with mothers, or of brothers with sisters, is small compared to the regular and extensive majority of sires breeding each season with their female progeny.

In pedigree No. 2 you will see the effect of four generations breeding back to the mother's race. But to be a tolerably perfect experiment you will remark that in this case it is necessary that the 50 ewes or 50 B shall be whole sisters. In breeding back to the father's line, from the power the male possesses of impregnating numbers, the relationship of his ewes, one to the other, does not signify to the same extent. Indeed, unless quite certain that they are of the highest strain, it is better when starting a station that they should not be whole sisters. For if not of the highest known strain the breeder would lose the superior chance offered by putting 50 ewes of similar but not so closely allied family, the chance of some atavism in some of them being awakened and called out which should hit in with the male and produce some exceptional animals.

To return to pedigree No. 2. If the ewes are not whole sisters the experiment no longer carries out its intention, as you will see by reference to pedigree No. 5, where I letter the different ewes B C D E F. Turning to pedigree No. 4, if B has a male lamb the experiment is only so far perfect that I can breed him with his mother, and there will be 24 other ram lambs to breed back with their mothers. The 25 ewes that produce ewe lambs are out of the experiment, and those ewe lambs go to strengthen pedigree No. 1 and its effects.

I must, you perceive, breed each ewe that has a ram lamb with that son, or I do not breed back to her blood. For, if I take any one ram lamb, say AB, and breed it next generation with all the ewes, they, not being sisters, would merely receive and transmit B's influence, without in the least effecting our purpose. AB with his mother would get, it is true, AB^2 or B^2A, but with the 24 other ewes, who are C D E F G, the result would only be ABC, ABD, ABE, ABF, ABG.

If AB begets from his mother a ram lamb or AB^2 the next generation would be AB^3, AB^2 D, AB^2 E, etc.

But this is not pure line breeding back to the mother, except with one individual, and at any moment that too is liable to stop, by B's progeny being female.

Again, if all the ewes are sisters, and you each generation breed AB and AB^2 with the original mothers, it is only an approximation, and AB breeds back only with one mother and 49 aunts.

I have gone into this to prove that without extraordinary trouble pure line breeding back to the maternal line is

impracticable, unless you begin with whole sisters, and even then it is only an approximation. With old stations, when all the females become more nearly allied, the young rams, when first put in, must be regarded as breeding with their aunts, and producing a sensible effect upon the female progeny.

The effects of breeding brothers with sisters, as in pedigrees 3 and 6, must again presuppose all the ewes to be sisters, for if not sisters, you will find by looking at pedigree 6 that instead of $A^{16}B^{16}$ and $B^{16}A^{16}$ you get $A^{16}B^{4}\ D^{2}\ FG$ or its equivalent; results so different from those of pedigree No. 1 that if *that* be the main principle which asserts itself, and if *that* be the beneficial principle of in-and-in breeding, I doubt if this be also beneficial.

In pedigree No. 1 you simplify and intensify. In pedigrees Nos. 3 and 6 you add continually equal increments to each side, and it seems to me strive to intensify the crossing, and not to eliminate a type.

I am, therefore, forced to believe that pedigree No. 1 is the beneficial principle—not because I see that it carries out any theory of my own, but because it is so much the prevailing and progressively prevailing effect that I conclude, if it were bad in principle, no in-and-in breeding on the present loose system would have been possible without deterioration.

If, therefore, I am asked what deductions I draw from the preceding figures, I would say that I am a believer in the indestructibility of type or organisation, but that I do not believe those original types to have been inferior but superior to the highest specimens now extant. I do not believe the original Dishley Leicester sheep to have been an awkward, ungainly, ugly wretch, with no good qualities of any kind. Mr. Bakewell, doubtless, found such an animal, but I believe that that was not the original type; it was the result of centuries—nay, thousands of years—of mongrelization, of bad impressions and conditions, and of non-observance of the law of in-and-in and like with like.

In every animal, I believe, a certain type resides, the characteristics of which are confused or brought out by the most recent female conjunctions. The male blood I regard as the indestructible organisation, and the impressions of the female, whether for good or evil, more or less temporary. But I do not look on female blood as a thing apart. I regard her only as the recipient, and as the conduct and channel for other male blood. When A marries B we must enquire who was B's father, for it is his blood, and B's father's father's and mother's father's blood that, if it appear, is impressed on A and B's offspring, and as it may be discordant or harmonious

with A, will clash or hit, and produce discordant or harmonious results. The ram A in like manner has latent in him the blood not of his mother, but his mother's father. But this, like other maternal influence, is but temporary in its effect, to be succeeded in coming generations by other temporary female impressions, the blood he hands down permanently being his father's father's father's and great-grandfather's blood.

To give the question a human significance, I believe that a man hands down to his sons his father's influence, modified temporarily by his maternal male blood and his wife's male blood—to be modified in their turn by their mother's male blood and their wife's.

In all the pedigrees I have made out I have only treated of one ram with 50 ewes. To examine the subject in the proper manner, by the hypothesis of a number of rams put to a larger number of ewes, would have made it too complicated for my purpose. It suffices to point out that in due course the rams become by the action of pedigree No. 1 brothers and half-brothers, and that though their action is only in a certain number of cases direct, that is to say, that of own great-grandfather to own great-grand-daughter, yet if not direct, it is indirectly so, and that it tends to become that of grand and great-grand-uncle with their grand and great-grand-nieces.

The whole tendency of in-and-in-breeding with sheep, owing to the power of one ram to impregnate 50 females, is more and more to intensify and revert to A's type.

If these are the tendencies of in-and-in-sheep-breeding, cannot the desired object be attained more effectually and quickly than now? I believe it can.

PEDIGREE No. 1,

Or, line-breeding back to Sire.

$a = 50b$

$25\ a\ b \qquad 25\ b\ a$

2nd Generation.

$a = 25\ b\ a$

$12\ a^2\ b \qquad 12\ b\ a^2$

3rd Generation.

$a = 12\ b\ a^2$

$6\ a^3\ b \qquad 6\ b\ a^3$

4th Generation.

$a = 6b\ a^3$

$3\ a^4\ b \qquad 3\ b\ a^4$

PEDIGREE No. 3,

Or, Progeny with Progeny.

$a = 50\ b$ (all whole [sisters).

$25\ a\ b \qquad 25\ b\ a$

2nd Generation.

$a\ b = 25\ b\ a$

$12\ a^2\ b^2 \qquad 12\ b^2\ a^2$

3rd Generation.

$a^2\ b^2 = 12\ b^2\ a^2$

$6\ a^4\ b^4 \qquad 6\ b^4\ a^4$

4th Generation.

$a^4\ b^4 = 6\ b^4\ a^4$

$3\ a^{16}\ b^{16} \qquad 3\ b^{16}\ a^{16}$

If Pedigree No. 1 be an instance of in-and-in breeding, this is not. And yet these two systems, so utterly opposed in principle, come under the present nomenclature of "in-and-in breeding"!!

PEDIGREE No. 2,

Or, line-breeding back to Maternal line.

$a = 50\ b$ (all whole [sisters.)

$25\ a\ b \qquad 25\ b\ a$

2nd Generation.

$a\ b - 50\ b$

$25\ a\ b^2 \qquad 25\ b^2\ a$

3rd Generation.

$a\ b^2 = 50\ b$

$25\ a\ b^3 \qquad 25\ b^3\ a$

4th Generation.

$a\ b^3 = 50\ b$

$25\ a\ b^4 \qquad 25\ b^4\ a$

PEDIGREE No. 4,

Fathers with Daughters.

Or, No. 1 re-stated (the Ewes not being Sisters).

To save trouble, those only are taken who are supposed to have female offspring—except in the last, where $b\ a^3$ has a ram-lamb.

$a=b \qquad a=c \qquad a=d \qquad a=e$

$b\ a \qquad c\ a \qquad d\ a \qquad e\ a$

2nd Generation.

$a=b\ a \qquad a=c\ a \qquad a=d\ a \qquad a=e\ a$

$b\ a^2 \qquad c\ a^2 \qquad d\ a^2 \qquad e\ a^2$

3rd Generation.

$a=b\ a^2 \qquad a=c\ a^2 \qquad a=d\ a^2 \qquad a=e\ a^2$

$b\ a^3 \qquad c\ a^3 \qquad d\ a^3 \qquad e\ a^3$

4th Generation.

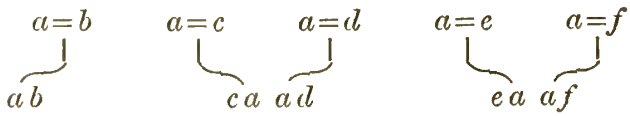
$a=b\ a^3 \qquad a=c\ a^3 \qquad a=d\ a^3 \qquad a=e\ a^3$

$a^4\ b \qquad c\ a^4 \qquad d\ a^4 \qquad e\ a^4$

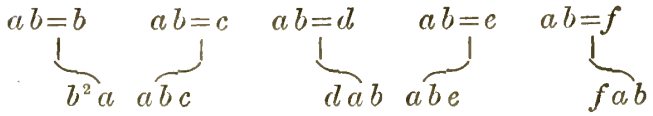
The fact of the ewes not being sisters does not affect the result which is, to breed back to a without intermixture.

PEDIGREE No. 5,

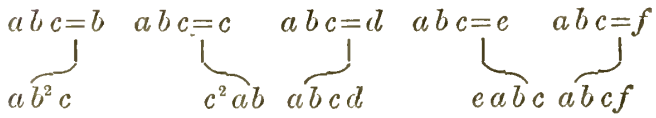
Line-breeding back to Maternal-line (the Ewes not being Sisters) ; and is No. 2 re-stated.



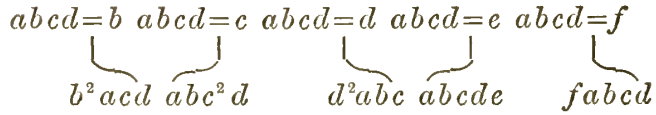
2nd Generation.



3rd Generation.

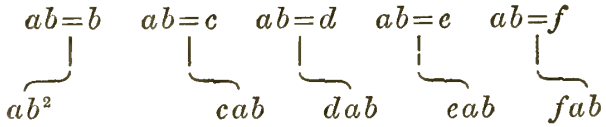


4th Generation.

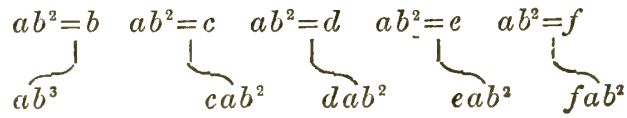


In this scheme is shewn how impossible it seems to intensify the mother's blood, unless all the mothers are whole sisters.—Not being sisters, and assuming that you must each generation take a young ram from a different mother, which virtually must be the case, as you cannot suppose one ewe always to produce ram-lambs, nor, if she did, can you suppose them always fitted for the stud. Suppose, however, this to be the case, and that the ewe *b* had a grandson by her son, and a great-grandson by her grandson, then it would show thus with the other ewes :—

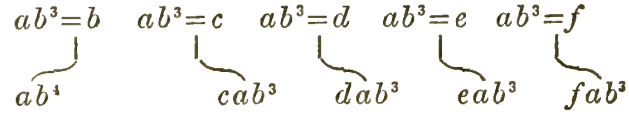
2nd Generation.



3rd Generation.



4th Generation.



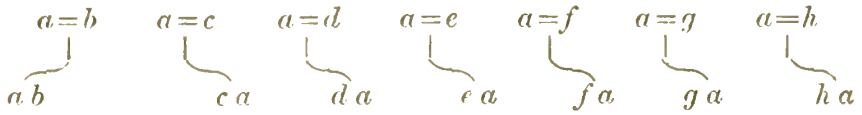
Either all the ewes must be sisters, or you must find a ewe who always breeds ram lambs.

PEDIGREE No. 6,

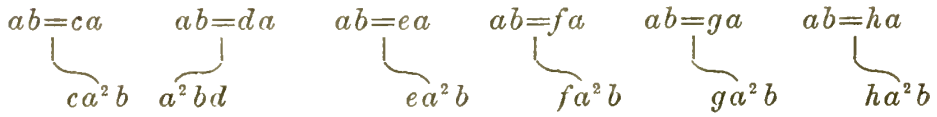
Or No. 3 re-stated.

Or, half-Brothers, half-Sisters and Cousins; the original Ewes not being Sisters.

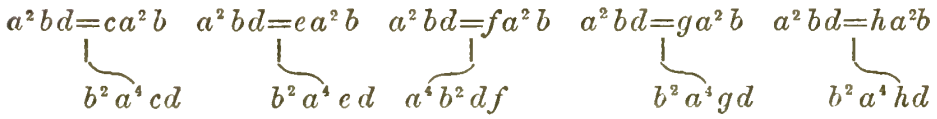
To save figures and trouble, the ewes are supposed to give female lambs,—save and except one in each generation, from which I take the ram to carry on with; his maternity I vary each generation.



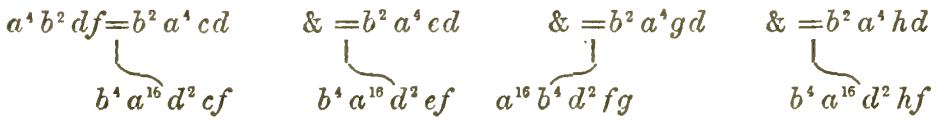
2nd Generation.



3rd Generation.



4th Generation.



THE SALMON TROUT.

By M. Allport, F.Z.S., F.L.S.

Read 8th August, 1871.

Much doubt having been expressed by scientific men in England as to whether young fish have really been reared in this colony from one species of migratory salmon, viz., the salmon trout *(Salmo trutta)*, without allowing the parent fish first to make the usual journey to sea, it was thought advisable to send one of such parent fish (which had twice deposited ova) to England, for the examination of all persons interested in that which will probably prove the most useful discovery in pisciculture yet made.

Accordingly such parent fish was, in March last, sent to the Zoological Society of London, together with two young fish of different ages, the progeny of similar parents.

By last mail Mr. Youl forwarded the following letter from Dr. Günther in reference to these fish :—

British Museum,
13th June, 1871.

Dear Sir,—I have examined the three salmonoids sent by Mr. Morton Allport, and mentioned in his letter directed to you, and dated March 15th.

(1.) The larger specimen is very interesting ; it is a female fish, with the ovaries well developed. With regard to the external characters, it agrees perfectly with the migratory sea-trout ; it has the dentition and scales, caudal fin, and præoperculum of that species ; it shows also ten parr marks, a number met with only in migratory species.

On the other hand, it has only thirty-six pyloric appendages, a number which I have never met with in purely bred migratory salmonidæ, but very commonly found in the river-trout and hybrids between river and sea-trout. (See my Catalogue of Fishes, &c., p. 27.) I think that this specimen does not serve to convince the sceptical that one species of migratory salmon will thrive in fresh water. The coloration of this specimen is altogether peculiar, and I have never seen a fish marked with spots so deeply black, so large, and so numerous as in this specimen. In ordinary sea-trout of the same size the parr marks would have disappeared, but here they are present, and their co-existence with the black spots gives to this specimen quite a peculiar appearance.

I need not give my determination of the species of the two smaller fish, as it appears from Mr. Allport's letter that he is acquainted with the parent fish ; but I think it right to state the principal characters, which may lead to a proper determination of these fish.

(2.) The larger, in smolt dress, has eleven series of scales below the adipose fin, 47 pyloric appendages, deeply cleft caudal ; parr marks entirely absent.

(3.) The parr has 10 parr marks, 11 series of scales below the adipose fin, 47 pyloric appendages, and deeply cleft caudal.

I remain, &c., &c.,

J. A. Youl, Esq. (Signed) A. Gunther.

Before considering this letter, I desire to express my sense of the great obligation the Salmon Commissioners and the colony are under to Dr. Günther for the trouble he has, on several occasions, taken to help us to a correct determination of the species of the various salmonoids sent to England, and to state that, whenever I have arrived at a somewhat different conclusion from so able an ichthyologist, it has been from a conviction that we have much to learn on this important subject, which no experiments yet tried in Europe have been sufficient to elucidate.

First, then, it would appear that in every external feature except colour the large or parent fish coincided absolutely with the description of the salmon trout *(Salmo trutta)*, but that certain peculiarities of colour, and, on dissection, the presence of only 36 pyloric appendages led Dr. Günther to doubt whether this specimen would convince the sceptical that one species of migratory salmon will thrive in fresh water.

But, upon reading Dr. Günther's own details of his examination, can any one doubt that this parent fish was a pure salmon trout ? And would it not have been amazing had it proved otherwise, for this fish was hatched, not from an egg laid here, but from one of the English eggs, and, if a hybrid, those who obtained the ova must wilfully and maliciously have played a trick upon all engaged, at great expense, in carrying out the experiment—a conclusion not easily arrived at by those who know Messrs. Youl and Ramsbottom.

As to the peculiarities of colour: variation in colour amongst fish, even where the circumstances are most favourable to healthy development, occurs so frequently that no one should be surprised at the peculiarities displayed by this specimen after its unnatural detention in fresh water. With true salmon *(Salmo salar)*, if smolts are detained in fresh water till the season for migration is past, the parr marks reappear. (See Proc. Zool. Soc., 1868, part 2, p. 247.) Before you is a beautiful specimen exhibiting this peculiarity ; it was hatched from one of the English eggs of *Salmo salar*, and died after having put on the smolt scales twice, and twice returned to the parr markings when the period for migration was past. As many present may remember, when the parent fish sent to England was first placed in spirits the parr marks were scarcely visible, but they became more intense afterwards, and, from Dr. Günther's description, must have darkened considerably on the voyage.

On those parent fish which remain in the pond, the parr marks are most apparent immediately after the spawning time, and the fish get gradually more and more silvery till the height of summer.

The deficiency in the number of the pyloric appendages seems far more difficult to account for than the mere variation in colour; yet even in this case may not variation be due to the unnatural detention in fresh water? It is certain that the number of these appendages varies greatly in individuals belonging to the same species. Dr. Günther gives 36 as the normal number for the river-trout *(Salmo fario)*, yet I have found more than 40 in several specimens undoubtedly belonging to the latter species.

One of the parent salmon trout from our pond, a male, which died nearly a year before that sent to England, and which is now in the Museum, was dissected in my presence by our curator, Mr. Roblin, who carefully counted the pyloric appendages, and found 47. With these facts before us, we should not place too much reliance on the number of the pyloric appendages as a specific test. Such facts only show the difficulty of what Dr. Günther, in his preface to the Catalogue of the Fishes in the British Museum, vol. 6, 1866, calls "finding a way through this vast labyrinth of variation of character in the salmonidæ."

Dr. Günther speaks of having found 36 pyloric appendages in hybrids between river and sea-trout; but where were such hybrids obtained, and how was the fact of their being such hybrids authenticated? To obtain a hybrid between these fish, at the same stage of growth as the parent fish sent hence, the ova and milt must have been obtained, the fish hatched and carefully attended to for four years by competent persons. Has this ever been done?

After all, the fact that the parent fish, in every minute external detail of measurement, corresponded exactly with the true salmon trout, and differed totally from the true river-trout, while in colour it resembled neither, proves that it was no hybrid beween those fish; and the circumstance of its having the same number of pyloric appendages as such hybrids therefore matters little.

With regard to the two smaller fish examined by Dr. Günther, his written descriptions correspond with those of the young of true salmon *(Salmo salar)*. Yet these were bred from eggs deposited by fish which never went to sea, and which externally are identical with the large parent fish sent to England; and I am, therefore, driven to the conclusion that, at this early period of their growth, the migratory species of salmon cannot, with any degree of certainty, be distinguished from one another.

RABBITS.

The following paper on the rabbit nuisance, sent to the secretary by Mr. John Bisdee, of Hutton Park, was read at the August meeting of the Society:—

The destruction of rabbits is now, I believe, generally admitted to have become absolutely necessary, and from my own experience I have no hesitation in saying that had not some means been found of destroying them, one more year—increasing at the rate they have been—would have ruined every agricultural farm near where rabbits were numerous, and stock of all kinds must have starved. I have therefore much pleasure in giving any information that will assist fellow-sufferers in getting rid of one of the worst evils the landholder ever had to contend with.

I may first of all state that I have given my plan to several who have applied to me, and have been surprised to hear that on trial they cannot get the rabbits to take grain, and that when they do appear to have eaten it, it has not killed. My opinion is that rabbits will always take grain, and that if they do not, it is the fault of the person who mixes it—at all events I have never found them refuse it poisoned with strychnine except once, when the strychnine was dissolved in a copper I had mixed lime and sulphur in, and a coating of the sulphur had remained on the sides. To the second objection, that if they do eat the grain that it does not kill, this may arise from many causes, and I can assure anyone who has to contend with rabbits, that he must not expect to be able to destroy them without many difficulties and disappointments that his own brains must help him to get over. If I were to describe all the experiments I have had to make with strychnine, arsenic, and other poisons, as well as other ways to destroy these vermin, I should fill more paper than you would care about reading. But that rabbits can be destroyed I think would be evident to anyone who had seen them on parts of this estate in May last, and who would take the trouble to ride over it now. The expense of strychnine is, no doubt, a drawback, but until some way of getting them to take a cheaper poison is found, there is no alternative. I have killed numbers with arsenic, but should never have cleared parts of this property as I have done if I had not gone back to strychnine, and I believe that if properly dried the skins will pay for the strychnine.

I commenced by dissolving 1oz. strychnine in 1½ gallons boiling water, with five teaspoonsful of muriatic acid; with this solution I pickled four bushels of wheat crushed. This

killed a great many, but not so many as I thought it ought. I then reduced the quantity of grain to three bushels, and changed from wheat to oats, but still did not pick up the numbers I expected. At that time I was using two different brands of strychnine, and found a very great difference in the numbers killed according to which sort I employed; so great was the difference that it took 2oz. of one brand to kill as many as 1oz. of the other, and I have no doubt one was a mixture of some sort. The brand to depend upon is "Jacop Hulle," and with the mixture I give below, carefully prepared, any number of rabbits can be killed. I have tried several experiments with this, and have dissolved 1oz. to one bushel, and yet did not pick up any more rabbits on the spot, they still travelled some distance, I think the faculty will be able to explain this; but I find that I get quite as many rabbits with 1oz. to two bushels, and have therefore lately kept to that quantity. Many have asked me whether it can be placed with safety on runs where sheep are running, and as I have heard it reported I had killed upwards of 500 sheep, the question is a serious one. I have laid it on some of my runs for the last two months, and have only found three sheep killed by it, and I think it likely they have been killed by the grain having in some places been laid too thick. The way to lay it on a sheep run is broadcast, and the quantity not more than a sower would cast at the rate of one bushel to the acre. I have laid many miles of it of this thickness without harm to anything except the rabbits, and a few kangaroo and kangaroo rats.

When I used wheat I found many white magpies were killed, but since using oats only a few. Crows appear almost poison proof. I think I have half the crows in the district here, and, as yet, have only seen a few killed, although they manage to clear up any number of dead rabbits the day after they (the rabbits) are killed.

My dogs live on the rabbits, and, as yet, without much harm —I have known them get a little too much, but a little strong tobacco water soon puts them right.

I will now give you my recipe which I can warrant, and if I was very hard up I would undertake to clear any estate infested with rabbits. The oats, if possible, should be crushed—as they absorb the poison better—and when once poisoned any amount of rain does not appear to affect them, which might not be the case if uncrushed; if crushed they should afterwards be winnowed to blow away the husks. In $1\frac{1}{2}$ gallons boiling water with five teaspoonsful muriatic acid, put 1 oz. strychnine, (less water will be sufficient if the grain is not crushed, say 1 gallon). Stir and let stand for 10 minutes. With this

solution pickle, in a tub, 80 lbs. of oats, or 120 of wheat or rye. Stir well until all is wet, let stand until next day when it will be ready for use. Lay it in trains, or broadcast it wherever the rabbits feed—if in trains not too thick—2 bushels will reach nearly two miles if properly laid.

As to the success I have met with, I can only say that I have killed many thousands; my men have collected some thousands of skins for which I pay them, as an inducement to them to lay the poison properly. I give them the use of all the sheds to dry the skins, which is done by hanging them on nails just as they come off the rabbits (inside out); but it is impossible to say the numbers that are destroyed, as in scrubby places I do not think more than half are found

Where it is a marsh that rabbits frequent, and it can be cleared of sheep, so that the grain can be spread thick, many hundreds can be killed in one night; but it is often the case that the first evening it is laid it is not eaten—I think from some smell about it they do not like, which goes off by exposure.

I think that late in the summer will be a very good time to work on them, as they leave the dry hills for any marshy ground, and can then be got at easily. I killed a great many with acorns, cracked and mixed with this solution, and believe that in the dry weather leaves (such as elm leaves) soaked in it and spread would kill numbers.

I never knew the rabbits before this season eat the ferns and wattle bark. I also notice that where they bark the wattles they are generally very poor. This, of course, may arise from shortness of feed, but if you pass on half-a-mile, to where there are few wattles, the rabbits are as fat as pigs. I have weighed them upwards of four pounds, when skinned and dressed. The leaf of the fern they leave, and eat only the stem; the same with dead thistles, they eat all the stem and leave the old leaves.

ROYAL SOCIETY.

OCTOBER, 1871.

The monthly evening meeting of the Society was held on Tuesday, the 10th October, M. Allport, Esq., in the chair.

The following gentlemen, who had previously been nominated by the Council, were after a ballot declared duly elected as Fellows of the Society, viz., John Swan, Esq., M.H.A., W. E. Crowther, Esq., and R. J. Creasey, Esq.

The following returns were brought under notice :—

1. Visitors to Museum during August, 1,241 ; September, 849.
2. Visitors to Gardens during August, 1,779 ; September, 2,214.
3. Plants, seeds, &c., received at and sent from Gardens during August and September.
4. Plants supplied for decoration of public places during August and September :—
   a. For Government House grounds 50 plants.
   b. For Public Offices and Franklin Square 48 plants.
   c. For Public Buildings, Launceston, 18 plants.
   d. For Green Ponds Church 100 plants.
   e. For Catholic Cathedral, Harrington-street, 60 plants.
5. Time of leafing, flowering, &c., of a few standard plants in Society's Garden, during August and September.
6. Books and periodicals received.
7. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., table for September.
2. Port Arthur, from A. H. Boyd, Esq., table for August and September.
3. Westbury, from C. Belstead, Esq., table for August and September.
4. Swansea, from Dr. Story, table for August and September.
5. Sydney, from the Government Observer, printed tables for June and July.

The Secretary then read the Notes on the Meteorology and Mortality of the Hobart Town Registration District during the month of September, 1871, by Dr. E. Swarbreck Hall.

The presentations to the Museum were as follow :—

1. From the South Australian Institute Museum, Adelaide—A named collection of bird skins from the Northern Territory. (56 specimens, comprising 36 varieties.)
2. From Mr. D. Chisholm—An Arabic or Persian coin, found at Clarence Plains by Mr. W. Free. A specimen of *Syngnathus*, and one of *Hippocampus*.
3. From Mr. J. Cassidy—A Spirifer (silicified), from Point Puer, Tasman's Peninsula.
4. From Mr. E. J. Webb—Two white cockatoos.
5. From Mr. Baynton, Brown's River—A specimen of the "native bread."
5. From Mr. Ross, Battery Point—A Snake, said to be from Fiji.
6. From Mr. Stephens—A fine specimen of the large Australian Volute. *(Voluta magnifica.)*
7. From Mr. W. Simpson—An unusually large egg of the domestic goose. Weight of egg 10½ oz.

8. From Mr. J. W. Graves—A common Sparrow, one of several found dead, probably poisoned, in Macquarie-street.
9. From Mr. J. Pearce—Two American notes ("Greenbacks"), value 50 cents. and 10 cents.
10. From Mr. J. W. Graves—Bulletin of the French Acclimatisation Society, Nos. 3 and 4, March and April, 1869.
11. From Hon. J. A. Dunn, Esq.—Two pamphlets on South Africa, forwarded by Sir H. Barkly to the Government of Victoria.
12. From Mr. Clifford, per Mr. M. Allport, skull of Wild Boar from New Zealand.
13. From Mr. R. C. Read, New Norfolk—A recent specimen of Swainson's Lorikeet (*Trichoglossus Swainsonii*), shot at New Norfolk, from among a flock of common green parrots.
14. From Mr. F. S. Edgar—Shell of small Turtle.
15. From Mr. W. Felmingham, per Mrs. C. Meredith—A fish, (*Uranoscopus sp.*) caught near Maria Island.
16. From Mr. W. Hatton, Elizabeth-street—A copy of Barker's Bible, printed in 1637.
17. From Mr. Wiggins—A fish, probably a species of Carp, from Mauritius.
18. From Captain Williams, of the Kestrel—Four shells from East Coast, Tasmania.
19. From the executors of the late Mrs. Butler—230 specimens of shells. An earthenware lamp from a tomb at Misenum, Naples. Portion of a human jaw from Pompeii. A small earthenware cup from an ancient tomb at Athens. Mosaics, &c., from Baiæ Beach, near Cumæ, Naples; &c., &c.
20. From Mr. J. G. Moir—Fossils (casts of *Spirifers*, &c.) from the limestone, near Brown's River.
21. From Mr. J. Mitchell—A French coin (Dix centimes) Napoleon, III., 1856.
22. From the author, Baron F. Von Mueller—A pamphlet on "Forest culture in its relation to industrial pursuits."
23. From Mr. W. Blyth, Honeywood—Seeds of Waratah.
24. From the Rev. H. D. Atkinson—Three geological specimens from Peppermint and Birch's Bays.
25. From Mrs. Fielding Browne—23 silver, and 22 copper coins and tokens, viz. :—*Silver* : One 5 lire, Italy, Napoleon I., 1808; five 10 cents, ditto ditto, 1808; one 10 soldi, ditto, ditto, 1813; one franc, France, Charles X., 1826; one half ditto, ditto ditto, 1827; one ditto ditto, Louis Philippe, 1843; one ditto ditto, 1835; one coin, Spain, Philip V., 1738; one quarter dollar, ditto, Charles III., 1768; one ditto, ditto, Charles IV., 1799; one dime, America, 1845; ditto ditto 1845; one half-crown, Bank of England token, George III., 1808; one shilling, colony of Essequibo, George III., 1808; one quarter, ditto ditto, 1816; two quarters (cut) of Spanish dollar, 2 unknown. *Copper* : One penny, George III. (?); one half ditto, George II., 1735; ditto, Prince of Wales (no date); one half anna, East India Co., 1845; one 20 cash, ditto, 1803; one coin, French Republic; one coin, Isabella II., Spain, 1836; one ditto, Brazil, 1828; two ditto, Russia, 1831, &c.; one 10 cents, Napoleon I.; two doits, Java, &c.; seven English and colonial tokens.

The SECRETARY directed attention to a handsome present of books received from America, through the Smithsonian Institution. Among these were the recent publications of the Smithsonian Institution; the Boston Society of Natural History; the Department of Agriculture,

United States; the Essex Institute ; the American Philosophical Society; the Portland Society of Natural History ; the American Academy of Arts and Sciences, Boston ; the United States Coast Survey Department, &c. &c.

The SECRETARY in bringing under the notice of the meeting some products of the beet prepared by Mr. Atkins, of the Cascades House of Correction, observed it was well known that the Society had long recognised the great value of the sugar-beet, and information in reference to it has from time to time been obtained and placed before the public. Papers by two of our members, Mr. Barnard and Mr. J. Walker, giving some details as to the beet sugar manufacture have been read at former meetings. From these and from other notices in the public press a considerable amount of attention had been directed to the beet-root, and in anticipation of a demand for fresh seed of the best quality—the White Silesian—a plot of ground in the Society's Gardens, had been planted with this variety. The meeting would be glad to hear that this anticipation had been fully realised, so that within the last few weeks applications had been received from upwards of seventy individuals from various parts of the colony, to all of whom parcels of seed have been furnished. It had now, therefore, been extensively distributed over the island, and no doubt the growers would of themselves take care to preserve in future whatever seed they may require whether for cultivation, sale, or distribution. As to attempts to extract the sugar from the beet he (the Secretary) thought they would be premature. In the neighbouring colonies they were vigorously at work attempting to solve this problem economically, with greater means and resources than Tasmania at present could command. In the course of a year or so we should have all the benefit of our neighbours' experiments without loss of capital, or misdirected energy on our part, and in the meantime it would be well for our farmers to acquire further knowledge of the beet, its best mode of cultivation, the soils most suitable for its growth, &c. (Hear.) Only an hour or two before the meeting he had received a note from a correspondent, experienced in the general management of stock, who informed him the beet was not only admirable for cattle and horses, but was also most excellent for poultry of every kind. In all cases it was given in the raw state. From Mr. Jackson, the owner of a dairy at Sandy Bay, the Society had received a communication on this subject from which he (the Secretary) would read "Last season was so bad that I had got no crop from mangolds after sowing them twice. I put in some beet seed quite as a forlorn hope in December, which was two months later than it ought to have been. From these, late as the season was, I had six tons of roots to the acre, and have since had reason to be so satisfied of their value for feeding purposes that I shall for the future pay a great deal more attention to their growth. The cattle eat them most ravenously, and are not so subject to scouring as on mangolds. They give no disagreeable flavour to either milk or butter."

The SECRETARY read the following communication, from the Hon. J. Maclanachan, Esq., on the rabbit nuisance :—

Ballochmyle, Tunbridge,
31st August, 1871.

My dear Dr. Agnew,—In compliance with your request I give you my experience in the destruction of rabbits as briefly as I can.

Previous to August, 1870, I used guns only without any apparent diminution of their number. On the contrary they increased to such an extent that I saw, if allowed to continue, starvation and death to every other grass-existing animal would be the consequence. I determined to cut down all the gorse about the homestead and fences on the runs, and hearing that the Messrs. Taylor, of Macquarie River, had been very suc-

cessful in blocking them up in their burrows, I adopted this plan and succeeded beyond my expectations. The work is rather slow, but sure, if properly done. My mode of doing it was with round wood of any sort cut into billets 18 or 20 inches long, and in every burrow had a billet larger than the hole, driven in by a strong man with a heavy iron maul, as far as he could get it, which was generally a little way inside the burrow, then level down the entrance of the hole over the end of the billet of wood, and the thing is complete. Its success, as I have said before, depends entirely on the work being properly done. Trustworthy men, if possible, should be employed; failing this, doubtful men require constant watching. When properly done very little fear of rabbits burrowing out, but great danger of outsiders burrowing in. To meet this I let the men have a fast dog to pick up outsiders, and made them begin work at the homestead and work outwards, so that they had to walk to and from their work daily over the work previously done, and wherever they saw a new burrow to block it up at once. I continued this work until the end of October, 1870, when other work compelled me to leave it off until March of this year. At this busy time failing to get good men I adopted another mode—that of giving ninepence a dozen for all grown rabbits killed on my ground and brought to me every night to be counted; and to prevent the possibility of their being brought a second time I cut one ear off each rabbit. For a short time the hands employed killed at the rate of 1,200 and odd a week, but the numbers soon became less and gradually decreased. On some parts of the land not two rabbits are to be seen where hundreds were before, and on all other parts, so much reduced in numbers, as to convince me that if every sufferer from these pests would go at them with a will the nuisance would soon be very much abated, and with perseverance put down altogether, but this will not be done without the aid of Parliament.

During the lambing season I stopped the men and tried the poison (strychnine), first with fruit and carrots with good results, and afterwards with oats slightly crushed with still better results. The mode of preparation has been so well described by Mr. Bisdee, of Hu'ton Park, from whom I got it, that I need not repeat it. I made small enclosures to put the poisoned oats in that the sheep could not get at it. I find now the grass is growing. The rabbits are so shy of the poisoned oats that I have again employed hands to kill them at so much per dozen. I believe the blocking up with good men to be the best mode tried except the poisoned oats.

Yours, &c.,

J. MACLANACHAN.

Mr. SWAN said when the ground was sandy the rabbits could easily be destroyed, by simply filling in the burrows to the extent of a foot or two with the sand. He had frequently seen dead rabbits taken out after this process. It was satisfactory to know that the expense of destroying them was partly recouped by the value of the skins in the English market. In London they had sold at 2s. 1d. per dozen, and at Bradford as high as 3s.

Mr. T. GIBLIN observed the export of skins was assuming great proportions. Mr. Fysh alone had exported 13 bales, in addition to which Mr. Bidencope had sent a large number.

The BISHOP of Tasmania felt that Government assistance was required, in order that some general and systematic action should be taken in the matter. It was useless for one or two settlers to destroy rabbits if their neighbours, whether owners of land or Crown tenants, made no attempt to clear their runs. It was well, however, to know that, as far as he could learn, the rabbits were really not making much headway except on sandy ground. He thought it would tend much to their destruction if their flesh possessed an economic value, and this could readily be given to it by the formation of meat-preserving companies. Both flesh and skins could then be profitably disposed of.

Mr. GOULD, whilst agreeing that some general action was necessary,

was afraid, if the tenants of the Crown lands were taxed for the purpose, that in many cases they would throw up their holdings, and how in such cases could Government act?

The following extract from a letter received by the Governor from F. S. Corrance, Esq., M.P., was read :—

"In reference to your remarks on your salmon question, I have only to observe that in my opinion, even after the inhabitant shall have declared himself in a most unmistakeable way, it will be at least some years before the fish could become sufficiently abundant for fishing for them, to have a chance of meeting with much success. It is, moreover, by no means an invariable propensity of the race to rise at a fly at all, and in the European rivers limited to about one-half. In none of the Dutch, nor Swedish, and in few English rivers is this the case, and it depends, as I think, upon the habits of the parr and smolts in their early life whether they do so or not. So you see that this part of the problem is scarcely likely to be worked out in your time at least. You say that the fords, &c., of the upper waters are more than 100 miles off, and that the banks of the river Derwent in those parts run for many miles through an uninhabited and almost impassable district. I do not think that ought to present an insuperable objection to an exploring expedition to that district at the proper time of year, by competent persons, and I should think such an expedition would be generally popular, considering the important results to the colony of a successful solution of this problem. All the shallows should be watched and reported upon. The time of year would be the autumn months."

His Excellency adds :—

"The writer of the above remarks is my brother-in-law, and there are few more experienced salmon fishers to be found in England, or possessing better knowledge of the salmon rivers of the United Kingdom and continent of Europe."

Mr. M. Alport repeated what he had expressed on a former occasion, viz., that the expense of watching the upper waters of the Derwent would be far beyond the means at the disposal of the Salmon Commissioners. If we knew where the spawning beds were, it would be easy to watch them ; but to search for them during the season would be a work of vast trouble and expense.

Mr. Gould read a paper on the geological structure of Flinders' Island in Bass' Straits, and illustrated his remarks by a large and very beautiful collection of specimens obtained by him during his stay there. He especially directed the attention of the meeting to the exceptionally fine crystals of Orthoclase Felspar, which had been obtained from cavities in the granite, and which he considered equalled in perfection those obtained from any part of the world. He also exhibited specimens of beryl, remarkable varieties of granite, specimens of crystals of topaz and felspar *in situ* in masses of rock, and supplemented his paper by a variety of additional observations elicited by the attention of the members to the examples before them—more especially in regard to a sample of tin ore of great purity and value.

Further discussion of a conversational character ensued, in which the Rev. Brooke Bailey, Mr. Barnard, Mr. Stephens, and others took part. A vote of thanks having been accorded to Mr. Gould for his valuable and interesting paper, and to the donors of presentations, the meeting terminated.

NOVEMBER, 1872.

The monthly evening meeting of the Society was held on Tuesday, the 14th November, His Excellency C. Du Cane, Esq., President, in the chair.

The hon. Mrs. Du Cane was present, and also several visitors from the neighbouring colonies.

The hon. P. O. Fysh, Esq., M.L.C., who had previously been put in nomination, was after a ballot declared duly elected a Fellow of the Society.

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

1. Visitors to Museum during October, 921.
2. Ditto to Gardens ditto, 2,568.
3. Times of leafing, flowering, and fruiting of a few standard plants in Society's gardens during October.
4. Books and periodicals received.
5. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., table and summary for October.
2. Port Arthur, from A. H. Boyd, Esq., ditto for September.
3. Westbury, from F. Belstead, Esq., ditto ditto.
4. Swansea, from Dr. Story, ditto ditto.
5. Melbourne, from the Government Observer, printed notes for August.

The Secretary read the notes on the Meteorology and Mortality of the Hobart Town Registration District during the month of October, 1871, by Dr. E. Swarbreck Hall.

The presentations were as follow:—

1. From Master Wm. Jefferson, Fernshawe, Victoria, (per J. W. Graves, Esq.), nest and egg of Lyre Bird, (*Menura superba*, and four other nests, with eggs, from same locality.
2. From Mrs. J. Sanders, Hobart Town, a singularly shaped Sponge, from Recherche Bay.
3. From H. B. Tonkin, Esq., 6 fossils, (casts of *Helix sp.*), from Risdon.
4. From Mr. Weymouth, a small map of Tasmania published in 1830 by Ross. (This copy is believed to have been used by John Batman, whose name it bears.)
5. From Mr. W. Josephs, a small copper coin, probably Persian, picked up at Clarence Plains.
6. From Captain Williams, an English halfpenny token, 1788.
7. From Dr. Hector, Wellington, catalogue of birds of New Zealand.
8. From the Hon. J. Maclanachan, Esq., a Carolina duck *(Dendronessa sponsa.)*
9. From M. Allport, Esq., specimen of Kauri Gum from New Zealand.
10. From T. Stephens, Esq., specimen of Travertine from Dunrobin.
11. From the author, Mr. W. Legrand, a copy of the 2nd edition of "Collections for a Monograph of Tasmanian Land Shells."
13. From Mr. Hissey, Skeleton of a Fox *(Canis vulpes.)*

Mr. Stephens called attention to a specimen of travertine from Dunrobin (presentation No. 10), the property of Mr. Bethune. As in most of the other instances which have come under notice, it appeared to have been formed by the percolation of water, holding lime in solution, and probably springing from beds of limestone concealed beneath other members of the Upper Palæozoic series which show on the surface. If any extensive deposit of this rock should be found it might possess considerable economic value, especially as a renovator of exhausted soils. Mr. Stephens mentioned that two strange birds had been found lying dead

among the drift wood floating down the Derwent near its junction with the Ouse. An examination of the beak and feet proved them to belong to a small species of Petrel (*Procellaria*), a bird which is very rarely found so far inland. He also exhibited an almost new shell (*Voluta Sclateri*), of which not more than three specimens have been seen, and which is therefore highly valued by collectors. It was obtained near Kelso, by Miss Sharland.

As to presentation No. 11 Mr. STEPHENS remarked that Mr. Legrand's Monograph included 14 new species discovered since the publication of the first edition. Several other members spoke of the great zeal and energy of Mr. Legrand in this branch of Natural History.

Mr. ALLPORT, in the absence of the author, read a continuation of Mr. Gould's remarks on the islands of Bass' Straits. (The first part was read at the last monthly meeting.)

As to the wanton and stupid destruction of the seals, referred to in the paper, Mr. ALLPORT remarked that nothing could more clearly show how necessary it was that the legislative measures for the protection and preservation of our valuable fish and other animals should be strictly carried out.

Mr. ABBOTT read some notes as to the recent results arrived at by the Royal Astronomical Society relative to the fluctuations of the star η argus and its surrounding nebula.

Mr. S. Smith TRAVERS read the following interesting and suggestive communication :—" Our fellow townsman, Mr. Aldred, having described to me a process by which he was of opinion that fowls' eggs might be imported from England, with their vitality so unimpaired, that they might be hatched, I am happy to say that having tried the experiment it has succeeded, and that an egg laid by a La Hécke hen in North Wales on the 1st of May was hatched on 10th October, and produced a very fine chicken. Mr. Aldred's instructions were to place the egg, immediately after laying, in an upright position, with the air bubble uppermost, that is to say with the broad end of the egg upwards. He insisted particularly on no time being lost between the moment of laying and the placing the egg in this position. Whilst in this position they should be dipped in a solution of gum arabic, and put in a case fitted with holes, in which they would retain their vertical position. I received only six eggs that were collected by a person in England on whom I could depend for an exact obedience to these instructions, and out of these six eggs two were found to be cracked. Of the four which remained, and which were duly placed under a hen, one was found to be decomposed. Two contained half-formed chickens, and the fourth produced the fine chicken I have referred to. The success of the experiment would have been on a larger scale, though not more perfect, if more care had been taken to preserve the case containing the eggs from the effects of the incessant motion, and very often violent concussion incident to a sea voyage. As it was, the case was fitted with a frame, in which it hung by means of an universal joint. But the frame was screwed to the deck, and only performed the part of keeping the eggs in the desired vertical position. Had the frame been suspended by elastic straps, I feel confident I should have had to report a larger measure of success. I think it surprising the vitality of the eggs should have survived the violent shaking that they must have endured owing to the rigidity of their frame. The time that elapsed from laying to hatching is remarkable, but still more when it is considered how much of that time was passed in the tropics in a hot cabin ; and I hope that the experiment will be carried out on shore, and for a longer period of time, with the object of finding how long eggs under such conditions may be

kept. If it be possible to hatch an egg after a lapse of five months, why not after five years ?"

Conversation ensued in which the President, the Secretary, Mr. Abbott, Mr. Allport, Mr. Stephens and others took part.

Mr. Justin BROWNE proposed the usual vote of thanks to the authors of the papers just read, and to the donors of presentations. He observed that (although it did not apply to the present meeting) papers might occasionally be brought forward of no particular interest to any present, yet these very papers might be of great interest to many readers at a distance. They composed the bulk of the Society's Transactions, and these were of great value as serving to keep up friendly relations and exchanges throughout the world with kindred societies, which otherwise might have little prospect of obtaining that knowledge of our Natural History, &c., which was of peculiar interest to them. The vote having been unanimously agreed to, the meeting separated.

THE ISLANDS IN BASS' STRAITS

By C. Gould, F.G.S.

[*Read* 10*th October*, 1871. *The paper was illustrated by a variety of choice and remarkable specimens.*]

Visits to the islands in Bass' Straits are so rare that I feel certain the members of this Society will accept a contribution to the natural history of the group without objecting to its brevity, and to its somewhat desultory character, induced by limited opportunities of observation.

Indeed the position and grouping of the islands render them especially interesting, whether our attention is directed to them as affecting their geological aspect—presenting as they do the connecting link between this island and Australia, and containing integral though distant parts of formations common to both countries—or to their mineralogical importance from their presenting a variety of mineral species not hitherto found elsewhere within the colony, or if so only rarely, many of them beautiful, some comparable in point of crystalline perfection with their congeners in any part of the world, and others possessing a substantial value of such importance as to justify a hope that at some future day their discovery in greater abundance may initiate novel and important mining adventures. Again, the researches of the field naturalist are eminently favoured in this locality by the harbour which its seclusion offers to various cetacea, and the numerous species of waterfowl now so rarely met with, or even almost extinct upon the shores of our own island, while the natural shelter of the outlying reefs and larger islands encourages the production of various mollusca less abundant or unknown on our own exposed coasts.

My visits, made during the past summer, were principally to the western side of Flinders and to Cape Barren, taking incidentally the smaller islands lying off them ; but I had no opportunity of visiting the eastern coast of Flinders, which is an enterprise of some hazard from the heaviness of the seas and absence of boat harbours, while my leisure did not permit a visit to Clarke's Island, which is the southernmost of the group.

The small coloured plan which I lay on the table of the Society will convey a fair general impression of the structure of the islands in so far as the oldest rocks are concerned. To express, with any accuracy, the distribution of the tertiary deposits which overlie them, would require a much more minute examination than I was able to afford ; their sinuous

extension between the ranges, and somewhat capricious occurrence upon their flanks, corresponding with the similar peculiarity observed in the occurrence of the tertiary deposit upon the N.E. Coast, with which they perfectly correspond.

The physical features of these islands are expressed somewhat more minutely in the general map of the colony by Mr. Sprent than is usually the case, but still it conveys no adequate idea of the strange appearance presented by the great granite ranges standing out abruptly like headlands or craggy islands from the plains of tertiary land, level as a sheet of water for miles, stretching for miles in length and width around their base, and winding in bay like valleys between them.

These plains are mostly sand or coarse quartz gravel derived from the adjacent granite rocks. This has been generally denuded away where the ranges butt against the coast line; but occasionally sections remain, showing friable sandstones with an amount of false bedding, which almost suggests unconformability, or impure limestone, the source of springs crusting the cliffs with tufaceous deposit.

The ranges in Flinders are with one exception (that of the Patriarchs), confined to the western coast line, and the highest point determined by Mr. Sprent was the summit of Strzelecki Peak, which has an elevation of 2,550 feet. They are nearly entirely composed of granite, and although, in some instances covered by forest and scrub, are for the most part bare and rocky masses, affording a great variety of really grand and very beautiful scenery. The slopes of these ranges, and the tertiary plains surrounding them, form a vast open grass tree country with only occasional belts of tea tree, and similar scrub. The true grassy portions of Flinders are restricted and patchy, the most important being situated on the extreme north end of the island, opposite to the Sisters, and in the vicinity of the settlement. Cape Barren is generally mountainous, and unfitted for occupation, the lower portion and plains bordering the ranges forming grass tree open country as in the case of Flinders. The smaller islands seem to be those best adapted for pastoral purposes, and most of them produce a rough coarse grass on which sheep manage pretty well. These are chiefly granite also, but being of low elevation have the advantage of exposing the most recent tertiary beds, containing a large amount of lime in the form of unaltered shells, closely allied to existing species. Many of them have also been at one time, or are still, highly manured by the existence on them of mutton bird rookeries. The plan exhibits outlying patches of Silurian rocks; these are of unimportant extent, relatively to the general area of the island,

and for the most part occupy inconspicuous and low positions. The only exception occurs about five miles eastward from the settlement, where two parallel strips of clay-slates occur, perched on the granite base, and culminating in hills about 1,000 feet in height. An area of about five miles in length, and four in breadth, is chiefly occupied thus by clay slates and sandstone; these are traversed by thin quartz strings, and occasionally by veins of quartz of tolerable dimensions.

Other outliers of slatey rocks occur on Badger Island, occupying about one half of it; upon the shores of Franklin Inlet adjoining Adelaide Bay, upon the north side of Cape Barren near Deep Bay, and at Cape St. John.

These have hitherto proved barren in metals with the exception of pyrites veins. And their chief interest is derived from the proof which they offer of the continuation northward and eastward of the great system of anticlinal and synclinal folds, which I have at various times shown before this Society to pervade and completely control the disposition of all the oldest formations in the colony. Thus we may readily conceive the outliers at Brougham's Sugar Loaf, and at Badger Island, and Cape St. John, to be on the respective slopes, if the expression is intelligible, of the anticlinal axis whose continuation traverses the main land south of Waterhouse Point, in the direction indicated on the chart, while the outlier fronting on the Franklin Inlet may show a continuation of the line of flexure on the extreme east of the colony, passing through Mt. William and the Scamander tier.

Trap rocks are exceptional altogether among the islands, but occur to a limited extent, and most unexpectedly in a few widely separated spots, either in the form of narrow dykes traversing the granite or of overflows of basalt—such as those marked at Killicrankie Bay, and in the neighbourhood of Mount Eliza and Sanfra Island; these are chiefly compact hard basalts, but on the surface vesicular and zeolitic.

The following is a list of minerals met with by myself, or reported to me, as occurring among the islands, to which I have appended the localities and the formation in which they occur :—

1. *Gold* was obtained by me in traces on Cape Barren Island. None whatever was found on any part of Flinders, and the stories current as to the discovery of gold there have not been substantiated. It is almost needless, however, for me to add that it is always possible that some may be discovered in the Silurian outliers near Brougham's Sugar Loaf, but the general aspect of those rocks is certainly unfavourable.

2. *Copper Ores.*—Stains of copper ore are said to occur on Pruin,

Seal, or Hummock Island of the Chart, and on Kent's Group, neither of which was I able to visit.

3. *Arfvedsonite.*—"A highly ferruginous variety of amphibole or black hornblende," containing one per cent. of copper. "The copper which it contains exists in part or all as oxychloride coating the crystals of Arfvedsonite" (G. Foord), locality Swan Island.

4. *Tin.*—The oxide of tin occurs in various parts of Cape Barren Island, and of Flinders Island as stream tin, in rolled fragments. This is the most valuable form in which the ore is obtained; it contains about 75 per cent. of tin, and the value varies from £80 to £100 per ton, according to recent fluctuations of the market.

5. *Bournonite.*—An ore of antimony and lead, occurring in patches near the junction of the slates and granite on the south-east shores of King's Island.

6. *Iron Pyrites.*—Marcasite, often mistaken for gold by the islanders, is a variety of iron pyrites, and occurs in veins in the slate formation.

7. *Topaz.*—This mineral occurs in crystals and washed pebbles in great variety of form, colour, and size, and in many localities associated with oxide of tin, zircons, tourmaline, etc., etc. It is derived from the granite, and crystals may, though rarely, be obtained *in situ* from rugs in the granite, together with rock crystal and with crystallized feldspar. I have the pleasure of introducing one very beautiful example of this to the notice of the Society. They are abundant on the north-east side of Killicrankie Bay in a creek descending from the ranges, and upon the beach, and are equally so in a gulchway about two miles south of the first-mentioned spot, and across the bay from it. I also found them inland in the creek descending westward from the Quoin, and in the Sanfra River on the south side of Flinders. I am also informed of their discovery in other creeks on the south end of Flinders, diverging from the peaks, and in a variety of spots upon Cape Barren Island; such as in Deep Bay and vicinity of Dover River upon the north, and Battery Bay and Kent's Bay upon the south side of Cape Barren. They are also occasionally found upon the outlying islands.

In regard to their occurrence, I may note that a remarkable feature in the granite is usually the index of their presence.

This rock which is in general throughout the islands an ordinary ternary granite moderately close-grained, or occasionally somewhat porphyrytic, appears to have been subjected to some abnormal condition of cooling, which has resulted in certain localities in the aggregation of its constituent minerals into masses of exceptional size. Thus it is not unusual to see vein-like streaks traversing the granite, varying from one to several feet in width, and composed of a material which can only be illustratively described as granite highly magnified. The materials are identical with those of the surrounding granite, but the size of the individual minerals is enormously increased, so that blocks of feldspar quartz and even mica occur, up to several feet in dimensions. These appear to be the scene of the most abundant sources of the topazes which have crystallised out into natural cavities, from whence they have been delivered by erosion.

The colour of the topazes varies from pure limpid white to various shades of blue, faint pink, yellow, &c. Crystals are found up to several inches in diameter. They are readily obtained by washing, as their specific gravity, which varies from 3·4 to 3·7, is considerably in excess of the quartz (2·5—2·8) and other constituents of granite.

8. *Beryls* are occasionally obtained in the form of hexagonal prisms, colourless or bluish green, free or *in situ*.

9. *Zircons*, are tolerably common, but rarely found in well defined crystals.

They are usually met with in washing, in broken rolled fragments ; localities, Killicrankie Bay, and in crystals in quartz from granite, Long Islands.

10. *Tourmaline*, black variety, very abundant and in exceedingly fine crystals on the northern side of Long Island ; also occurs on various parts of Flinders and Clarke's Island.

11. *Garnets*, often found in washing in various streams, but especially abundant on the south side of Cape Barren, near Half Moon Bay, where they occur almost as a constituent of the granite rock, and in confused crystallization.

12. *Chrysolite.*—I found only one example on Flinders, from the granite formation.

13. *Red Hematite*, both in the hepatic form and in well defined crystals, occurs on the south end of Flinders, on the beach in basalt, S.W. of Mount Eliza.

14. Exceptionally beautiful crystals of feldspar occur in the neighbourhood of Killicrankie, north boat harbour, in the rugs in granite, often four or five inches in diameter, and very perfect. The species appear to be orthoclase.

15. *Rock crystal* is not uncommon ; beautiful examples are obtained from Kent's Bay, on the south side of Cape Barren Island ; and very large crystals of smoky quartz are said to be obtained from hollows in the granite on Flinders, opposite Woody Island.

16. *Mica.*—Large masses in spots indicated above.

17. *Kaolin* of fine quality is frequent about Killicrankie Bay, and generally through the island.

18. *Mineral Pitch*, a species of, occurs on thenorth end of Pruin Seal. I had no opportunity of visiting the locality.

[*Read* 14*th November*, 1871.]

In continuation of my remarks upon the islands in Bass' Straits, I have now to advert to the Mammalia and, more especially to pen the deplorable memento of the gradual decrease, and now rapidly approaching extinction of some of those species adapted by form and structure to inhabit the wildest and least accessible spots, and whose abundant presence formerly on the detached reefs and rocky coasts throughout the group must have imparted a gratifying air of animation to what are now dumb and barren solitudes.

It is well, I think, for naturalists to begin to assemble the pages of the history of a species without waiting until the tombstone has been finally erected above it, and I have therefore gathered from the journals of the earlier voyagers such

incidental remarks as illustrate the aspect of the island in point of the abundance of the amphibious carnivora, prior to the hostile invasion of man.

It seems hardly credible that wanton apathy should have permitted a wholesale extermination at all seasons of so valuable an article of commerce ; but true it is that no steps appear ever to have been taken to afford protection to the various species of seal during the fence season, and the inevitable result of so persistently ungenerous a persecution, has been their almost total disappearance from localities once abounding in them by thousands.

A correct foreboding was expressed by a writer in the Hobart Town *Gazette*, March 25th, 1826, in the following terms :—"It is evident that the Legislative Government must enact a law for the fishery of seals at improper seasons, else this most valuable source of colonial export will soon be lost. There are two species of seal in these seas. The early kind brings forth its young from the 25th November to the latter end of December, and the reefs and banks should be left undisturbed until May following, when the increase will be grown up and the skins well furred. The black seal, which is the most valuable, is a month later.

"The unthinking sealers harass these useful animals at all seasons, and the consequence is that many reefs are deserted, and inferior skins have been procured from animals too young, and imposed upon the merchants."

I cannot find that action was taken upon this remonstrance. The seals appear then to have been still abundant, and a prompt interference might not have been too late. The skins alone were valued at 5s. each, and a case is quoted in which 300 cubs had perished on one bank alone through the untimely destruction of the dams.

It is to be regretted that we have no reliable description of all the different species of seal once inhabiting the coasts of this island, and of those in Bass' Straits. That the number was more considerable than is generally imagined may be inferred from an expression occurring in Lieut. Colonel Collins's History of New South Wales, conveying observations made by Mr. Bass in the course of one of his earliest explorations, to the effect that : "The seals appeared to branch off into various species. He did not recollect to have seen them precisely alike upon any two islands in the Strait. Most of them were of that kind called by the sealers hair seals, but they differed in the shape of the body, or of the head, the situation of the fore fins, the colour, and very commonly in the voice, as if each island spoke a peculiar language." These are clearly specific differences, and not such as might be

attributed to local variations. Mr. John Gould, in his large illustrated work upon the "*Mammals of Australia*," has figured two species, and speaks of the seals as being even in his day of rare occurrence or almost extinct. My own enquiries have led me to the belief that three very distinct species still remain extant, and possibly a stray wanderer from the south belonging to the tribe of the great sea elephant may occasionally pay a hurried visit to the ancient domain of his ancestors. We have no authentic record, however, of such having been the case within late years, but it must be remembered that the once favourite spots of these gigantic sea monsters are upon a remote island, and in that portion of it now rarely visited, while it would be only during a limited period of the year that these animals might be looked for.

It is remarkable that neither Bass nor Flinders give any special account of the sea elephant, although the latter visited King's Island in the year 1802, in the month of April, near the time when sea elephants should have been arriving in their migration from the southward. However, Mr. Flinders' stay was short, and only paid to one portion of the coast, and it is possible that as this island had already been known to sealers for three seasons, having been discovered by a Mr. Reid prior to 1799, that the wholesale slaughter of these helpless and inoffensive monsters had already gone far towards their expatriation. Mr. Flinders obtained one example of which he says: "A seal of a species different to any yet seen by us was also procured; its flippers behind were double when compared to the common kinds of seal, and those forward were smaller and placed nearer to the head; the hair was much shorter, and of a bluish grey colour, the nose flat and broad, and the fat upon the animal was at least treble the usual quantity. I never saw the sea elephant, and possibly this might have been a young female, but there was no appearance of any trunk." It may be noted that both Bass and Flinders appear to have been very familiar with both the hair and fur seal, with neither of which does this description tally. The most full and accurate description, however, has been left us by that very excellent naturalist, M. Peron, in his, "*Voyage de decouvertes aux Terres Australes*," who arrived at King's Island, in Bass' Straits, on December 10th, 1802, and after landing at Sea Elephant Bay was detained there for 15 days by the vessel having to run off shore before a gale of wind through the cable having been chafed asunder by sharp pointed rocks, which are specially referred to as involving such a danger by M. Peron, whose opinion has been fatally confirmed within our own time by the disaster attending the telegraphic cable, which must have been laid down upon the very rocks described

by him. Although the bay was habited by a party of eleven sealers, who had been for a long period employed in the slaughter, he described the portion where he landed as being covered with sea elephants, whose brown colour rendered them conspicuous on the beaches, and caused them to appear from a distance like great black rocks. On his approach some fled, while others remained motionless on the sand and regarded him with indifference. Elsewhere he says, "all the coasts of this island are covered with a prodigious number of amphibia, some of which attain twenty-five or thirty feet in length, which have become a source of valuable commerce to the English." He speaks of an abundance of emu, and notes the absence of aboriginal inhabitants. The sea elephant was killed for its skin, for the oil which was obtained in large amounts, and for the tongue which was considered a great delicacy. A small portion remained all the year round but the great masses migrated to and from the south, arriving about June, and leaving some months later. It differed from other seals in preferring sandy beaches to rocks, and evinced a partiality to bathing in fresh water; it was mild and inoffensive and easily killed. It was almost entirely confined to the Hunter Islands, King's Island, and New Year's Island, a very few were found on the Sisters Islands, north of Flinders; a few were occasionally forced by tempests on the New Holland and Tasmanian shores, the natives on such occasions destroying the exhausted animal by thrusting flaming brands down its throat! The sea elephant appears to have browsed on kelp, and M. Peron specially states that no remains of fish or any other bony animal were ever discovered within their stomachs. Those who feel further interested in the natural history of this grand and valuable animal will find the amplest details in M. Peron's volumes.

The species next in importance in point of size, though not in value, is the sea leopard *(Stenorynchus leptonyx)*—"*Gould's Mammals of Australia*"—which still occurs sparsely throughout the islands, and occasionally on the coast. This attains more than ten feet in length, and is distinguished from the others by its spotted skin. M. Peron speaks of Waterhouse Island as frequented in his time by great numbers of seals of enormous size, and which were probably individuals of this species. I do not think, however, that it was nearly so abundant generally as the next two to which I shall refer. In regard to these great confusion prevails.

The species *Arctocephalus lobatus* is also figured in the "*Mammals of Australia*," and Dr. Gray is quoted. He states "that this species and the *A. Hookeri* are called hair seals by the sealers, because they are destitute of any under fur;

but this appears to be the case only with the older specimens, for the young of *A. lobatus* is said to be covered with soft fur, which falls off when the next coat of hair is developed." Flinders describes hair seals of enormous size and extraordinary power, as frequenting Armstrong's Channel, one killed by him equalling an ox in weight. I cannot identify this with the *A. lobatus*, as he describes it as having a bull-dog nose, and thinly-set sandy hair, characters not possessed by the *A. lobatus*.

Mr. Bass, in Collins' Hist. N. S. Wales, p. 158, in speaking of Cape Barren Island, says, "The rocks were covered with fur seals of great beauty of a species approaching nearest that named by naturalists as the Falkland Island seal. And Flinders gives a more particular description of them. In speaking of Cone Point, on the extreme S.E. of Cape Barren Island, his words are :—"The number of seals exceeded everything we had any of us before witnessed, and they were smaller and of a different species from those which frequented Armstrong's Channel. Instead of the bull-dog nose and thinly-set sandy hair, these had sharp-pointed noses, and the general colour of the hair approached to black, but the tips were of a silver grey, and underneath was a fine, whitish, thick fur. The commotion excited by our presence, in this assemblage of several thousand timid animals, was very interesting to me who knew little of their manners. The young cubs huddled together in the holes of the rocks and moaned piteously; those more advanced scampered and rolled down to the water with their mothers; whilst some of the old males stood up in defence of their families, until the terror of the sailors' bludgeons became too strong to be resisted. Those who have seen a farm yard, well stocked with pigs, calves, sheep, oxen, and with two or three litters of puppies, with their mothers in it, and have heard them all in tumult together, may form a good idea of the confused noise of the seals at Cone Point."

Mr. Bass speaks of landing on the Patriarch. "He found the outermost island well inhabited. The various tribes had divided it into districts, one part was white with gannets, breeding in nests of earth and dried grass, petrels and penguins had their underground habitations in those parts of the island which had most grass. The rocks of the shore, and blocks of granite, were occupied by the pied offensive shag, and common gull; geese, red bills, and quails, lived in common, and the rest was appropriated to the seals, who seemed to be the lords of the domain." "The males, who possessed a rock to themselves where they sat surrounded by their numerous wives and progeny, on his drawing near them,

hobbled up with a menacing roar, and fairly commenced the attack, &c." He unfortunately does not indicate the character of the species—the fur seal observed by Flinders at Cone Point, its sharp pointed nose &c., distinguishing it from the *Otaria Falklandica*, or ordinary fur seal of commerce, which is described as having a broad head and rather flat. A yellowish seal is described by M. Peron as occurring at the I. des Phoques in enormous quantities. He says "the largest, which were of a yellowish colour, occupied the upper portions of the rock, while the smaller, which appear black, filled the cavities in the rocks below." Probably the larger species here referred to was identical with the sandy-haired large seal described by Flinders in Armstrong's Channel, and the smaller black ones with the fur seal at Cone Point. Many other incidental observations on the habits and abundance of seals are made by these old and intelligent observers, for example M. Labillardiere especially draws attention to the fact of a seal killed in D'Entrecasteaux Channel (which he calls *Phoca menachus)* having been found to have been feeding on shell fish. But of these it will be unnecessary to quote more, sufficient having been cited to prove that in the earlier times four, if not five species of seals were abundant in the Straits, viz., *Macrorhinus proboscidens* (Cuv.) or the sea elephant. The sea leopard *(Stenorynchus leptonyx)*, a fur seal, and one, or perhaps two hair seals. At the present day from my inquiries I learn that there remain the sea leopard and at least one hair seal, and one fur seal. The haunts of these are on the double rocks off Moriarty Bank south east of Clarke's Island, the Stacks, or Craggy Island of the charts, between Flinders Island and Kent's Group, Barren Joe's Island, Hogan's Group near Wilson's Promontory, and some of the other rocky islands off the Victorian coast line; more occasionally they are found on the westernmost of Kent's Group and the Sisters Rock. Only the hair and fur seal are pursued, and rather for the oil which they afford than for the skins. One or two small sealing parties still annually leave the islands in the Straits for the purpose of their capture. The seals in Hogan's Group are described as gathering into a vast cavern, only communicating with the sea by a narrow outlet, impassable for a boat, but with a narrow open crevice in the roof above which permits of the most adventurous in the party being lowered by a rope down into the midst of them; they are killed by shooting and clubbing. The number annually obtained, however, from the whole group is but small; what the numbers originally obtained amounted to may be inferred from the following extracts of a few takes recorded by old Sydney *Gazettes*, and quoted by Mr. James Bonwick, from whom I borrow them:—"The

schooner Endeavour, from March 9th, 1803, to May 28th, 1804, got 9,514 skins; the schooner Surprise, from March 11th, 1803, to September 15th, 1803, got 15,480 skins. In September, 1803, a vessel brought in to Sydney 11,000 skins."

Sufficient has been stated to show what the value of this fishery might have been if ordinary forbearance had been exercised, and it now only remains, as the past is irrevocable, for those who are interested in the Natural History of these islands to endeavour to procure examples of the different species still existing, in order to clear up as far as possible the doubts as to the nomenclature, before their final extinction.

η ARGUS AND ITS NEBULA. By F. Abbott, F.R.A.S., F.R.M.S.

[*Read 14th November*, 1871.]

I beg to bring under the notice of the Society some preparatory results arrived at by the Council of the Royal Astronomical Society, relative to the fluctuations of the Nebula, &c., about the object η Argus.

In the Monthly Notices R.A.S. there appears the following note, together with two additional papers and drawings from Hobart Town.

"On account of the interest attached to the question of the variability of the nebula of η Argus, the Council have determined to print as well Mr. Abbott's communications as the remarks upon them by the late Sir J. F. W. Herschel, and the Astronomer Royal. For convenienc of reference it may be mentioned that Mr. Abbott's former papers are printed in the *Monthly Notices*, vol. xxi., p. 230, (June 1861); vol. xxiv., p. 2, (November 1863), with plate; vol. xxv., p. 192, (April 1865, paper dated 18th February); and vol. xxviii., p. 200, (May 1868, paper dated 29th February), with a plate; and that there is a paper by Sir J. F. W. Herschel, vol. xxviii., p. 225, ((June 1868; and one by him and Lieut. Herschel, vol. xxix., p. 82, (January 1869), with five plates."—Ed.

The Council have referred the subject to the Astronomer Royal, who makes some comments on previous observations to which I have temporarily replied as notes and queries, pending the appearance of the object in a favourable position for new observations, which will be about the month of February, when the notes from the Astronomer Royal will be dealt with seriatim.

The following passages occur in Mr. Airy's remarks on the subject:—

"I duly received the packet of papers relating to Mr. Abbott's observations on η Argus; and with these I have perused also the preceding papers in various volumes of the *Monthly Notices*. The subject is really a very puzzling one.

"As regards stars only the map of 1870, and the map of 1871 have so much difference (not a great deal) that I conceive them to be certainly independent; and yet they have so much similarity as to give strong probability to their faithful representation of the visible objects. See in particular the line of four stars convex towards η *Argus*."

"These four stars have some agreement, not quite good, with four of Sir J. Herschel's. But other stars in the concavity of the bend are wanting in Sir J. Herschel's.

"* * * * I do concede to Mr. Abbott the merit of first pointing out that the nebula has shifted its position with regard to the star η *Argus*, and has changed its form materially, both which points I regard as certain. * * * * *

"Allow me to suggest that papers of this kind ought to be pre-

served more carefully. Mr. Abbott's maps were crimped up till I could not read them. I have flattened them, and will endeavour to persuade Mr. Dunkin to keep them flat."

In the first paper referred to from Lieut. Herschel and Sir W. F. Herschel, page 83, line 21, the former repudiates his own observations as follows :—

"You know how difficult it is to represent faithfully one's impression of a nebula by a hurried pencil drawing, and will understand that the accompanying copy (based on all) has no pretension to accuracy. *In fact it is a wretched attempt.*"

On comparing drawings Nos. 1 and 2 by Lieut. Herschel, although both were taken about the same time, it would be extremely difficult to recognise them as applying to the same object. The last two plates, 4 and 5, are by Sir John Herschel, as noted, semi-reversed by being pricked off from his engraving of 1834, or Cape observations.

Now, if we apply to this mode of procedure the article in the *Astronomical Register*, by G. F. Chambers, on July 7th, 1866, it will appear difficult to reconcile its authority :—

"Sir John Herschel's Drawings of Nebulæ.

"To the Editor of the *Astronomical Register*.

"Sir,—I have lately made a discovery which, whether it be really such or no, at any rate has not, so far as I am aware, ever been pointed out. *All Sir J. Herschel's drawings of Clusters and Nebulæ are represented as they cannot be seen.* The way this has come about appears to be as follows :—The sketch is placed on paper in exactly the position which the object has in the (inverting) telescope. This sketch is copied on to the copperplate also exactly as it stands on the paper, and the result is that when the paper is printed the picture is reversed right and left. The inconvenience of this plan is manifest as concerns observers working with the telescope, and seeking to make comparisons between what they see and what Sir John indicates that he saw ; but worse than all this, Lord Rosse and, so far as I have noticed, all other celestial draftsmen, adopt the common-sense plan of making their drawings to show exactly as the telescope shows, consequently other sketches placed in juxtaposition with Sir J. Herschel's wholly mystify and delude the reader ; indeed I am free to confess that I have myself thus been taken in. More than once have I sought in vain to reconcile the engraving of the nebula in Orion, appended to Herschel's *Outlines of Astronomy*, with the original viewed in an ordinary inverting telescope. Fortunately for me, I only copied into my book a limited number of Herschel and Rosse sketches, but in Guillemin's book Sir John's device leads to a far more serious amount of confusion.

"I am, Sir,
"Your obedient servant,
"G. F. Chambers."

"Sydenham,
"July 7th, 1866.

In some of my early papers I have given an opinion that

no two very dissimilar telescopes will show nebulous matter alike ; take, for instance, the nebulæ as portrayed by the Earl of Rosse with those of Sir J. Herschel, and compare them together with the drawings of G. P. Bond. The instruments used by these observers respectively were a 56 feet reflector, with 6 feet speculum ; a 20 feet reflector ; and an achromatic of 22 feet 6 inches in length, with an object glass 15 inches in diameter. The difference between them leads to much confusion in Guillemin's fine book of the heavens. I have also a strong opinion that the variations in the position of this fluctuating object will have more or less effect in the sketches made of it at different times.

The Astronomer Royal takes exception to my drawings on the ground of inaccuracy in points of geometry. If Mr. Le Seur's opinion that the star η shines with the light of burning hydrogen, and has consumed the nebula, is thought to be correct ; or, if the communicated opinions of Dr. Halley and the late two Herschel's that a nebula may concrete into individual stars, are of any account, how can geometry be applied to the object under consideration without certain fixed points?

An elaborate paper, with a drawing, has been prepared by H. C. Russell, Esq., B.A., the Government Astronomer of New South Wales, and read at a meeting of the Royal Society of that colony, which I lay on the table. Mr. Russell, while doing full justice to the object with the Sydney telescope, has given due credit to the observations previously made at Hobart Town.

If the Astronomer Royal had offered some opinion as to the cause of the fluctuations of this extraordinary and interesting object it would have been a boon to physical astronomy.

As regards the accuracy of the Hobart Town drawings I can refer to Mr. Piguenit, of the Survey Department, who is now present, by whom they were checked and confirmed previous to their transmission to the Royal Astronomical Society.

The following is a reply to the notes and queries made by the Astronomer Royal on the "Observations of η Argus and its nebula." Monthly Notices, R.A.S., for June 9th, 1871, pp. 233 and 234:—

"Note 1.—See in particular the line of four stars convex towards η Argus.

"These stars have retained their apparent position, &c., more than any others in the same object, although variations to a small degree have taken place. In carefully looking over the drawings it will be found that a similarity exists in the position of many of the stars, but as a rule some changes have taken place.

"In regard to the use of geometry it was never my intention to apply it, but only to sketch the object as an eye draft, and by adopting the term 'line of sight,' it was intended to simplify by always observing the object in one position, *i.e.*, the telescope lying in a direct line W.N.W. to E.S.E. (the drawing being reversed), and at an angle of from 70° to 80° above the horizon, according to the state of the atmosphere at the time, *and in this line of sight* all the drawings have been made; and in an easy sitting position, with the light shaded from everything but the paper, the object has always been carefully delineated.

"With regard to 'all the stars agreeing with either Sir John, or Lieut. Herschel's configuration,' I never expected they would, as apparent changes have more or less constantly been taking place.

"The question asked in No. 7, 'the drawing (Lieut. Herschel's) had undoubtedly reached Australia, has Mr. Abbott copied it?' I answer no! The whole of my drawings were made previous to, and independent of any others.

"In making comparisons it would be desirable to refer to the original drawing, as in the lithographs, which are on a reduced scale, some trifling inaccuracies occur."

[Sent October 7th, 1871, to the Hon. Secretary, R.A.S., and to Mr. R. A. Procter, together with the plates and paper read before the R. S. of Tasmania.]

METEOROLOGY.

MARCH, 1871.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In	°	°	°	°			
1	29·774	29·554	69	52	99·0	44·5	NW	1·30	
2	29·665	29·586	68	53	97·0	50·5	NW SE NW	1·04	
3	30·001	29·848	64	42	102·5	40·5	N W SW	3·12	
4	30·252	30·186	63	50	101·0	49·0	SW SE	·78	
5	30·264	30·241	66	53	98·0	50·0	NW SE	·52	0·03
6	30·225	30·052	74	54	110·0	51·0	NW E SE	·78	
7	29·897	29·752	72	48	109·0	45·5	NW S	·52	0·09
21	30·034	29·995	62	46	96·0	42·0	SW NW	1·04	
22	30·176	30·102	58	46	89·0	43·5	SE	1·60	
23	30·186	30·126	61	40	91·0	37·5	NW SE	·52	
24	29·987	29·905	72	49	102·0	46·5	SE NW	·52	
25	30·042	29·899	73	49	109·0	48·5	SW SE	1·04	
26	30·248	30·219	74	41	108·5	38·5	NW SE	1·30	
27	30·291	30·123	85	45	118·0	45·5	NW SE	3·12	
28	30·083	28·887	88	48	120·0	50·0	NW	1·04	
29	29·679	29·593	81	56	110·0	56·0	NW W NW	5·47	0·13
30	29·876	29·685	61	49	93·0	44·0	NW SW	·78	0·02
31	30·083	30·012	74	46	113·5	42·5	SW SE	1·04	
Monthly mean 29·978			60·00		101·90	46·53	Total Force ..	46·30	1·33

The mean in all cases is ta
and minimum.
The direction of the wind
according to Lind's Wind G
is a very arbitrary one, and
The relations of the quan
evening at sundown.
The 25 years' standard table

three daily registers, and not from the maximum
ts moving at a height of 192 feet and the force
however, of a uniform velocity during the month
red only approximately correct.
under the different winds are registered each
he difference from the average.

The Meteorology for January and February, 1871, was by mistake bound up in the Proceedings for 1870.

Leafing, Flowering, and Fruiting of a few standard plants in the Royal Society's Gardens during the month.

14th.—Tips of hornbean commencing to turn yellow.
16th.—Coe's golden drop plum ripe.
18th.—Tips of elm turning yellow.
20th —Seckle pear commencing to ripen.
24th.—Leaves of horse chestnut turning brown.
25th.—Ash leaves commencing to fall.
26th.—Oak ditto.

Barometer mean, 29·978 in., being 0·123 in. above the average.
Temperature mean, 60·00°, being 0·24° above the ditto.
Solar intensity mean, 101·90°, being 1·39 below the ditto.
Dew point mean, 46·8, being 2·42 below the ditto.
Humidity of air mean, ·66, being ·05 per cent. below the ditto.
Elastic force of vapour mean, ·337, being ·019 per cent. below the ditto.

METEOROLOGY.

MARCH, 1871.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In	°	°	°	°			
1	29·774	29·554	69	52	99·0	44·5	NW	1·30	
2	29·665	29·586	68	53	97·0	50·5	NW SE NW	1·04	
3	30·001	29·848	64	42	102·5	40·5	N W SW	3·12	
4	30·252	30·186	63	50	101·0	49·0	SW SE	·78	
5	30·264	30·241	66	53	98·0	50·0	NW SE	·52	0·03
6	30·225	30·052	74	54	110·0	51·0	NW E SE	·78	
7	29·897	29·752	72	48	109·0	45·5	NW S	·52	0·09
8	30·010	29·962	72	48	109.0	46·0	NW SE	1·04	
9	30·042	29·752	74	45	111·5	43·0	NW SE	1·04	
10	29·815	29·587	69	50	105·5	48·0	SW	10·41	
11	30·094	29·890	59	48	90·0	45·0	NW SE	1·04	0·28
12	30·275	30·229	73	43	108·0	41·0	NW SE	1·60	
13	30·134	29·897	76	52	97·0	46·0	N NW	·78	0·40
14	29·684	29·606	75	56	108·5	54·5	NW	·78	
15	30·167	29·984	68	50	110·5	42·0	SE	1·30	
16	30·339	30·319	73	52	107·0	50·0	NW E NE	·78	
17	30·338	30·238	62	51	69·5	49·5	NE E NE	·26	
18	30·150	30·013	64	52	85·0	50·0	SW NW SE	·78	
19	29·937	29·815	64	47	96·0	46·0	NW S SW	0·	0·22
20	29·782	29·734	63	50	95·0	50·0	SW SE	1·04	0·16
21	30·034	29·995	62	46	96·0	42·0	SW NW	1·04	
22	30·176	30·102	58	46	89·0	43·5	SE	1·60	
23	30·186	30·126	61	40	91·0	37·5	NW SE	·52	
24	29·987	29·905	72	49	102·0	46·5	SE NW	·52	
25	30·042	29·899	73	49	109·0	48·5	SW SE	1·04	
26	30·248	30·219	74	41	108·5	38·5	NW SE	1·30	
27	30·291	30·123	85	45	118·0	45·5	NW SE	3·12	
28	30·083	28·887	88	48	120·0	50·0	NW	1·04	
29	29·679	29·593	81	56	110·0	56·0	NW W NW	5·47	0·13
30	29·876	29·685	61	49	93·0	44·0	NW SW	·78	0·02
31	30·083	30·012	74	46	113·5	42·5	SW SE	1·04	
Monthly mean 29·978			60·00		101·90	46·53	Total Force ..	46·30	1·33

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.
The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Gauge. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.
The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.
The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few standard plants in the Royal Society's Gardens during the month.

14th.—Tips of hornbean commencing to turn yellow.
16th.—Coe's golden drop plum ripe.
18th.—Tips of elm turning yellow.
20th —Seckle pear commencing to ripen.
24th.—Leaves of horse chestnut turning brown.
25th.—Ash leaves commencing to fall.
26th.—Oak ditto.

Barometer mean, 29·978 in., being 0·123 in. above the average.
Temperature mean, 60·00°, being 0·24° above the ditto.
Solar intensity mean, 101·90°, being 1·39 below the ditto.
Dew point mean, 46·8, being 2·42 below the ditto.
Humidity of air mean, ·66, being ·05 per cent. below the ditto.
Elastic force of vapour mean, ·337, being ·019 per cent. below the ditto.

Total amount of rain, 1·33in., being 0·34in. below the ditto.
Increase of spontaneous evaporation on rain-fall, 2·00in.
Mean amount of ozone, 6·11, being 0·90 of chromatic scale below the ditto.
Electricity active on the 1st, 3rd, 4th, 10th, 22nd, 27th, and 28th.
Strong southern lights on the 23rd. Aurora Australis on the 24th.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF MARCH, 1871.

By E. Swarbreck Hall.

High atmospheric pressure, great daily variations of temperature, cloudy weather with deficiency of sunshine, small rain-fall, and paucity of ozone, have characterised the present month, and told heavily on old and feeble people, more than two-fifths of the mortality having fallen on persons at and above sixty years old.

Atmospheric pressure mean, 29·978, was +·123 above the 25 years' average. The maximum, 30·339, was on the 16th; the minimum, 29·554, on the 1st. The extreme range of the month, therefore, was small, only ·785. But the daily fluctuations were very great, 18 days having more than one-fifth of an inch, and one of them, the 15th, a rise of +·521 in the 24 hours.

Wind-force total, 46·30 lbs., was—6·79 lbs. below the average. *North West* winds were more numerous than from any other points of the compass, but were below the average in strength. *North*, *North East*, and *East* were both few in number and trifling in force. *South East*, our most propitious wind, was largely over the average both in number and force. *South* was below the average in both aspects. *South West* winds were about three times more than the average in number, and double in force. *West* was only recorded once, but with the strength of 5·21 lbs. pressure to the square foot. Only one other wind of the same force was recorded, and that a *South West* one. *Calms* were 25, being — 3·22 less than the average.

Temperature mean, 60·00 degrees, only varied from the 25 years' average by + 00·24. The highest record was 88 degrees on the 28th, nine years out of the 25 having a higher maximum. The lowest temperature, 40, was on the 23rd, only five years in the 25 having lower minima. The *wet bulb* mean was 53·56, being 00.39 below the average.

Daily-range of temperature exceeded the average by +1·44, being 20·84 degrees. The greatest range in 24 hours, 40 degrees, occurred on both the 27th and 28th. These fluctuations of temperature, combined with high atmospheric pressure, are very trying to diseased, feeble, and aged persons, though young and healthy people are little affected by them.

Solar-intensity mean, 101·90, was —1·39 less than the average. The maximum was 120 degrees on the 28th, which has often been exceeded.

Terrestrial-radiation mean, 46·53 degrees, was —1·62 below the average. The minimum record was, for the night of the 23rd, the temperature being, 37·5 degrees. Only thrice before in 15 years have there been lower minima in March.

Elastic-force of vapour 337 was—19 below the average; ranging from 126 at noon on the 28th, to 522 at noon on the 14th.

Humidity mean, 66, was —5 below the average.

Rain-fall, 1·33 inches, was —·34 below the average. It fell on eight days, being —1·09 less than the average. It was sufficient to flush water courses and drains on the 11th, 13th, 19th, 20th. During the four months past, December, January, February, March, the rain-fall has only amounted to 4·48 inches, being —1·97 inches less than the 25 years' standard mean. *Snow* never was visible from the city, on Mount Wellington, during the month.

Spontaneous-evaporation was 3·33 inches.

Cloud mean, 6·06, was +·64 above the average.

Ozone mean, 6·11, was—·90 below the average, and the smallest on record for the month of March.

Electricity. 14 positive with tension from 3·5 to 6 were recorded; negative 46 with tension from 2 to 6, and 2 "nils." The *Aurora Australis* was

seen on the nights of the 23rd and 24th. There was *thunder* with rain on the 29th.

The *deaths* during the month were 51, being—3 4-14ths less than the average of the preceding 14 years, though +4 more than March 1870 and +9 more than 1869 had. In 1861 the deaths were the same in number, but in every other year of the fourteen more ; the range being from 42 in 1869 to 73 in 1864. Thirty (30) were males, 21 females. Under one year old there were 11 deaths ; from 1 to 5 the deaths were 4 ; none between 5 and 10 ; one (1) from 10 to 15 ; one (1) from 15 to 20 ; from 20 to 60 there were 13 ; and from 60 to all ages above 21, the oldest being 92, an old Waterloo soldier who died at the Brickfields Invalid Asylum. The deaths in the General Hospital were 13, seven (7) of which were from other Registration Districts, and one a foreign sailor. At the *Cascades Invalid Asylum* there were 5 deaths, at the *Brickfields* 2. There were 3 *inquests.* One died one hour after admission into hospital from a *tumour of the liver* ; another died there from *compound fracture of both bones of the leg*, which occurred at Brighton. The leg was amputated ; the third died before he reached the hospital from *inflammation of the bowels*, having been brought down the long and torturing journey from the Lakes. It is high time that cottage hospitals should be established by the settlers in their respective districts to avert such sufferings as this poor man must have endured. *Zymotic diseases* caused 13 deaths mostly from bowel complaints, but no epidemic disease prevailed. *Consumption* caused 4 deaths, none of the deceased having been natives of Tasmania.

APRIL, 1871.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·191	30·153	75	45	113·0	45·5	NW SW SE	1·04	
2	30·191	30·105	77	45	115·0	42·0	NW N SE	1·04	
3	30·177	30·148	74	48	100·5	48·0	NW NE SW	·78	
4	30·217	30·125	63	54	67·0	52·5	NW SE	·78	
5	30·178	30·115	69	53	100·0	52·0	SW SE W	·52	
6	29·126	30·085	74	48	105·0	44·0	NW NE SE	·26	
7	30·005	29·813	67	45	95·5	43·0	NW	·26	
8	29·940	29·844	69	50	101·0	45·0	NW W NW	1·04	
9	29·932	29·850	68	50	96·0	50·5	NW	7·80	
10	29·824	29·647	74	55	104·5	52·0	NW	5·72	
11	29·963	29·834	71	48	102·5	46·0	NW SE W	1·04	
12	29·948	29·565	62	42	65·0	39·0	NW	3·38	0·10
13	29·598	29·499	62	43	87·0	38·5	W NW SW	7·80	0·62
14	30·189	30·011	59	43	91·0	37·0	SW SE	5·72	
15	30·260	30·251	68	38	95·0	37·5	SW NW	·52	
16	30·278	30·184	68	40	99·5	36·0	NW SE	·52	
17	30·203	30·135	70	41	91·0	40·5	NW SE	·78	
18	30·165	30·055	71	44	101·0	43·0	NW	·52	
19	29·907	29·679	79	48	105·5	47·0	NW W	5·63	
20	30·279	29·942	61	47	95·0	46·0	SW SE	·78	0·06
21	30·464	30·378	71	45	99·5	43·0	NW SE	1·04	
22	30·174	29·979	66	41	93·0	40·0	NW NE	·78	
23	29·735	29·614	65	50	84·0	49·0	NW	5·73	
24	29·860	29·664	67	45	92·0	43·5	NW	2·36	0·10
25	29·824	29·693	64	45	88·0	44·0	NW	3·64	
26	29·907	29·832	66	50	72·5	48·5	NW	·78	
27	29·980	29·879	78	53	105·0	51·0	NW W	1·30	
28	30·115	30·015	68	51	70·0	48·0	W SW	1·30	
29	30·345	30·304	68	42	97·5	39·0	NW NE SE	·52	
30	30·361	30·330	57	44	64·0	40·0	NW NE	0·	
Monthly mean 30·019			58·36		90·32	44·37	Total force 73·38		0·86

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month of April, 1871.

12th.—Coe's late red plum ripe.
15th.—Leaves of common elm falling.
20th.—Chinese chrysanthemum commencing to flower.
22nd—Leaves of mountain ash commencing to fall.
25th.—Seeds of Carpinus betulus ripe.
28th.—Leaves of black mulberry commencing to fall.

Barometer mean, 30·019in., being 0·128in. above the average.
Temperature mean, 58·36°, being 3·33° above the average.
Solar intensity mean, 90·32°, being 1·49° below the average.
Dew point mean, 46·6°, being 0·51 below the average.
Humidity of air mean, ·67, being ·09 per cent. below the average.
Elastic force of vapour mean, ·323, being ·002 per cent. below the average.
Total amount of rain, 0·86in., being 0·92in. below the average.
Increase of spontaneous evaporation on rain fall, 2·58in.
Mean amount of ozone, 6·47, being 0·52 of chromatic scale below the average.
Electricity active on the 6th, 8th, 9th, 10th, 11th, 12th, 14th, 15th, 20th, 21st, 24th, 25th, 27th, and 29th.
Mount Wellington covered with snow on the 12th.
Strong Southern Lights on the 24th.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF APRIL, 1871.

By Dr. E. Swarbreck Hall.

This month though unusually mild as to temperature, and with great aerial movements, was characterised by high atmospheric pressure, wide daily range of temperature, defective rain-fall, &c. The deaths were much below the average, and with a very equable distribution as to age, but a most unparalleled inequality of the sexes, females exceeding males in the proportion of 16 to 12.

Atmospheric pressure mean, 30·019, exceeded the 25 years' standard average by +·128. On ten days the variations exceeded one-fifth of an inch, the maximum, a rise of +·646, having occurred on the 14th. Nevertheless the range for the whole month was only ·965 of an inch, the maximum being 30·464 on the 21st, minimum, 29·499, on the 13th.

Wind-force amounted in the aggregate to 73·38lbs., being +26·70 above the average. *North-west* winds were recorded 51 times out of the 90, with a force of 41·38lbs. On four days these winds partook of the character of *hot-winds* though in a subdued form. *West* winds were unusually frequent and strong. On the 19th one was registered as exercising a pressure of 10·42lbs. to the square foot, the maximum of the month. *South-west* to were more numerous and stronger than common; no *South* winds were recorded; *South-east* were only 13 in number with a total of 4·94lbs. force; no *East* winds; *North-east* 5 in number, only ·78 of a lb. in force; one *North* wind ·26 of a lb. strength.

Temperature mean, 58·36 degrees, was +3·33 above the April average. The years 1855-6-7, only, out of the 30 years recorded, had a higher mean. The maximum was 79 degrees on the 19th by the self-registering thermometer, lent 80 by the observed thermometer at one p.m. There was a strong hot-wind on that day. The April maximum has often been higher than this. The minimum, 38, was recorded for the night of the 15th. It has often been lower in previous Aprils. The *wet bulb thermometer* mean was 52·11 degrees, being +1·02 above the average.

Daily range of temperature mean, 21·93 degrees, was +4·71 above the average. The highest recorded was 32 degrees on the 2nd.

Solar intensity mean, 90·32 degrees, was —1·49 less than the average, which may be accounted for by the excess of cloudy days. The maximum was 115 degrees on the 2nd.

Terrestrial radiation mean, 44.37 degrees, was —1·30 above the average, the minimum was 36 degrees in the night of the 16th.

Elastic force of vapour mean, 323, was —2 less than the average; it ranged from minimum 215 in the morning of the 14th to maximum 545 at noon on the 19th.

Humidity mean, 67, was —9 below the average.

Rainfall amounted to only ·86 of an inch, —92 of an inch below the April average —·62 of an inch fell in one day, the 13th. Only 4 wet days were registered, being —7·82 less than the average. Though almost all the meteorological phenomena of this month were widely different from those of April, 1870, in no one was the contrast greater than in rainfall. In that month there were 13 wet days with an aggregate amount of 4·25 inches. *Snow* appeared on Mount Wellington on the 12th, 13th, and 14th.

Spontaneous evaporation was 3·38 inches, a great excess over rainfall, as was sure to be the case with so much wind and warmth.

Cloud mean, 6·26, was +·52 above the average.

Ozone, mean, 6·47, was —·52 only below the average. Saturation (10) was registered on the mornings of the 14th and 25th. A much greater deficiency of ozone might have been expected with such a prevalence of the anti-ozonic winds from the north-west, and the very dry character of the month.

Electricity was indicated by the electrometer for all the 60 observations during the month, 12 of the records being "positive" with tension from 4 to 7·5; the other 48 "negative" with tension from 2·5 to 7·5.

Deaths.—Only 28 persons were registered as dying during this month, though another is known of, but not yet registered as the law requires. The

average April deaths for the previous 14 years is 42 12-14th, ranging from 27in. 1869 to 54 in 1864. No year had less than 34, but the present one and 1869. Under one year of age there were 5 deaths ; from 1 to 5 one death ; from 5 to 10 the deaths were 3 ; from 10 to 15 one death ; from 15 to 20 one death ; from 20 to 60 the deaths were 8 ; and at 60 and all ages above, 9, the oldest being 88 years old. So equal a distribution in the various groups of ages is a very rare occurrence. 12 only were males, 16 females, the disparity of the sexes being usually just the reverse. No epidemic disease was prevalent, and in all the *Zymotic class* there were only 2 deaths, from *diarrhœa*, aged 5 weeks and 15 months respectively. *Consumption* caused 4 deaths, one a native of Tasmania, the rest born in England, Ireland, and Scotland repectively. The last was only a visitor for health from Ceylon. The public *Hospital* had only 3 deaths, one of which came from another registration district, another was from *burns* on which an *inquest*, the only one in the month, was held. At the *Brickfields Male Invalid* establishment there was only one death, but at the *Cascades* there were 5.

MAY, 1871.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			0·0
1	30·182	30·013	63	51	66·0	50·0	SW NW	0·	0·07
2	29·826	29·715	62	53	75·0	52·0	NE NW N	0·	0·01
3	29·789	29·779	61	50	70·0	39·0	SE S	0·	0·02
4	29·922	29·800	62	43	95·0	41·5	SE SW SE	·52	
5	29·960	29·937	55	44	86·0	42·0	NW N E	0·	0·04
6	30·018	29·979	57	45	68·5	42·5	NW E SE	0·	
7	30·070	30·037	56	43	58·0	40·0	NW SE	·26	0·03
8	30·110	30·090	53	48	57·0	44·0	SE	1·04	0·05
9	30·227	30·147	53	45	59·5	43·5	SW SE	·52	0·04
10	30·197	30·186	54	45	63·0	41·5	SE	0·	
11	30·191	30·147	53	50	59·0	47·0	SE	·78	
12	30·160	30·134	59	48	86·0	42·0	NW SE NW	0·	
13	30·136	30·062	62	42	87·0	35·0	NW SW	·52	
14	30·070	30·042	63	34	85·5	33·0	NW SE	1·04	
15	30·061	30·020	65	38	90·0	35 5	NW	1·30	
16	30·034	30·010	64	50	89·0	48·0	NW NE	·78	
17	30·182	30·140	64	40	83·0	37·5	SE NE NW	·78	
18	30·266	30·146	62	36	80·5	34·5	NW W	·78	
19	30·247	30·215	67	40	91·5	38·0	NW W	·52	
20	30·262	30·233	73	40	98·5	38·0	NW SW NW	·78	
21	30·309	30·272	75	43	100·0	41·0	NW SE	·26	
22	30·369	30·347	71	47	97·0	40·5	NW SE	·52	
23	30·384	30·333	57	49	59·5	45·0	NW	0·	
24	30·386	30·328	56	50	58·0	44·0	NW	0·	
25	30·363	30·330	56	38	66·5	36·5	NW	·26	
26	30·203	30·099	61	43	86·0	43·0	NW	1·04	
27	29·990	29·845	63	49	76·0	48·0	NW E	0·	0·05
28	29·748	29·685	60	43	88·0	41·5	NE SW W	·52	0·08
29	29·495	29·413	53	41	75·0	39·0	NW	·52	0·25
30	29·903	29·824	50	40	78·0	33·0	W SW NW	2·86	0·02
31	30·095	30·065	70	45	95·5	42·5	NW	1·30	
Monthly mean 30·071			52·98		78·31	41·15	Total force	16·44	0·66

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

12th.—Medlar commencing to ripen.
18th.—Coronilla glauca commencing to flower.
20th.—Photinia serrulata ditto ditto.
24th.—Diosma alba ditto ditto.
25th.—Spirea prunifolia ditto ditto.
26th.—Ailanthus glandulosus leaves all fallen.

Barometer mean, 30·071in., being 0·224in. above the average.
Temperature mean, 52·98°, being 2·70° above the ditto.
Solar intensity mean, 78·31°, being 3·56° below the ditto.
Dew point mean, 45·0°, being 1·52° above the ditto.
Humidity of air mean, ·78, being ·02 per cent. above the ditto
Elastic force of vapour mean, ·311, being ·009 per cent. above the ditto.
Total amount of rain, 0·66in., being 1·15in. below the ditto.
Increase of spontaneous evaporation on rainfall, 0·60in.
Mean amount of ozone, 5·36in., being 1·44 of chromatic scale below the ditto.
A small amount of electricity all through the month.
The early part of the month was notable for a large amount of cloud, and a frequent register of calms, with dewy mornings, and low vapour.
Snow on the apex of Mount Wellington on the 29th.
On the 30th the mountain and low hills were capped with snow. FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF MAY, 1871.

By Dr. E. Swarbreck Hall.

The character of the weather during the month was in almost every aspect abnormal. Very high atmospheric pressure, very calm, very mild, very cloudy, little rain, little ozone, little sunshine, little electricity. The deaths were considerably below the average of the previous 14 years, falling principally upon aged and infirm people, nearly one-half of the deaths being at and above 60 years old, the oldest 84. Under 20 the deaths were remarkably few.

Atmospheric pressure mean, 30·071, was + ·224 above the 25 years' adopted standard mean. Only three Mays in the previous 30 years have had higher means. The maximum was 30·386 on the 24th; the minimum, 29·413, on the 29th, the month's range consequently ·973 of an inch. The greatest movement in any 24 hours was a rise of + ·389 of an inch on the 30th. On only 7 other days did it exceed one-fifth of an inch. Steady high barometrical pressure with moderate fluctuations, and small extreme range, characterised this month.

Wind force, 16·64 lbs, was —21·21 lbs. below the May average. *North-west* winds were recorded 48 times out of the 93 observations, and had 10·66 lbs, of the total force. The strongest wind had only 2·60 lbs. pressure to the square foot; it occurred on the 30th, and was from the north-west. *Calms* were 52 in number being +9·20 above the average.

Temperature mean, 52·98 degrees, was +2·70 above the average. Only four Mays, out of the previous 30, had a warmer mean. The maximum was 75 degrees on the 21st. The minimum 34 on the 14th. *Wet-bulb* mean was 49·30, being +2·22 above the average.

Daily Range of Temperature had the mean of 16·32 degrees, being +1·16 above the average. The greatest on any day was 33 degrees on the 20th.

Solar Intensity mean, 78·31 degrees, was —3·56 below the average, owing no doubt to the cloudy character of the month. The maximum was 100 on the 21st, the minimum 57 on the 8th.

Terrestrial Radiation mean, 41·15, was +1·84 above the average. The lowest was recorded for the night of the 30th, being 33 degrees. Often before has it fallen below freezing point (32.)

Elastic force of Vapour mean, 311, was + 9 above the average. It ranged from 503 on the 2nd, to 197 on the 15th.

Humidity mean, 78, was + 2 above the average.

Rainfall ·66 of an inch, was—1·15 below the average. May 1870 was almost

the same. It fell on 11 days, being 3·09 below the average. On only one day, the 29th, did sufficient (·25) fall to cleanse the surface channels. *Snow* covered Mount Wellington and all the low hills about the city on the morning of the 30th.

Spontaneous evaporation was 1·26 inches.

Cloud Mean, 6·68, was + 1·18 above the average. At 35 out of the 93 records the sky was entirely over-clouded.

Ozone Mean, 5·36, was—1·44 below the average. No previous May record had so small an amount.

Electricity was almost confined to negative of a low tension, ranging from 1 to 5. There was only one positive with tension of 4. There were 7 nils. No thunder heard or lightning seen during the month.

The *deaths* during the month were 33 being—7 6-14 less than the average of the previous 14 years, and—6 less than May 1870 had. Again the female deaths, 17 out of 33, preponderated. Under one year old there were 3 deaths ; from 1 to 5, also 3 ; from 5 to 10, none ; from 10 to 15, one ; from 15 to 20, none. In May 1870 there were 12 deaths under 20 years old. From 20 to 60 the deaths were 10 ; and at 60 and all ages above the large proportion of 16, the oldest being 84 years old. May 1870 had 17, the oldest being 90. In the *zymotic class* of diseases there were only 2 deaths from erysipelas ; one an old man from a country district, the other a child only 2 years old. From *consumption* there were 2 deaths, one a woman aged 50, a native of Switzerland, the other a girl of 14, daughter of a coal miner from the coal mines, Tasman's Peninsula, born in Tasmania. Her mother and a sister both died from the same disease in Hospital some time before, so that probably the hereditary tendency in the family is strong. In the public *Hospital* there were 6 deaths, inclusive of the girl from consumption. At the *Cascades* there were 5 deaths, three females aged 60, 74, 75, and two males aged 71 and 81. At the *Brickfields* there was only one death, a man aged 72. There was only one *Inquest*, a man aged 75 who died from natural causes.

JUNE, 1871.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·172	30·121	68	35	90·5	32·5	SW NW	1·30	
2	30·132	30·110	71	51	95·0	50·0	NW	·78	
3	29·887	29·821	62	51	72·0	47·5	NW	1·56	
4	30·129	30·066	66	40	90·0	35·5	NW E SE	·78	
5	30·264	30·220	56	37	72·5	34·0	NW W	·26	0·02
6	30·363	30·299	61	40	88·0	35·5	NW E SW	0·	0·22
7	30·172	30·048	52	36	73·5	34·0	NW N SE	0·	
8	29·930	29·872	58	33	80·5	32·0	NW	·78	
9	29·916	29·872	61	38	89·0	39·5	NW SE SW	1·04	
10	29·697	29·606	54	35	75·0	32·0	NW	1·30	0·01
11	29·950	29·887	62	40	85·5	37·5	NW	1·30	
12	30·006	29·956	64	42	91·0	39·5	NW	·26	
13	29·894	29·737	58	40	81·0	36·5	NW	·52	0·02
14	29·790	29·608	57	46	65·0	44·0	NW	·52	
15	29·948	29·924	62	44	89·8	44·0	NW	1·04	0·13
16	30·069	30·029	65	37	85·5	34·0	NW SW	1·04	
17	29 972	29·914	60	37	94·0	34·0	NW SE	·52	
18	30 097	29·961	56	37	70·0	32·0	NW E SE	0·	0·02
19	30·198	30·184	54	46	63·0	40·5	SE	1·04	0·03
20	30·269	30·250	53	45	60·5	42·5	SE	·26	0·07
21	30·305	30·297	51	42	55·0	39·0	NW SE	0·	0·01
22	30·274	30·248	52	35	75·0	32·0	NW	·26	
23	30·142	29·992	59	36	81·5	32·0	NW	1·56	
24	29·664	29·382	61	38	84·0	35·5	NW	3·38	0·02
25	29·637	29·560	64	36	87·0	33·0	SW NE SW	·78	
26	29·719	29·613	62	35	76·5	32·0	NW	·78	0·05
27	29·428	29·311	61	46	81·0	45·0	NW	1·30	0 15
28	29·784	29·711	58	41	80·0	41·5	SE NW	1·30	
29	29·806	29·530	63	43	81·0	39·0	NW	·52	0·03
30	29·593	29·440	53	47	83·0	44·0	NW SW	1·56	0·07
Mean monthly 29·925			50.41		80·28	37·67	Total Force	.. 25·48	0·55

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.
The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Gauge. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.
The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.
The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month of April, 1871.

16th.—Maclaura aurantiaca leaves all shed.
17th.—Common privet ditto.
28th.—Black mulberry ditto.

Note.—The early narcissus, snow-flake, and pyrus japonica, which were in flower last year, on the 15th, 20th, and 24th respectively, have not yet flowered this year, being retarded, probably, by the unusually dry state of the ground.

Barometer mean, 29 925in., being 0·044in., above the average.
Temperature mean, 50·41°, being 3·66° above the ditto.
Solar intensity mean, 80·28°, being 5·34° above the ditto.
Dew point mean, 41·8°, being 0·56° above the ditto.
Humidity of air mean, ·77, being 7 per cent. below the ditto.
Elastic force of vapour mean, ·279, being ·010 per cent. above the ditto.
Total amount of rain, 0·55in., being 1·28in. below the ditto.
Increase of spontaneous evaporation on rainfall, 0·56in.
Mean amount of ozone, 6·13, being 3·37 of chromatic scale below ditto.
Electricity feeble all through the month.
The apex of Mount Wellington covered with snow on the 10th and 28th.
Strong Aurora Australis on 11th.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF JUNE, 1871.

By Dr. E. Swarbreck Hall.

This month has been more than usually fatal to persons above 15 years old, and the mortality very small indeed to all under that age. The weather was altogether abnormal, though very pleasant. This is the first month in 1871 in which the death-rate has exceeded the average of the previous 14 years.

Atmospheric-pressure mean, 29·925 was + ·44 above the 25 years' average. The extremes were, maximum, 30·363, on the 6th ; minimum, 29·311, on the 27th, being an extreme range for the whole month of 1·052 inches. This was considerably exceeded in June, 1870, though the average height of the barometer was less. On ten days the range exceeded one-fifth of an inch, the 24th having a fall of more than half an inch, *i.e.*—·580.

Wind-force total, 25·48 lbs., was only + ·98 above the average, but *north-west* winds, the least favorable to health, had 64 out of the 90 observations, with 20·54 lbs. of the strength. All the winds from the other seven points of the compass were much below their average both in frequency and force. The strongest wind, a north-west on the 24th, had only a pressure of 2·60 lbs. to the square foot.

Temperature mean, 50·41 degrees, was + 3·66 above the 25 years' average, and nearly two degrees warmer than June 1870 was. Only two Junes in the previous 30 years had a higher mean, *i.e.* : 1861 being 50·92, and 1867 51·64. The extremes were 71 on the 2nd about noon, and 33 in the night of the 8th. The maximum was twice exceeded in the previous 30 years, the minimum was less in thirteen out of the 30 years. The *wet-bulb thermometer* mean was 46·53 degrees, being + 2·08 above the 20 years' average.

The daily range of temperature was the most abnormal meteorological phenomenon of this month, the mean being 19·83 degrees, which is + 4·79 above the 25 years' average. Only four out of the previous 30 years' Junes had a higher mean. Last year's daily range mean was nearly six degrees less. The greatest range in any twenty-four hours was 33 degrees on the 1st, but on 14 other days the range exceeded 20 degrees between the extreme heat of the day by the self-registering shade maximum thermometer, and the self-registering minimum thermometer in the night. To these extreme variations of temperature was no doubt owing the excessive death-rate in feeble, diseased, and aged persons, and the great prevalence of diseases of the respiratory organs, catarrh, bronchitis, and pneumonia. No doubt, however, the dry state of the air, and the great elastic force of vapour, tended also to the same result. External warmth by fires and good bedding (not from over crowding) is essential at such times to preserve life in aged, diseased, and feeble people, together with warm nutriment in the long and trying interval between the evening and morning meals. The Registrar-General of England emphatically notices in his reports the greatly augmented death-rate in old and ailing persons that accompanies a sudden and extensive fall of temperature.

Solar Intensity mean, 80·28 degrees, was + 5·34 above the average, and more than four degrees higher than in June 1870. Only June 1856 exceeded the present month. The maximum was 98 degrees on the 15th, being the highest in our records. This extreme warmth of sunshine is the more remarkable, because the cloudy days were above the average.

Terrestrial-radiation mean, 37·67 degrees, was only + 1·04 above the average. The minimum, 32 degrees (freezing point), was noted for the nights of the 2nd, 8th, 10th, 18th, 23rd, 26th. To be exposed, as many persons are, to the extremes of the sun's heat by day, and this cold by night, a variation of 66 degrees, must be trying to the strongest constitutions, and lethal to weak ones.

Elastic force of vapour mean, 279, was + 10 above the average. It ranged from minimum 175 on the morning of the 8th, to maximum 456 at noon on the 29th.

Humidity mean, 77, was — 7 below the June average.

Rain fell on 14 days, which is + 2·36 above the average, but the quantity was too trifling on any day but the 27th to make the channels run. The

total was only ·55 of an inch, being — 1·28 inches below the average. The three Junes, 1852-3-4, were the only ones in the previous 30 years with less rain-fall than the present month. But every month now for the last seven months has had less than the average rain-fall ; altogether for the first half of this year the deficit of rain amounts to 4·14 inches. *Snow* remained on Mount Wellington on the 1st of the month, and received a slight addition on the 11th, and a copious addition on the 28th.

Spontaneous Evaporation amounted to 1·11 inches.

Cloud mean, 6·10, was + ·59 above the average.

Ozone mean, 6·13, was — ·37 below the average. Saturation (10) was recorded twice.

Electricity was feeble, only 3 positive with tension from 3·5 to 5. Negative 50 tension 1 to 5. "Nils" 7.

The Deaths were 51, being + 5 2-14ths above the average of the previous 14 years. Only four out of the fourteen had a greater number of deaths, the highest being 1861 with 59. 36 were males, only 15 females. Under one year there were 4 deaths; from 1 to 5 there was only one death ; from 5 to 10 no deaths ; from 10 to 15 one death ; from 15 to 20 there were 4. Ten deaths only under 20 years old out of 51 at all ages, is a very small proportion indeed. From 20 to 60 there were 20 deaths ; and at 60 and all ages above, the oldest being 94, there were 21 deaths. The *Zymotic* class of diseases had only 3 deaths, two from *Diarrhœa*, one "*English Cholera*." There were 4 deaths from *Pneumonia*, being an unusually large number. *Consumption* caused 6 deaths, four of them Tasmanians by birth, one Englishman, and the 6th a native of New South Wales on a visit for change of climate. The deaths in *Hospital*, including inquest cases, were unusually large, 17. At the *Brickfields* Male Invalid Asylum, there were 2 deaths, aged 68 and 94; at the Cascades there were 4 deaths, three males, one female, respectively aged 58, 68, 70, 73. The *Inquests* were 5, four of them in connection with the gaol for males, one having died there, and three in Hospital shortly after being removed from the gaol.

JULY, 1871.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	29·772	29·740	56	43	82·0	34·0	NW	1·30	0·03
2	29·584	29·426	53	40	75·0	36·5	NW	3·38	0·11
3	29·908	29·622	47	41	60·5	32·0	W	3·64	
4	29·966	29·942	54	44	74·0	35·5	NW	1·56	
5	29·828	29·600	61	44	86·5	40·0	NW	1·30	
6	29·694	29·596	58	40	72·0	36·0	NW SW	5·72	0·31
7	29·819	29·798	57	38	73·0	35·0	NW	8·33	0·03
8	29·837	29·787	61	44	83·5	40·0	NW NE	1·56	0·05
9	30·009	30·000	60	44	72·5	30·0	NW NE	·26	
10	30·016	29·900	63	40	85·5	36·0	NW	·26	
11	29·678	29·635	60	46	82·0	43·0	NW	3·58	
12	29·795	29·753	57	40	80·0	36·0	NW	1·30	0·03
13	29·866	29·790	57	40	79·0	37·5	NW	·78	0·10
14	29·294	28·990	56	41	68·5	40·0	NW	1·30	0·55
15	29·264	29·090	55	37	62·0	33·5	NW	1·30	0·18
16	29·467	29·438	56	41	83·0	34·0	W NW	10·94	0·54
17	29·000	28·758	57	42	60·5	40·0	NE NW SE	1·04	0·48
18	29·139	29·114	51	38	76·0	32·0	NW	1·04	0·06
19	29·714	29·483	46	36	74·0	31·0	SW SE S	3·64	0·01
20	29·859	29·765	51	43	71·0	31·0	NW SW	1·30	
21	30·182	30·066	63	39	90·0	33·0	NW NE SW	0·	
22	30·339	30·309	60	33	90·5	29·0	NW NW SE	·52	
23	30·327	30·142	57	34	84·0	29·0	NW NW SE	0·	0·04
24	29·819	29·556	52	37	65·0	33·5	NW	·78	0·13
25	29·208	29·052	63	37	88·0	33·0	NW SW NW	·78	
26	30·388	29·313	53	44	67·0	41·0	SW NW	·78	
27	29·420	29·287	59	37	72·5	32·5	NW	·26	0·29
28	29·493	29·236	60	43	91·0	38·0	NW S SE	·52	0·05
29	29·809	29·742	64	36	89·0	31·0	NW NE SW	0·	
30	30·079	30·042	62	38	90·0	34·5	W SE NW	·52	
31	30·096	30·024	63	43	94·0	41·0	NW	·52	0·04
Monthly mean 29·684			48·85		78·11	35·40	Total force 60·01		3·59

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

14th.—Arbutus unedo commencing to flower.
20th.—Garrya elliptica, ditto.
21st.—Almond in full flower.
25th.—White mulberry commencing to break.
31st.—Yellow crocus commencing to flower.

Barometer mean, 29·684in., being 0·160in. below the average.
Temperature mean, 48·85°, being 3·13° above the average.
Solar intensity mean, 78·11°, being 2.60° above the average.
Dew point mean, 39·6°, being 0·46° below the average.
Humidity of air mean, ·76, being ·07 per cent. below the average.
Elastic force of vapour mean, ·260, being ·003 per cent. above the average.
Total amount of rain, 3·59in., being 1·53in. above the average.
Increase of spontaneous evaporation on rainfall, 0·42in.
Mean amount of ozone, 7·40, being 0·31 of chromatic scale above the average.
Surface-electricity feeble all through the month.
Snow never absent from Mount Wellington during the month. The low hills and ground covered with a thick layer of fresh snow on the 19th.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF JULY, 1871.

By E. Swarbreck Hall.

The weather this month was unusually wet, windy, and warm, with great mutations of atmospheric pressure, and an excessive daily-range of temperature, together with ozone above the average. It is very remarkable that exactly one-half of all the deaths were at and above 60 years of age, while deaths under 20 years old were less than one-fifth of the whole. The total deaths were about 24 per cent. less than the July average for the previous 14 years.

Atmospheric-pressure, 29·684, was — ·160 below the average. The extreme range of the month was 1·581 inches, being the largest on record. The extremes were : maximum, 30·339 on the 22nd ; minimum, 28·758 on the 17th. So low a minimum has only been registered seven times in the last 30 years. There was no excess of wind in Hobart Town, but great storms were reported elsewhere. The greatest movement of the barometer in any twenty-fours from 1 p.m. to 1 p.m. was a fall of — ·600 of an inch on the 14th, but on four other days there were movements of more than half an inch. Altogether there were 18 days on which the variations exceeded one-fifth of an inch, which is without parallel in the Hobart Town records. As is usual these excessive fluctuations of atmospheric pressure caused many deaths amongst old and debilitated people.

Wind-force total, 60·01 lbs., was + 20·46 lbs. above the July average. At 67 out of the 93 observations, with 36·85 lbs. of the force, the wind was registered from the north-west, but there is no doubt that many of them were really deflected west winds from their high ozonic character. It is, as has often been before noted, that owing to the sudden angle in the valley of the Derwent at Bridgewater eleven miles from the city, caused by the Mount Wellington tier, winds from the west are liable to be deflected towards the north-west. West and south-west winds were 13 in number with 18·22 lbs. of the force. The other winds were unusually below the average in both aspects. The strongest winds had only 5·21 lbs. pressure to the square foot, and were registered only three times. *Calms* were 23, being — 16·89 below the average.

Temperature mean, 48·85 degrees, was + 3·13 above the 25 years' average. In the previous 30 years there have only been 4 Julys with a higher temperature. It is noteworthy that the mean by the self-registering maxima and minima thermometers agree with that of the observed thermometers within a trifle. The maximum was 68 on the 31st ; the minimum 33 on the 22nd. The *wet-bulb* thermometer mean, 44·98 degrees, was + 1·86 above the average.

Daily range of temperature mean, 17·23 degrees, was + 2·09 above the average. The greatest range was on the 29th, being 28 degrees. These excessive changes of temperature, together with fresh winds and an excess of ozone, caused much disease of the organs of respiration, principally catarrh, but popularly, through erroneously, called influenza.

Solar intensity mean, 78·11 degrees, was + 2·60 above the average, which is remarkable, as cloud mean was also considerably above the average. The hottest sunshine was 94 degrees on the 31st.

Terrestrial radiation mean, 35·40 degrees, was — ·15 below the average. The lowest records were in the nights of the 22nd and 23rd, being 29 degrees.

Elastic-force of vapour mean, 260, was + 3 above the average. It ranged from 175 on the 19th to 374 on the 14th.

Humidity mean, 76, was — 7 below the average. Saturation (100) was registered three times.

Rain-fall amounted to 3·59 inches, being + 1·53 above the July average. This is the first time since November, 1870, that the rainfall has attained the average. It fell in a gentle and continuous way, there being 18 wet days, or + 4·27 more than the average. No floods occurred in Hobart Town, at the same time water courses, sewers, and rivulets were thoroughly flushed. *Snow* was never absent from Mount Wellington during the month, and received frequent and copious augmentations. On the 19th the streets and

low hills about the city had a good coating, but of short continuance. No ice was ever observed in or near the city, in this usually the coldest month in the year.

Spontaneous evaporation, owing to the warm and windy character of the month, exceeded precipitation, being 401 inches.

Cloud mean, 6·32, was + ·92 above the average.

Ozone mean, 7·40, was + ·31 above the average. Saturation (10) was recorded 8 times.

Electricity was registered 49 times out of the 62 observations ; 4 only were positive with tension from 4 to 5, The negatives, 45, had tension from 1 to 5. There were 13 " nils." No *thunder*, or *lightning*, or *auroral* displays.

The *deaths* during the month were 42, being — 12 12-14 below the average of the previous 14 years' Julys. Under 1 year old the deaths were 4 (the registered births in the month being 65) ; from 1 to 5 the deaths were 2 ; from 5 to 10 one ; from 10 to 15 *nil* ; from 15 to 20 1 ; from 20 to 60 there were 13. At and above 60 the deaths were 21, the oldest being 90 ; 15 out of the 21 were above 70. Males were 26 in number ; females only 16. In the *Zymotic class* of diseases there was only 1 death, a case of *croup* in a child aged 5 years. In *diseases of the brain* and *nervous system* there was the very large number of 14 deaths, many of them sudden from *apoplexy*, &c., a consequence of the rapid and extensive variations of atmospheric pressure. From *diseases of the organs of respiration* there were 5 deaths. *Consumption* caused only 1 death, a young woman born in Hobart Town. At the *Hospital* there were 10 deaths, inclusive of 1 *inquest* case, the only one in the month. Six of them were from other registration districts. One was one of the two last females of the aboriginal natives of the island, who died from *paralysis* ; recorded as 50 years old only (?) At the *Brickfields Invalid Asylum* there were 6 deaths, aged respectively 67, 71, 74, 77, 83, 90. At the *Cascades* there only 2, aged 49 and 82.

AUGUST, 1871.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in inches
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In	°	°	°	°			
1	30·062	29·995	57	47	72·0	43·0	WE SE	1·04	
2	30·177	30·134	62	33	87·0	27·5	NW	·78	
3	30·161	30·024	65	41	89·5	38·0	N W SE	0·	
4	29·802	29·770	62	48	85·5	43·5	NW W NW	3·38	
5	29·853	29·771	62	44	86·0	40·0	NW SW	·52	
6	29·664	29·609	70	39	92·0	34·5	N NE	0·	
7	29·684	29·598	63	44	88·5	41·5	NW W	1·30	0·06
8	29·678	29·656	54	41	57·0	39·0	SE S SE	1·04	
9	29·824	29·787	56	37	85·0	32·5	W SW SE	·52	
10	29·812	29·801	65	36	89·0	31·5	NE NW S	·52	
11	29·852	29·774	62	41	81·5	40·5	NW	·52	
12	29·824	29·802	68	41	92·5	34·5	NW	·26	
13	29·823	29·674	67	45	93·0	40·0	NW	2·86	0·16
14	29·934	29·790	58	40	87·0	36·5	NW	1·04	
15	29·934	29·761	60	40	90.0	37·5	NW SW W	3·38	0·15
16	30·224	30·145	59	35	84·0	29·0	NW N	·26	
17	29·970	29·726	61	38	84·0	36·0	NW	·78	
18	29·556	29·543	56	42	60·5	37·5	NW	·52	0·07
19	29·774	29·724	65	34	90·0	30·0	N NW	1·30	
20	29·464	29·281	61	40	84·5	38·0	NW	2·86	0·15
21	29·603	29·467	58	40	87·5	37·5	NW W NW	1·56	0·09
22	29·865	29·838	61	46	93·0	43·5	NE NW	1·04	0·05
23	29·976	29·848	58	44	86·5	43·0	NW S SW	·78	
24	29·917	29·441	53	34	75·5	30·5	NW	1·30	0·08
25	29·387	29·335	56	43	83·0	43·0	NW W	3·64	0·75
26	29·879	29·861	60	43	90·0	39·5	NW	1·04	
27	29·882	29·800	60	45	87·0	40·0	NW SW SE	·78	
28	30·032	29·957	62	32	91·0	29·5	NW SE	·26	
29	29·695	29·301	52	37	56·5	32·0	NW	1·04	0·31
30	29·530	29·409	58	42	86·5	41·0	NW SW NW	1·04	
31	29·512	29·483	57	43	75·5	39·5	NW	·26	0·12
Monthly mean 29·761			51·45		83·56	37·08	Total Force	35·88	1·99

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few standard plants in the Royal Society's Gardens during the month.

12th.—Sambucus niger commencing to break.
15th.—Gooseberries ditto.
18th.—Horse chestnut ditto.
23rd.—Elm commencing to flower.
24th.—Poplar commencing to break.
29th.—Apricot ditto.

Barometer mean, 29·761in., being 0·046in. below the average.
Temperature mean, 51·45°, being 3·38° above ditto.
Solar intensity mean, 83·56°, being 8·04° above ditto.
Dew point mean, 40·08°, being 0·76° per cent. below ditto.
Humidity of air mean, ·71, being ·09 above ditto.
Elastic force of vapour mean, ·265, being ·003 per cent. above ditto.
Total amount of rain, 1·99, being 0·16in. above ditto.
Increase of spontaneous evaporation on rainfall, 0·93in.
Mean amount of ozone, 6·42, being 1·18 of chromatic scale below the average.
Electricity active on the 2nd, 7th, 10th, 14th, 15th, 16th, 23rd, 26th, 27th, and 28th.
A brilliant Aurora on the 6th.
High wind, 15·62lb. to square foot on the eve of 21st.
Snow remaining on Mount Wellington during the month, with frequent fresh deposits.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF AUGUST, 1871.

By Dr. E. Swarbreck Hall.

Except in a warmer temperature than usual, the weather during this month departed less from the average normal character than usual. The deaths were much below the average of the previous 14 years, and specially so in those at all ages under 20 years old.

Atmospheric pressure mean, 29·761, was only — ·046 below the 25 years' standard mean. The maximum, 30·224, occurred on the 16th; the minimum, 29·281, was noted on the 20th. The extreme range of the barometer for the month was only ·943 of an inch, which has been largely exceeded in 12 out of the previous 16 years. Nevertheless, the daily mutations, within this extreme range, were very great; the greatest being a fall of — ·589 on the 29th; and on the 26th there was a rise of + ·527. On 10 other days there were variations exceeding one-fifth of an inch. As usual, these excessive fluctuations of atmospheric pressure told heavily on diseased, feeble, and aged people, while young and healthy persons were little affected by them.

Wind-force recorded at the usual hours of observation amounted on the whole to 35·88 lbs., being —10·61 lbs. below the average; but in the nights of the 21st and 26th there blew gales having a pressure of 15·62 lbs. each to the square foot, which really made the wind-force of the month in excess. The strongest winds recorded at the usual hours of observation, 7 a.m., 1 p.m., and sunset, were only 2·60 lbs., registered four times. North-west winds had 60 out of the 93 observations with strength of 23·40 lbs., but this must be qualified by the same remarks that were made in the previous month; many of these winds so registered being really deflected West winds. The *calms* were 30, being — 5·33 below the average.

Temperature mean, 51·45 degrees, was + 3·38 above the 25 years' average. The extremes were 70 degrees at about midday on the 6th, and 32 in the right of the 28th. Both higher and lower registers have often been made in August. *Wet bulb* mean was 46·45, being only + 1·39 above the average.

Daily Range of Temperature mean, 19·90 degrees, was + 3·47 above the average, showing how necessary it is to take into consideration every meteorological record before drawing conclusions from the means of any one instrument. The greatest range was 31 degrees, noted on the 6th and 19th.

Solar-Intensity mean, 83·56 degrees, was + 8·08 above the average. The maximum was 93 degrees on the 13th and 22nd, and much greater heat than this has often been recorded.

Terrestrial-Radiation mean, 37·08 degrees, was + 1·28 above the average. The coldest night was the 16th, when this self-registering thermometer on the grass recorded 29 degrees only.

Elastic-force of vapour mean, 265, was — 3 below the average. The range was from minimum 175 at 7 a.m. on the 16th to maximum 353 at noon on the 6th.

Humidity mean, 71, was — 9 below the average, Saturation (100) was never recorded.

Rainfall — 1·99 inches was + ·16 above the average. It fell on 11 days, being — 2·45 below the average. In another and more elevated part of the city 18 wet days were registered, with a total fall of 2·51 inches. It was generally felt that this August was much wetter than usual. *Snow* was never absent from Mount Wellington during the month, and received frequent and copious additions, but none ever fell in the city.

Spontaneous Evaporation amounted to 2·92 inches.

Cloud Mean, 5·39, was — ·31 below the average.

Ozone Mean, 6·42, was —1·10 below the average, ranging from 3·5 to 9.

Electricity had 21 positive indications with tension ranging from 3 to 6. The negatives were 36, with tension from 1 to 6. There were 5 *nils*. Neither *thunder* nor *lightning* were observed during the month. An *Aurora* was registered on the evening of the 6th.

The *Deaths* during this month were 34, being —12 less than the average of the previous 14 years. Only one year out of the fourteen, 1866, had less, *i.e.*, 33. The range being from that to 74 in 1858. Under one year old there was only

one death ; from 1 to 5 there were 3 ; from 5 to 10, one; from 10 to 15 none; from 15 to 20, one. So small a proportion of the total deaths under 20 years old is very remarkable, August 1870 had ten more. From 20 to 60 the deaths were 17, being one less than in August 1870. At 60 and all ages above the deaths were 11, being — 4 less than in 1870. The three oldest this month were above 80 years old, the oldest being 86. In the *Zymotic Class* only one death was recorded, a man aged 60 from *gastric fever*. From *consumption* there were 4 deaths, 2 of them natives of Tasmania, born in Hobart Town, women, aged 21 and 25 respectively. One a man aged 44, a shoemaker, born in Dublin ; the other a man, aged 52, a truss-maker, born in Middlesex. In the public *Hospital* there were 11 deaths, all belonging to the Hobart Town registration district, except one from Green Ponds. There was only one *Inquest* on a man who died in hospital to which he was removed from the gaol. At the *Brickfields Invalid Asylum* there were 3 deaths, aged respectively 64, 68, 83. At the *Cascades* establishment two men died aged 58 and 73, the average age in the latter being eleven and a half years less than in the former. At the *Queen's Asylum* for orphan and destitute children, a girl aged 15 died from *abscess of the liver.*

SEPTEMBER, 1871.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	29·670	29·495	58	37	90·0	32·5	NW	1·04	0·04
2	29·792	29·572	53	38	85·5	35·0	NW SW SE	5·46	0·37
3	30·032	30·014	64	39	88·5	35·5	NW	1·04	
4	30·092	29·950	58	46	66·0	42·0	SW N SW	2·86	
5	30·219	30·176	61	39	91·5	33·0	NW SE	·26	
6	30·027	29·710	66	35	96·0	31·0	NW	·52	0·21
7	29·307	29·185	61	47	75·5	43·5	NW	·52	0 16
8	29·505	29·456	57	43	82·0	40·0	NW	·78	0·09
9	29·890	29·587	53	38	78·0	34·5	W SW	5·56	
10	30·111	30·044	68	39	99·5	36·5	SW N NW	·78	0·02
11	30·060	30·002	63	49	88·0	47·0	NW	·52	0·05
12	30·014	29·990	60	46	66·0	42·0	SE NW SE	·78	0·01
13	29·848	29·707	64	47	82·0	43·0	NW N NE	·52	
14	29·810	29·763	70	46	104·5	42·5	NW SE	0·	
15	30·179	30·061	60	41	95·0	37·5	NW SW SE	·78	
16	30·369	30·334	63	45	99·0	42·5	SW SE NE	·78	0·25
17	30·242	30·034	56	47	60·0	40·0	NW	1·04	
18	29 977	29·890	71	49	105·0	48·0	NW SE	·52	
19	30·337	30·262	65	43	100·0	41·0	W NE SE	·52	0·04
20	30·241	30·115	63	49	95·0	45·0	SW NE SE	·78	
21	30 106	29·902	74	42	105·0	40·0	NW SE NE	·26	0·06
22	29·771	29·665	63	52	85·5	50·0	NW SW	·26	0·03
23	29·863	29·842	67	46	100·0	46·0	NW	·26	
24	29·765	29·576	67	45	94·0	41·5	NW SW	·78	0·07
25	29·650	29·580	61	44	95·0	38·5	NW SW	3·52	0·03
26	29·881	29·751	69	49	98·0	39·0	NW	1·08	
27	29·691	29·484	69	47	95·0	45·0	NE NW	7·84	0·12
28	29·830	29·742	64	47	94·0	42·0	SW	7·81	
29	29·864	29·617	66	39	96·0	36·0	NW	·52	
30	29·750	29·721	63	44	97·5	39·5	NE NW	2·04	0·05
Mean monthly 29·866			54·22		90·23	40·32			1·60

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few standard plants in the Royal Society's Gardens during the month.

14th.—Ash commencing to break into leaf.
22nd.—Grape vines do do.
26th.—Oak do do.
27th.—Moutan Peony commencing to flower.
29th.—Horse chestnut do do.
30th.—Robinia pseudo-Acacia commencing to leaf.

Barometer mean, 29·866in., being 0·105in. above the average.
Temperature mean, 54·22°, being 3·46° above the average.
Solar intensity mean, 90·23°, being 1.69° above the average.
Dew point mean, 44·1°, being 1·93° above the average.
Humidity of air mean, ·71, being ·05 per cent. below the average.
Elastic force of vapour mean, ·298, being ·009 per cent. above the average.
Total amount of rain, 1·60in., being 0·48in. below the average.
Increase of spontaneous evaporation on rainfall, 1·50in.
Mean amount of ozone, 8·35, being 0·39 of chromatic scale above the average.
Electricity active on the 3rd, 4th, 5th, 8th, 10th, 16th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, and 30th.
Fresh fall of snow on Mount Wellington on the 2nd and on the 9th, a heavy fall on the mountain and low hills, remaining in abundance until the end of the month.

FRANCIS ABBOTT.

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NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF SEPTEMBER, 1871.

By E. Swarbreck Hall.

With the exception of June last, this is the only month since August, 1870, in which the deaths have exceeded the average of the previous 13 and 14 years.

The detailed remarks on the various meteorological phenomena of the month will indicate some of the causes to which this excessive mortality may reasonably be ascribed.

Atmospheric pressure mean, 29·866, was + ·105 above the 25 years' standard mean for September. It ranged from minimum, 29·185 on the 7th, to 30·369 on the 16th, being an extreme range for the month of 1·184 inches. The greatest movement of the barometer in any 24 hours from 1 p.m. to 1 p.m., was a fall of — ·682 of an inch on the 7th, being the largest recorded during the last 11 years. On 15 other days the movements exceeded one-fifth of an inch, which is an unusually large proportion for any month.

Wind-force total was 42·23 lbs., being — 30·30 less than the average for this usually very windy equinoctial month. The strongest winds were only 5·21 lbs. pressure to the square foot; one was from the north-west recorded on the evening of the 27th; the other west at the morning observation on the 9th. At only five other observations was the pressure of 2·60 lbs. registered. At 50 out of the 90 observations the wind blew from the north-west, with 22·11 lbs. of the total force. From north, north-east, east, south-east, and south, only 23 winds were recorded with the very small united force of 4·94 lbs. *Calms* were 28 in number, being + 5·55 above the average.

Temperature mean, 54·22 degrees, was + 3·46 above the September average. In the previous 30 years, only the Septembers of 1858 and 1855 were warmer than the present month. The high-day mean was 63·23 degrees, the low-night 43·93 degrees. The maximum was 75 degrees, noted on the 21st; the minimum was 35, which occurred in the night of the 6th. *Wet-Bulb* mean was 49·19 degrees, being + 2·62 above the average.

Daily-range of temperature mean, 19·30 degrees, was + 1·66 above the average. The greatest was 32 degrees on the 21st.

Solar intensity mean, 90·23 degrees, was + 1·69 above the average. The highest was 105 degrees recorded on the 18th and 21st.

Terrestrial-radiation mean, 40·32 degrees, was + 1·93 above the average. The lowest was 31 degrees on the 6th.

Elastic-force of vapour mean, 298, was + 19 above the average, ranging from 182 on the 6th, to 501 on the 18th.

Humidity mean, 71, was — 5 below the average.

Rain-fall amounted to 1·60 inches, which is — ·48 below the September average. There were 16 days on which rain was registered, being + ·73 above the usual number. On four days enough fell to scour the gutters and drains, but not so heavily as to cause floods; the rest was deposited in light genial showers, keeping the ground in the most advantageous state for vegetation. *Snow* was never absent from Mount Wellington during the month, and received frequent and copious additions.

Spontaneous-evaporation amounted to 3·10 inches.

Cloud mean, 6·42, was + ·58 above the average.

Ozone mean, 8·35, was + ·39 above the average.

Saturation (10) was recorded 11 times. This excessive purity of the air, together with excessive daily range of temperature and frequent variations of atmospheric pressure, would account for the excessive number of deaths.

Electricity had 20 positives with tension from 4 to 9; and 34 negatives with tension from 1 to 10, and 6 "nils." So high a tension has never before been recorded either from positive or negative. No *thunder* heard or *lightning* seen during the month. *Southern lights* were seen on the evening of the 3rd.

The deaths during this month were 46, and as the average for September for the previous 14 years was $40\,^{10}/_{14}$ the deaths were in excess by $+\ 4\,^{4}/_{14}$ With the exception of June, this is the only month since August, 1870, in which the deaths have exceeded the average. The range for September in the 14 years was from 56 in 1862 to 22 in 1869. Under one year old this month the deaths were 7, while September, 1870, had only 5; at one to five years of age there was only one death, being the same as in September last year; at five to ten there were two deaths, while September, 1870, had three; at 10 to 20 the deaths were three; while September last year had not any; at from 20 to 60 the deaths were 16, while last year they were only 13; at 60 and all ages above there were 17 deaths, the oldest being a man at the Brickfields Invalid Asylum aged 85; altogether 15 out of the 17 were aged 70 and above. Last year the deaths above 60 were 16. In the *Zymotic* class of diseases only one death can be tabulated, and that is doubtful, being a child 18 months old from *Diarrhœa*, an out-patient of the Hospital. Last year had two deaths from croup in this class. In the *Cachectic* or *Constitutional* class of diseases there were three deaths: one from *Dropsy*, two from *Consumption*, the latter were, a youth of 16, a married woman aged 38, both natives of Tasmania. In 1870 this class had six deaths, three of them from consumption, and two of them natives of Tasmania. In 3rd class, *Monorganic* or *local* diseases, there were 33 deaths, while 1870 had only 16. In the 1st order of this class, diseases of the *brain and nervous system*, there were seven deaths, 1870 had only four. In the 2nd order, diseases of the *heart and organs of circulation*, there were seven deaths, 1870 had only four deaths. In the 3rd order, diseases of the *lungs and organs of respiration*, there were 10 deaths, while 1870 had only three. The excess in this class makes up the difference, within one, of the total deaths from all causes between this year and the last. Last year ozone was — ·99 below the average, this year it was + ·39 above the average, and this valuable agent so antagonistic to diseases arising from impure air—being nature's grand disinfecting agent—when in excess always over-stimulates the air passages of the organs of respiration, producing catarrh (not influenza), bronchitis, and pneumonia. The variations of temperature also were greater this month than in 1870. The difference in the other classes and orders between the two years were not material, and need not be detailed. In the public Hospital there were nine deaths, all belonging to the Hobart Town Registration District; last year there were only seven. Inquests were three, all from natural causes; last year there was only one. At the Brickfields Male Invalid Asylum there were two deaths, aged respectively 78 and 85; last year there were not any. At the Cascades there were four deaths, two men aged respectively 68 and 75, and two women, 58 and 70.

OCTOBER, 1871.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	29·812	29·775	57	38	91·0	34·5	NW SE	·78	0·32
2	30·075	29·989	49	38	56·5	34·0	SW S	3·12	0·05
3	30·072	30·024	57	38	95 0	32·0	NW SE SW	·52	
4	29·976	29·865	62	42	97·0	40·0	SW SE	·52	0·05
5	29·853	29·763	62	42	101·0	38·5	SW SE	·78	0·07
6	29·954	29·853	55	44	66·5	41·0	SE	1·56	0·06
7	30·003	29·976	55	45	67·0	40·0	SW SE	3·12	
8	30·124	30·065	62	44	107·0	42·0	SW SE	1·56	
9	30·164	30·099	68	38	104·0	35·5	NW SE	·78	0·02
10	29·950	29·667	79	44	112·0	42·0	NW	5·73	0·02
11	29·752	29·721	56	45	90·5	40·5	SE	·52	0·09
12	29·348	29·233	57	45	94·0	40·0	NW	7·81	
13	29·614	29·570	62	42	91·0	40·0	W SE NW	5·99	
14	29·692	29·669	68	47	99·0	40·5	NW	5·72	0·31
15	29·576	29·545	67	48	1 0·0	41·0	NW W NW	10·94	
16	29·655	29·559	66	50	99·0	47·0	NW W SW	8·33	0·03
17	30·065	29·958	61	41	97·5	38·0	W NW W	8·33	
18	30·112	29·939	63	48	102·0	40·5	NW	6·25	
19	30·161	29·995	60	46	97·5	40·0	SW	8·33	
20	30·266	30·202	68	37	106·0	34·0	NW NE SE	·52	
21	30·170	30·126	61	42	75·5	39·0	NW SE	·52	
22	30·160	30·152	66	45	106·0	42·5	NW SE	1·04	
23	30·198	30·031	73	43	110·0	40·0	W SE	1·04	
24	29·926	29·782	84	50	117·0	47·5	NW NE	5·46	
25	29·892	29·821	80	46	90·5	46·0	SE E NW	3·64	0·47
26	29·920	29·857	64	42	99·5	38·0	NW W NW	3·64	
27	29·950	29·915	60	43	87·0	39·5	NW NE E	·26	
28	29·912	29·871	64	47	92·0	45·5	NW SW SE	3·38	
29	29·937	29·899	68	47	103·0	45·0	NW	1·04	
30	29·890	29·825	71	48	105·0	44·0	NW W	3·38	
31	29·782	29·551	72	50	103·0	45·0	NW W	21·35	0·03
Monthly mean 29·891			55·33		95·71	40·42	Total force 126·74		1·52

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.
The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Gauge. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.
The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.
The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

8th.—Carpinus betulus commencing to leaf.
18th.—Ailanthus glandulosa ditto ditto.
24th.—Tilea Europea (Lime) ditto ditto.
27th.—Morus niger ditto ditto.
28th.—Elm seeds commencing to fall.
31st.—Melia azederach commencing to leaf.

Barometer mean, 29 891in., being 0·107in , above the average.
Temperature mean, 55·33°, being 1·39° above the ditto.
Solar intensity mean, 95·71°, being 0·11° above the ditto.
Dew point mean, 43·2°, being 1·20° below the ditto.
Humidity of air mean, ·67, being ·06 per cent. below the ditto.
Elastic force of air mean, ·287, being ·013 above the ditto.
Total amount of rain, 1·52in., being 0·45in. below the ditto.
Increase of spontaneous evaporation on rainfall, 2·02in.
Mean amount of ozone, 8·47, being 0·55 of chromatic scale above the ditto.
Electricity active all through the month, with 17 positive, and 45 negative.
Snow never absent from Mount Wellington during the month, with a fresh deposit on the 16th.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF OCTOBER, 1871.

By Dr. E. Swarbreck Hall.

The extreme purity of the atmosphere, very great aerial movement, with strong tension and great prevalence of electricity, were the peculiar characteristics of this month. Deaths were slightly below the average, and fell principally upon adults and old people, the deaths under 20 years old being only about one-fifth of the total at all ages.

Atmospheric-pressure mean, 29·891, was + ·107 above the 25 years' adopted standard mean for October. The minimum was 29·233 on the 12th; the maximum was 30·242 on the 20th; consequently the extreme range in the month was 1.009 inches The greatest movement of the barometer in any 24 hours was a fall of —·519 of an inch on the 12th. On seven other days the movements exceeded one-fifth of an inch.

Wind-force total, 126.74lbs. was +26.79 above the average for October, and also above the average of any other month. *North West* had the greatest number and the greatest force, though it is evident many recorded for this point of the compass were really deflected West winds. 29 *South East* winds out of the 93 observations were registered, but with only a total force of 12.74lbs.; nevertheless this is considerably in excess of the average from this point of the compass, which in Hobart Town is the purest wind, and most conducive to health. *North*, *North East*, and *East* winds were scarcely appreciable; but *South West* and *West* were above the average number and strength. There was only one *South* noted, but it had the force of 2·60lbs. to the square foot. The strongest wind was a gale from the *West* on the evening of the last day of the month, with a force of 15·62lbs. to the square foot. *Hot winds* of a moderate character were noted on the 10th, 24th, 31st. *Calms* were 12 in number, being 3·22 below the average.

Temperature, mean, 55·33 degrees, was +1·39 above the average, according to the three daily observations, but more than one degree less by the self-registering maximum and minimum thermometers. The extremes were: maximum, 84 on the 24th; minimum, 37 in the night of the 20th. The *wet bulb* thermometer had the mean of 40·22 degrees, which is only +·03 above the average.

Daily range of temperature mean, 20·39, was +1·72 above the average. The greatest range was on the 10th, being 35 degrees.

Solar-intensity mean, 95·71 degrees, was only +00·11 above the average. The hottest record was 117 degrees on the 24th.

Terrestrial-radiation mean, 40·42 degrees was —1·57 degrees below the average. The coldest record was 32 degrees (freezing point) in the night of the 3rd. On the day following four deaths occurred, being double the number for any other day of the month.

Elastic force of vapour mean, 287, was —13 below the average, ranging from minimum 179 at the evening observation on the 4th, to maximum 413 on the evening of the 23rd.

Humidity mean, 67, was —6 below the average. The highest record was 93 on the morning of the 25th, but saturation (100) was never noted.

Rain-fall amounted to 1·52 inches, which is —·45 less than the October average. There were 12 days on which rain was recorded, being — 2·90 less than the average. On three days the rain fell sufficiently to cleanse water-courses, sewers, &c., the heaviest fall being ·42 of an inch on the 25th. *Snow* was never absent from Mount Wellington during the month, and received frequent additions, so copiously on the 3rd as to coat the mountain to its base. There was a smart hail storm in the city on the 2nd.

Spontaneous-Evaporation amounted to 3·54 inches.

Cloud mean, 5·90, was + ·20 above the average.

Ozone mean, 8·47, was + ·55 above the average. At 17 observations saturation (10) was registered, which is without parallel in the Hobart Town records. Deaths from diseases of the organs of respiration, consequently, were above the average.

Electricity had 17 positives, with tension from 5 to 8·5; and 45 negatives, with tension from 4 to 9; no nils.

Deaths were 41 in number being—2 7-14ths less than the October rate. The October range is from minimum 29 in 1861, to maximum 59 in 1869. Under one year old there were 6 deaths, one being only 3 days, the second two weeks, the third 3 weeks old. October, 1871, had the same number. From 1 to 5 there were 2 deaths, last year had twice as many. From 5 to 10 there were no deaths. October, 1870, had one. From 10 to 20 there was one death, while last year had 2. From 20 to 60 there were 17 deaths, while 1870 had only 6. At 60 and all ages above there were 15 deaths, the oldest being a woman of 82, last year had 16 the oldest a woman of 84. In the *zymotic* class of diseases there was not a single death. In the *Cachectic* or Constitutional Class there were 7 deaths, three from cancerous affections of various organs, three from *Consumption*, two of them natives of Tasmania, the third a German man, one from *Dropsy*. In diseases of the *Brain and Nervous System* there were 10 deaths; from diseases of *Heart and organs of Circulation* there was only one death. From diseases of the *Lungs and organs of Respiration* their were 9 deaths. From old age, &c., 5. The remainder do not require particularizing. At the *Hospital* there were only 5 deaths, two of them not belonging to the Hobart Town Registration District. At the *Brickfields Male Invalid Asylum* there was only one death at 55 years old. At the *Cascades* there were three men aged, one 69, two 70, and one woman aged 47. There were two *Inquests*, one returned "manslaughter," the other "found drowned," the poor Orphan Asylum apprentice Claravance Barker.

NOVEMBER, 1871.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In	°	°	°	°			
1	29·834	29·808	63	42	87·0	39·0	NW SW W	1·04	
2	29·834	29·691	68	43	104·0	38·0	NW	3·04	0·02
3	29·725	29·696	63	44	103·0	40·0	SW NW NE	·78	0·38
4	29·658	29·509	65	47	90·0	33·0	SW NW SE	1·30	
5	29·744	29·703	59	41	98·5	40·0	NW SE SW	·78	
6	29·869	29·845	66	45	94·0	42·0	NW W	1·04	
7	29·834	29·613	68	47	94·0	41·0	NW	21·35	
8	29·844	29·517	66	56	107·5	50·0	NW W	10·41	
9	30·320	30·140	61	46	104·0	43·5	SW SE	5·46	
10	30·347	30·168	60	44	83·0	40·0	NW NE	5·40	0·19
11	29·937	29·749	70	50	76·5	45·5	NW	0·	0·26
12	29·863	29·795	70	54	73·0	51·0	W SE	1·04	0·10
13	29·994	29·929	67	53	90·0	50·0	SE	·78	0·02
14	29·824	29·485	68	54	93·0	54·0	SE E SE	·78	0·18
15	29·789	29·651	68	49	74·0	41·0	SE	3·64	0·34
16	29·959	29·934	55	45	65·5	42·0	SE	1·30	0·06
17	30·048	30·025	59	43	89·0	40·5	SW SE	1·30	
18	29·957	29·915	65	44	107·0	39·5	W SW SE	2·86	
19	30·145	30·120	62	45	97·0	41·0	SE SW SE	1·30	0·05
20	30·022	29·897	73	47	108·0	41·0	NW SE	·78	0·17
21	30·026	29·984	63	51	68·0	48·0	SE	·26	
22	30·034	29·972	67	52	104·0	49·0	NE N NE	·78	0·60
23	29·677	29·462	66	53	91·5	49·5	SE	·78	0·62
24	29·454	29·342	65	54	73·0	50·0	NW W SW	1·04	0·08
25	29·521	29·351	69	47	102·0	40·5	NW SE NW	·78	0·03
26	29·636	29·480	69	50	103·0	47·5	NW W	3·38	
27	29·839	29·755	71	53	105·5	50·0	NW W	1·04	
28	29·866	29·799	71	56	110·0	50·0	NW	1·30	
29	30·002	29·921	68	49	94·0	45·0	NW	1·04	0·04
30	30·104	30·074	72	52	107·0	50·0	NE SW SE	1·04	
Monthly mean 29·832			58·39		93·2	44·38	Total Force	76·48 023·	

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

15th.—First strawberry ripe.
20th.—First cherry ripe.
22nd.—Black mulberry in blossom.
27th.—Pomegranate in flower.
28th.—First raspberry gathered (Antwerp).
30th.—Bougainvillœa spectabilis in full flower.

Barometer mean, 29·832in., being 0·087in. above the average.
Temperature mean, 58·39°, being 2·73° below ditto.
Solar intensity mean, 93·20°, being 10·77° below ditto.
Dew point mean, 46·6°, being 2·42° below ditto.
Humidity of air mean, ·69, being ·01 per cent. above ditto.
Elastic force of vapour mean, ·337, being ·015 per cent. below ditto.
Total amount of rain, 3·02in., being 1·29in. above ditto.
Increase of spontaneous evaporation on rainfall, 0·49in.
Mean amount of ozone, 8·52, being 1·13 of chromatic scale above the average.
Electricity active on the 2nd, 3rd, 4th, 5th, 7th, 8th, 9th, 10th, 16th, 17th, 19th, 20th, 26th, and 29th.
Mount Wellington covered with fresh snow on the 5th.
Heavy storm of thunder, lightning, and rain on the 23rd.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF NOVEMBER, 1871.

By E. Swarbreck Hall.

The deaths this month were considerably above the average, though no epidemic disease prevailed. There does not appear anything in the meteorological phenomena so adverse to health and life to have caused this excess in the death rate, except excess of ozone and deficiency of sunshine, and great elastic force of vapour.

Atmospheric pressure mean, 29·832, was +·111 above the 25 years' standard average. The extreme range of the month was 1·005 inches; the maximum, 30·347, having occurred on the 10th; the minimum, 29·342, noted on the 24th. The greatest range in any 24 hours was registered on the 9th, being — ·467. On only nine other days were the mutations more than one-fifth of an inch. There was therefore nothing unusually remarkable in the barometrical movements to affect the death rate.

Wind force total was 76·48lbs., being — 35·85 below the average for November. The ozone bearing *south-east* winds were greatest in number, but the *north-west* with the reverse character were above twice as much in force. From the other points of the compass there was no remarkable deviation from the standard average. The strongest wind was a north-west on the 7th, having a pressure to the square foot, at the sunset observation, of 15·62lbs. *Calms* were 16 in number, being + 6·33 above the average.

Temperature had the mean of 58·39 degrees by the observed thermometers, but more than a degree and a quarter less by the self-registering. The former was only +·85 of a degree above the November average. The extreme was maximum 73 on the 20th, the minimum 37 in the night of the 4th. The latter was therefore the same as in October, while the former was 11 degrees less. The *wet-bulb* thermometer had the mean of 52·65 degrees, which is +·80 more than the average.

Daily-range of temperature mean, 17·70 deg., was — 1·38 below the average. The greatest range in any 24 hours was 28 degrees, noted on the 4th. On several days in the month fires were essential to comfort in sitting rooms.

Solar-intensity mean, 93·20 degrees, being — 8 61 degrees below the average. The numerous wet and cloudy days account for this. The hottest record was 110 degrees on the 28th.

Terrestrial-radiation mean, 44 38 degrees, was + 2·11 above the average. The coldest record was 33 degrees in the night of the 4th.

Elastic-force of Vapour mean, 337, was + 12 above the average. This condition of the atmosphere is adverse to health and life. The range was from minimum 224 to maximum 550.

Humidity mean, 69, was — 2 below the average.

Rain-fall amounted in the aggregate to 3·02 inches, being +·18 of an inch above the average of this the wettest month in the year. It fell on 16 days, which is + 3·18 above the average number. On the 23rd more than one-third of the whole was precipitated, but in so moderate a way as not to cause floods. The soil was kept moist during the whole month, greatly to the advantage of vegetation; and both the air and the surface of the earth were well washed from impurities.

Spontaneous Evaporation amounted to 3·51 inches.

Cloud mean was 7·69, being + 1·63 above the average, an unusual excess.

Ozone mean, 8 38, was + ·82 above the average. At 12 observations saturation (10) was recorded. The excess of ozone did not, as in the previous month, tell so much on diseases of the organs of respiration, as the winds were not so high, or so dry.

Electricity had 12 positives, with tension ranging from 4·5 to 8·5. The negatives were 41, with tension ranging from 2·5 to 8·5. There were 7 *nils*. There was a heavy storm of *thunder*, *lightning*, and *rain* on the 23rd.

The *Snow* of the previous month continued on Mount Wellington until the 5th, when it received a very copious augmentation, but disappeared altogether after the 9th.

Deaths were 45, being + 7·6—14 above the average of the previous 14 years.

Under one year old there were only 5 deaths. From 1 to 5 there were 4. In the next three quinquennial periods there was one each. From 20 to 60 there were 13 deaths, and at 60 and all ages above, the oldest being a man at the Brickfields Invalid Depôt, aged 88, there were the very large number of 20 deaths. The month, therefore, was very auspicious to all under 20 years old, but very fatal to all above 20, and more especially to those above 60. In the *Zymotic* class of diseases there were 2 deaths from *Diarrhœa*. In the *Cachectic* class there were 4 deaths, 3 from *Cancer* of different internal organs, and one from *Consumption*, the latter not belonging to Tasmania, being a sailor from a ship in port and a native of the Sandwich Islands. In diseases of the *Brain and Nervous System* there were the unusually great number of 13 deaths. In diseases of the *Heart*, &c., 5. Diseases of the *Lungs and Organs of Respiration* 5 also ; *Stomach and Organs of Digestion* 7. Other classes a few only in each. At the *Hospital* there were 14 deaths, but five of them did not belong to the Hobart Town Registration District. At the *Brickfields Male Invalid Depôt* there were 4 deaths, but another was removed to and died in Hospital. At the *Cascades Invalid Stations* there were only 2 deaths, one male aged 60, one female aged 65. There were only two *Inquests*.

DECEMBER, 1871.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·174	30·075	71	52	110·0	50·0	NE SE	·52	
2	29·984	29·947	76	55	111·0	51·0	NW SE	1·30	0·03
3	29·994	29·909	78	54	115·0	50·5	NE SE	1·04	
4	29·939	29·592	98	65	132·0	52·0	NW	7·80	
5	29·937	29·778	88	56	118·5	50·0	E SE	1·30	
6	29·924	29·843	79	51	112·0	45·0	NW SE	3·12	
7	29·968	29·930	75	53	109·0	49·0	NW SE	1·30	0·25
8	29·843	29·586	75	54	102·0	52·0	NW SE NW	·78	
9	29·762	29·677	79	58	112·0	56·5	NE NW W	1·30	
10	29·884	29·862	74	49	95·0	41·5	NW SE SW	1·04	0·20
11	29·580	29·354	68	49	89·0	45·0	NW W	1·04	
12	29·484	29·262	66	48	88·0	44·5	SW NW	3·64	0·23
13	29·698	29·618	70	42	81·5	38·5	NW W	7·80	
14	29·874	29·860	68	54	75·0	45·0	NW	3·36	
15	29·874	29·836	73	54	115·0	52·0	NW SE	3·12	0·02
16	29·675	29·422	82	53	96·0	45·0	NW	2·86	
17	29·593	29·362	80	56	110·0	54·5	NW W NW	10·94	
18	29·941	29·827	80	55	110·0	52·0	NW	1·56	
19	29·989	29·951	70	52	107·0	44·0	NW SE	·52	
20	30·069	30·043	76	58	110·0	55·0	SE	1·30	
21	29·910	29·659	87	58	128·0	53·5	NW SE	·78	
22	29·642	29·328	87	65	107·0	64·0	NW W	7·80	
23	29·888	29·828	75	55	115·5	52·0	NW NE	1·04	
24	29·686	29·599	71	57	114·0	47·5	NW SW	3·72	
25	29·797	29·686	70	45	109·0	41·0	NE NW	1·56	
26	29·877	29·729	67	51	95·0	49·0	NW W	1·04	
27	29·995	29·939	73	42	112·0	36·5	NW SE	1·04	
28	30·061	29·924	73	50	110·0	44·0	NE E SE	1·30	
29	30·124	29·953	82	52	118·0	44·0	NW SE	1·30	
30	29·659	29·528	91	50	125·0	51·0	NW SE	1·04	
31	29·620	29·553	72	54	112·5	46·0	NW SW W	18·23	
Monthly Mean 29·790			65·95		107·71	48·41	Total Force	96·51	0·53

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.
The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Gauge. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.
The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.
The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

8th. First bunch red currants ripe.
10th. Common privet commencing to flower.
12th. First bunch black currants ripe.
20th. Doyenne d'Ete pear ripe.
21st. Melia Azederach commencing to flower.
24th. Juneating apple commencing to ripen.

Barometer mean, 29·790 in., being 0·045 in. below the average.
Temperature mean, 65·95°, being 4·83° above the average.
Solar intensity mean, 107·71°, being 3·77° above the average.
Dew point mean, 49·7°, being 0·68° above the average.
Humidity of air mean, ·59, being ·09 per cent. below the average.
Elastic force of vapour mean, ·380, being ·028 per cent. above the average.
Total amount of rain, 0·53in., being 1·20in. below the average.
Increase of spontaneous evaporation on rain fall, 3·46in.
Mean amount of ozone, 7·22, being 0·03 of chromatic scale above ditto.
Electricity active on the 5th, 6th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 22nd, 23rd, 24th, and 25th.
Hot wind on the 4th; thunder, lightning, and rain on the 7th; fresh snow on Mount Wellington on the 10th.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE HOBART TOWN REGISTRATION DISTRICT DURING THE MONTH OF DECEMBER, 1871.

By Dr. E. Swarbreck Hall.

The hot and very dry character of this month, together with the excessive daily variations of temperature, might have been expected to cause a death-rate largely above the December average, but the excess was only trifling, three-fourths of the deaths being above 15 years old, children's deaths under the age forming an unusually small proportion of the total deaths, while those above 60 years old were more than one-third of the whole.

Atmospheric pressure mean, 29·790, was only + ·45 above the average. The maximum was 30·174 on the 1st, the minimum, 29·262, on the 12th; the extreme range of the month therefore being ·912 of an inch. The greatest movement of the barometer in any twenty-four hours was a fall of —·513 on the 30th. There were, however, 12 other days on which the variations exceeded one-fifth of an inch.

Wind-force total, 96·51 lbs., was + 9·09 above the average. Winds from the *north west* greatly exceeded those from any other point of the compass both in frequency and force. Many of them, however, were no doubt deflected west winds. Two of them were hot winds. West winds were the next in point of strength, but south-east in regard to number. The strongest wind of the month was on the 31st, when a gale from the west was recorded as having a pressure of 10·42 lbs. to the square foot. There were only 7 *calms* being —5·89 below the average.

Temperature Mean was 65·95 degrees, being + 4·83 above the average. Only one December in the previous 30 years was hotter, *i.e.* 1855, when the mean was 67. The extremes were 98 degrees on the 4th, and 42 degrees in the nights of the 13th and 27th. The *wet-bulb thermometer* had the mean of 57·35, being + 2·37 above the average.

Daily range of temperature, 23·13 degrees, was + 3·22 above the average, and was only exceeded in the previous 30 years by December 1857, when 25·50 was recorded. The greatest range of any twenty-four hours was 41 degrees on the 30th.

Solar Intensity mean, 107·74 deg., was + 3·77 above the average, and only once exceeded. The hottest record was 132 deg. on the 4th. In December 1859 one deg. higher was registered. The highest ever recorded here for any month was in February 1857, when it was 143 deg.

Terrestrial Radiation mean, 48·44 deg., was only + ·20 above the average. The minimum was 36·5 in the night of the 27th. It is one of the pleasant peculiarities of the weather in Tasmania, that cool nights generally prevail even when the days are unusually hot.

Elastic-force of vapour mean, 380, was + 28 above the mean, and higher than any December since 1860 when it was 392. It ranged from maximum 589 on the evening observation of the 8th, to minimum 165 on the morning of the 25th. This range was unusually great.

Humidity mean, 59, was—9 below the average—only in the first year (1841) of the 30 years' series of meteorological records was humidity less, *i.e.*, 56.

Rainfall, ·53 of an inch, was—1·20 below the average. In five Decembers out of the preceding 30 there have been less rainfalls than in this, and in one the same. On only one day, the 8th, was there rain enough to flush the drains, &c. – a thunderstorm. The rain fell on 5 days being —7 below the average. No *snow* on Mount Wellington during the month.

Spontaneous Evaporation was 3·99 inches.

Cloud mean, 5·82, was + ·21 above the average.

Ozone mean, 7·22, was + ·03 above the average showing, in the absence of the usual fall of rain, that many of the winds recorded north west were really ozone-bearing winds from the sea, and so maintaining a purity of the atmosphere counteracting other atmospheric phenomena adverse to health and life.

Electricity had 20 positive indications, with tension ranging from 3 to 8;

negatives 40, with tension from 2·5 to 8, and 1 nil. There was a smart *thunderstorm*, with *lightning* and heavy rain, on the 8th.

The *deaths* during the month were 46, being + $1^{13}/_{14}$ only above the average. December 1870 had 10 less. Under 1 year old there were 7 deaths, being the same in number as 1870; from 1 to 5 years old there were 4 deaths, exactly the same as in 1870. At 5 to 10 there were no deaths; from 10 to 15 none, while December 1870 had 2; at 15 to 20 there was 1 death, 1870 had 2. It thus appears that in this month there were 12 deaths only under 20 years old, while in 1870 there were 15. From 20 to 60 years there were 17 deaths, being 5 more than in 1870. At 60 years old, and all ages above, there were 17 deaths, the oldest being 85; while 1870 had only 9, the oldest being 79. In the *zymotic* class of diseases there were 6 deaths, all cases of infantile diarrhœa. In the *constitutional* class there were 4 deaths from *Consumption*, one a native of Tasmania. One death from *Cancer* of the mouth. In the *Diseases of the Brain and Nervous System* there were 7 deaths, 1 recorded as idiopathic tetanus, 3 apoplexy, 1 hydrocephalus, 1 convulsions, 1 diseased brain. In December, 1870, there were 5 deaths in this class, one being from tetanus. In Diseases of the Heart &c., there were 2 deaths; in Diseases of the Lungs, &c., 9, all being of a chronic character except 2. There were 4 *inquests*, one of them a death in Hospital. In Hospital there were 11 others. At the Cascades a child aged 15 months died in the gaol, registered bronchitis. Three men died in the Invalid Asylum aged 67, 81, 85. At the Brickfields Invalid Asylum there were 2 deaths aged 63 and 76.

In all 1871 there died in the Hobart Town registration district 507 individuals, being only 7 more than in the previous year, but 53 less than the average of the previous 14 years. In the first quarter the deaths were 140; in the second quarter 113; in the third 123; in the fourth 131; as usual the autumn and winter quarters having the smallest mortality.

The *Births* registered in all Tasmania during 1871 were 3,053, being one less than in the previous year. The *Deaths* registered were 1,350, being 54 less than in 1870, and about $13\frac{3}{4}$ per 1,000 of population, being somewhat less than the death rate in the healthiest of the English registration districts, notwithstanding a greater proportion relatively of very young and very old in the population of Tasmania when compared with that of England and Wales.

JANUARY, 1872.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	29·862	29·763	76	46	112·0	41·0	NW SE	1·30	
2	29·612	29·497	71	47	107·0	46·0	NW SW	8·33	0·08
3	29·919	29·906	71	40	111·5	36·0	NW NE NW	5·20	
4	29·994	29·859	69	50	98·0	47·5	NW SW NW	·52	
5	30·197	30·165	74	44	112·0	41·0	NW SE	1·04	
6	30·151	30·049	77	52	112·0	48·0	NW SE	1·04	
7	30·065	30·025	77	56	112·5	55·5	N SE	1·04	
8	29·947	29·943	78	58	111·0	51·0	NE SE NE	·78	0·05
9	29·813	29·667	96	62	126·0	53·5	NW SE	3·12	0·21
10	29·719	29·685	77	60	84·5	59·0	NW SW	·78	1·10
11	29·915	29·871	71	43	110·0	40·5	SW SE	1·04	
12	29·991	29·963	75	46	110·0	43·0	SW SE	1·30	
13	30·028	30·005	69	53	72·0	51·5	SW NE SE	·26	
14	29·960	29·762	82	59	119·0	56·0	NW SE	1·30	
15	29·857	29·841	81	60	93·5	59·0	SE	1·56	
16	29·664	29·451	92	62	124·0	60·0	NW	5·99	0·23
17	29·559	29·364	86	56	120·0	51·5	NW SE NW	5·73	
18	29·941	29·818	77	55	116·0	52·0	SW SE S	1·30	
19	29·945	29·873	76	50	114·0	46·5	NE SE	1·04	
20	29·960	29·865	77	58	115·0	53·0	NW SE	1·04	
21	29·672	29·425	85	55	122·5	53·0	N SE	·52	
22	29·477	29·170	84	59	105·0	62·0	SW	10·41	0·05
23	30·065	30·034	80	49	109·0	46·0	S SE	1·30	
24	30·381	29·982	77	47	117·0	43·0	SW SE	1·30	
25	30·044	29·967	78	57	115·0	56·0	NW SE	1·04	
26	29·760	29·514	85	58	118·0	56·5	SW SE	2·86	
27	29·818	29·799	80	55	115·0	54·0	NW	7·80	
28	29·983	29·825	80	53	115·5	49·0	NE SE	1·56	
29	29·612	29·591	82	59	119·0	56·0	NE NW	5·20	
30	29·747	29·661	76	56	110·0	51·0	SE NE	·78	
31	29·617	29·517	80	55	117·0	50·5	NW W NW	1·04	
Monthly Mean 29·822			66·81		111·06	50·60	Total Force 77·52		1·72

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.
The direction of the wind is registered from currents moving at a height of 102 feet and the force according to Lind's Wind Guage. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.
The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.
The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few standard plants in the Royal Society's Garden during the month.

8th.—First apricot gathered (Roman).
11th.—Jargonelle pear ripe.
12th.—Veronica angustifolia in flower.
15th.—Grevillea robusta in full flower.
18th.—Mulberries commencing to ripen.

Barometer mean, 29·822in., being 0·95in. below the average.
Temperature mean, 66·81°, being 0·03° below the average.
Solar intensity mean, 111·06°, being 1.42° above the average.
Dew point mean, 52·6°, being 2·05° above the average.
Humidity of air mean, ·64, being ·03 per cent. below the average.
Elastic force of vapour mean, ·419, being ·046 per cent. above the average.
Total amount of rain, 1·72in., being 1·36in. above the average.
Increase of spontaneous evaporation on rainfall, 3·80in.
Mean amount of ozone, 7·09, being 0·22 of chromatic scale above the average.
Electricity active on the 1st, 2nd, 4th, 11th, 12th, 18th, 19th, 23rd, and 24th. Thunderstorm on the 8th.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE HOBART TOWN REGISTRATION DISTRICT DURING THE MONTH OF JANUARY, 1872.

By E. Swarbreck Hall.

The meteorology of this month is quite peculiar, and had not some of the phenomena most adverse to health and life been counteracted by others of the opposite character, the health of the community would have been seriously affected, and the death-rate have been much in the excess of the 15 years' mean for January. As it was, the excess of deaths is scarcely appreciable, being only the fifteenth of one, and no epidemic disease became prevalent.

From the commencement of this year the meteorological standard of comparison for my monthly notes will be (in most of the phenomena) for 30 years instead of for 25 years as before. By the conjoint labours of Mr. Francis Abbott, F.R.A.S., Mr. Roblin, Curator of the Royal Society's Museum, and myself, tables for the longer period have been compiled, thus extending our Meteorological Records from 1841 to 1870 inclusive. They will soon be in the hands of the Government printer, and available for all interested in the subject.

Atmospheric-pressure mean, 29·822, was only + ·078 above the 30 years' mean. The maximum, 30·381, occurred on the 24th, the minimum, 29·170, on the 22nd, so that the whole range of the month was 1·211 inches, and recorded within two days. This is by far the highest range in any January since 1855, except 1856. Between the morning observations of the barometer on the 22nd and 23rd the mercury rose + ·864 of an inch. In January, 1856, it was 1·014, but no other January approached to anything near that of the present month. On 13 other days the variations of atmospheric-pressure were above one-fifth of an inch. The lethal influence of this, conjoined with great heat, and wide alterations of temperature, was exemplified in the heavy death-rate from diseases of the brain, &c.

Wind-force total, 77·52 5· lbs., was + 176 lbs. above the mean. The ozone-bearing, health-promoting, gentle sea breezes from the South East were the greatest in number, but those of the opposite character from the North West were the greatest in force. The four strongest winds recorded had 5·21 lbs. pressure to the square foot each, three were from the North West on the 2nd, 16th, and 17th, the other a South West on the 22nd, when the barometer attained its minimum. Hot winds were recorded on the 9th, 16th, 21st, 22nd. *Calms* were 19, being — 2·10 below the average.

Temperature mean, 66·81 degrees, was + 4·12 above the 30 years' mean for January. Only January 1856 had a higher mean, *i.e.*, 71·10. The greatest high-day temperature was 96 degrees on the 9th. The smallest low-night temperature was 40 degrees on the 3rd, giving the extreme range for the month of 56 degrees, the same as in the month of December preceding. Only January 1849 had a wider range, the maximum being 105—(the highest ever recorded here)—the minimum 43. The *wet bulb* thermometer mean was 59·31 degrees, being + 3·41 above the 30 years' standard.

Daily range of temperature had the mean of 25·00 degrees, being + 4·36 above the 30 years' standard average. Three years only had higher means, *i.e.*, 1862, 25·03; 1856, 25·13; 1841, 25·50. The greatest range in any twenty-four hours was 34 degrees on the 9th.

Solar intensity mean, 111·06, was + 3·04 above the mean of the 15 years recorded in the standard tables. The years 1856, 1857, 1862 only had higher means. The maximum was 126 degrees on the 9th, this has been exceeded in nine years out of the 15.

Terrestrial radiation mean, 50·60 degrees, was — ·10 below the 15 years' average. The maximum was 62 degrees in the night of the 22nd, the minimum 36 degrees in the night of the 3rd.

Elastic force of vapour mean, 419, was + 46 above the 30 years' average. In only three years was this mean exceeded, *i.e.*, in 1856, 1859, 1861. The range of the month was from minimum 214 on the morning of the 3rd, to maximum 675 at 1 p.m. on the 16th.

Humidity mean, 64, was —3 below the 30 years' standard.

Rain fell to the aggregate amount of 1·72 inches, which is + ·15 of an

inch above the 30 years' mean for January. The greatest part of it (1·31 inches) was precipitated in 26 hours following the hot-wind on the 9th. This was a most beneficial event on sanitary grounds, as it gave a thorough cleansing to the gutters, drains, sewers, &c., which, from the previous long continued dry weather, were full of decomposing organic matters, and very offensive. The death records give one instance at least of the effects of such filth accumulations; a boy of 16 died in Hospital from Pythogenic or Typhoid fever, or more expressively *filth-fever*, taken from a bad street in the centre and lower part of the city. Every year's delay in properly sewering the city is causing an increased saturation of the soil with the seeds of this and other zymotic diseases, as well as adding to the ultimate expense which will be entailed upon the citizens. Fortunately our water supply is not liable to be contaminated with the soakage of these pestilential products, but it behoves every family to pay great attention to their water butts and cisterns, for the dust which is so great in dry windy weather is loaded with animal ordure and other organic matters, and settles abundantly in the uncovered receptacles of water, and there rapidly ferments and decomposes. Every water-cask ought to be thoroughly cleansed at least once a week. I demonstrated to the Royal Society some years ago how full of living creatures water long stored in casks, &c., became. Our mountain supply of water could not at its origin be of a purer quality; but no pains or expense should be spared to deliver it uncontaminated to the citizens. Too much obnoxious dust settles in the reservoirs at the Cascades, and even in the covered one in Hill-street, owing to the opening in the latter's gables not being screened with gauze wire as I long ago suggested should be done. The proposal before the Municipal Council to convey the water from the "Springs" to the "bower" in pipes, instead of the open channels, is in every sanitary respect highly desirable, but there should be no union of different metals in their construction. Nevertheless, I must repeat what I have said heretofore, that since the new waterworks came into operation deaths from Diarrhœa in the city have been much diminished, though liable to augment again from the increasing accumulations in the vile cess-pits and cloacæ so prevalent in the city. The dread penalty paid by so many towns in Great Britain for this sort of sanitary neglect and mismanagement ought to warn the authorities of all the young cities and towns of the southern hemisphere, how they overlook these most important matters. Pure as is the air we receive in our happily situated island, it can, and will be polluted by local neglect of scavenging, sewering, and ventilating, and human lives will have to pay the penalty of such want of hygienic forethought. The rain fell on 6 days, which is — 2·93 below the average of 16 years.

Snow was never seen on Mount Wellington this month.

Spontaneous Evaporation amounted to 5·52 inches, thus far exceeding precipitation, as was sure to be the case with so much wind and heat.

Cloud mean, 4·92, was — ·82 below the average.

Ozone had the mean of 7·09, which is + ·16 above the January average for the 13 years of the new standard tables. On four observations saturation (10) was recorded.

Electricity had 23 positives with tension from 3 to 8·5, and 32 negatives with tension from 1·5 to 5·5. Nils were 7. *Thunder* and *lightning* were observed on the 8th.

There were 50 *deaths* during the month, being + $^{1}/_{15}$ above the January average for the previous 15 years, and only + 3 more than 1871 had. Under one year old there were 18 deaths—being one only more than January 1871 had. From 1 to 5 there were 4 deaths; 1871 had not any. From 5 to 10 one death; 1871 also one. From 10 to 15 no deaths; 1871 the same. From 15 to 20 two deaths; 1871 none. From 20 to 60 there were 18 deaths, being + 4 more than in 1871. At 60 and all ages above, the oldest being 94, there were only 7 deaths, while 1871 had 15. In the *Zymotic* class of diseases there were 13 deaths, being + 7 more than in the previous month, December 1871. Typhoid fever 1; croup 1; erysipelas 1; pyœmia, after wound in the hand 1; diarrhœa 9, mostly very young infants. In the *Cachectic* or constitutional class there were 7 deaths, 2 of them from *Consumption*, one of them a girl of 20 being a native of Tasmania, the other a sailor from a ship in harbour, a half-caste native of New Zealand, aged 24. In *diseases of the brain and nervous system* there were

14 deaths, being twice as many as in the previous month of December. In *diseases of the heart*, &c., only one death. In diseases of the *lungs*, &c., only one, which is remarkable with such wide daily ranges of temperature, and verifying the remark I have often had occasion to make, that mere alterations of temperature do not cause diseases of the organs of respiration to the extent that they do in the British Isles. In the other classes there was nothing unusual. In the *Hospital* there were 13 deaths, 5 of them not belonging to the Hobart Town registration district. There was only one *Inquest*, a suicide from poisoning with strychnine. At the *Cascades Invalid Asylum* there was only one death of a man aged 94, but a child of one of the officers of the House of Correction there died at the age of 4 months, as its fellow-twin did on the 24th of December previous, but which was not entered into my report for that month, as the death was not registered until the 11th January, notwithstanding the penalty the Act provides for such neglect. At the *Brickfields Male Invalid Asylum* there were two deaths, one aged 75 the other 77.

FEBRUARY, 1872.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	29·926	29·833	75	50	115·5	49·5	SE	·78	
2	29·694	29·602	71	51	108·0	46·0	NW SW	3·65	
3	29·980	29·799	72	40	113·0	34·0	NW NE S	1·30	
4	29·706	29·660	71	49	112·0	44·5	NW SW W	5·73	
5	30·013	29·934	67	48	1 0·0	43·0	NW SE	1·04	
6	29·979	29·744	72	52	95·0	50·5	SW NE SW	·52	
7	29·439	29·409	73	50	106·0	46·0	NW W	5·99	0·11
8	29·899	29·753	71	43	103·0	39·5	NW	·52	
9	29·836	29·810	80	58	114·0	51·0	NW	3·65	
10	30·076	29·968	81	55	117·0	51·5	NW SE	1·56	
11	30·068	29·947	80	52	112·5	47·0	NW SW SE	1·30	
12	29·827	29·821	77	53	85·0	53·5	NW SE	1·30	0·15
13	30·068	30·036	72	44	110·0	40·0	NE SE	1·04	
14	30·052	30·003	76	48	112·0	45·0	NW SE	1·30	
15	30·266	30·159	75	51	110·0	46·5	SE	1·56	
16	30·294	30·178	82	53	116·0	49·5	NW SE	1·04	
17	30·140	30·099	71	59	86·0	58·5	NW E SE	·78	0·07
18	30·163	30·122	66	57	80·0	55·5	SE	·26	0·01
19	30·130	29·962	83	58	118·5	57·5	NW NE	1·04	
20	29·841	29·653	81	66	95·5	65·5	NW W	1·30	0·50
21	29·852	29·774	79	53	86·0	49·5	SE	1·30	
22	30·047	29·945	74	44	90·0	40·5	NW SE	1·04	
23	30·178	30·123	79	52	118·0	50·0	NW SE NE	·78	
24	29·968	29·794	80	54	102·0	51·5	NW SE	1·56	0·57
25	30·060	29·947	76	49	107·0	43·5	NW SE SW	1·30	
26	30·225	30·178	79	51	118 0	43·5	NW SE	3·38	
27	30·429	30·423	75	51	115·0	44·5	NW SE	1·04	
28	30·369	30·110	89	56	121·5	49·5	NW SE	1·30	
29	30·214	30·116	86	60	120 0	52·0	SE	1·04	
Monthly mean 29 974			63·69		106·48	47·64	Total force	48·38	1·41

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, during the month.

4th.—Kerry pippin apple commencing to ripen.
5th.—Windsor pear commencing to ripen.
10th.—Bon Chretien pear commencing to ripen.
14th.—Green gage commencing to ripen.
24th.—Ash commencing to shed seed
25th.—Sycamore commencing to shed seed.

Barometer mean, 29·974in., being 0·143in. above the average.
Temperature mean, 63·69°, being 1·81° above the ditto.
Solar intensity mean, 106·43 , being 1·44 below the ditto.
Dew point mean, 48·38 , being 2·17 below the ditto.
Humidity of air mean, ·66, being ·04 per cent. below the ditto.
Elastic force of air mean, ·386, being ·012 above the ditto.
Total amount of rain, 1·41in., being 0·28in. below the ditto.
Increase of spontaneous evaporation on rainfall, 2·6sin.
Mean amount of ozone, 7·16, being 0·15 of chromatic scale above the ditto.
Electricity moderately active on the 1st, 2nd, 3rd, 4th, 5th, 8th, 10th, 14th, and 28th.
Squally on the 7th, with fresh snow on Mount Wellington.
Aurora Australis on the 12th.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE HOBART TOWN REGISTRATION DISTRICT DURING THE MONTH OF FEBRUARY, 1872.

By E. Swarbreck Hall.

Warm days, cold nights, numerous and gentle sea breezes with plenty of ozone, nearly an average of rain-fall. but mostly precipitated on two days, five days apart, though with atmospheric pressure high and variable, and temperature above the average, was conducive to the health of the community above five years old, the deaths at all ages being considerably less than the average of the previous 15 years.

Atmospheric-pressure mean, 29·974, was +·132 above the 30 years' adopted standard average for February. The range of the month was 1·019 inches; the minimum 29·409, noted on the 7th; the maximum, 30·428, on the 27th. The greatest movement of the barometer in any 24 hours was a rise of +·487 of an inch on the 8th. On twelve other days there were movements exceeding one-fifth of an inch. The influence of these mutations of atmospheric pressure is visible in the deaths under "Diseases of the Brain," &c., and of the "Heart," and "old age," which altogether were 15 out of the total, from all causes, of 40.

Wind-force total, 48·38 lbs., was —6·34 below the average, but south-east sea breezes laden with ozone were not only unusually numerous, but prevailed over winds from all other points of the compass, both in frequency and force. The strongest winds had 5·21 lbs. pressure to the square foot, and were recorded at noon on the 4th from the south-west, and at sunset on the 7th from the west. No *hot winds*. *Calms* were 16 only, being —1·67 below the February average. Moderate, constant, and pure breezes from the best points of the compass therefore characterised this month.

Temperature mean, 63·69 degrees, was + 1·58 above the 30 years' average for February. The extremes were maximum high-day temperature, 89 degrees, on the 28th, and minimum low-night temperature, 40 degrees, in the night of the 3rd. The mean of all the maxima was 76·31 degrees, the mean of all the minima being only 51·97 degrees, and the highest of the minima but 60 degrees. Warm days and cool nights were therefore characteristic of this month. The *wet-bulb thermometer* mean was 56·79 degrees, being + 1·08 above the average.

Daily range of temperature, 24·34 degrees, was + 4·53 degrees above the 30 years' average. Only the first year of the series—1841—had so high a mean, *i.e.*, 24·30. The highest range on any day was 33 degrees on the 28th, that being the extreme range between the hottest part of the day in the shade, 89 degrees, to the coolest record in the following night, 56 degrees.

Solar intensity mean, 106·43 degrees, was — 1·17 below the average. The highest record was made on the 28th, being 121·5 degrees only. Twice in 16 years only have there been lower records.

Terrestrial radiation mean, 47·64 degrees, was — 2·03 degrees less than the average, giving still stronger proof of the cool nights than the self-registering minimum air-thermometer did. The coldest night was the 3rd, when the thermometer sank to 34 degrees. On the night of the 20th this thermometer marked 65·5, being only half a degree less than was marked by the air-thermometer.

Elastic force of vapour mean, 386, was + 11 above the average. The range was from 224 minimum on the morning of the 3rd, to 641 maximum at noon on the 20th.

Humidity mean, 66, was — 4 less than the average.

Rain fell to the amount of 1·41 inches, which is only — ·12 below the average. It was recorded on 6 days, being — 2·93 days below the average. On the 20th half an inch fell, and on the 24th a little more, *i.e.*, ·57 of an inch. These two events were highly salutary in scouring the water courses, sewers, &c., of decomposing organic matters. *Snow* fell abundantly on Mount Wellington on the 7th, and did not disappear until some hours after sunrise on the 8th.

Spontaneous evaporation amounted to 4·09 inches.

Cloud mean, 5·67, was only + ·04 above the average.

Ozone mean, 7·16, was but —·01 below the average. Saturation (10) was registered 5 times.

Electricity had 17 positives with tension ranging from 3·5 to 6, and 35 negatives with tension from 2 to 7, and 6 nils. Neither *thunder* nor *lightning* were observed. An *Aurora* was seen on the evening of the 12th.

The *Deaths* numbered 40 only, being — $13^{3}/_{15}$ less than the average of the previous 15 years. Only February 1867 had fewer, *i.e.*, 34, and 1860 had 40 also. The highest February was that of 1859, *i.e.*, 75. Two of the deaths were in visitors from Victoria. Under one year old there were 13 deaths; from 1 to 5 there were 4; from 5 to 10 none; from 10 to 15 there were 2; from 15 to 20 there was 1. Thus exactly half the deaths of the month were under 20 years old. From 20 to 60 there were only 7 deaths, at 60 and all ages above there were 13, the oldest being a man aged 100 who had been in these colonies 67 years, and whose death was caused by the *accidental* fracture of his thigh-bone.

In the *Zymotic* class of diseases there were 13 deaths, all from bowel complaints at and under twelve months old. By the new Nomenclature of Diseases of the Royal College of Physicians of London now generally adopted, Diarrhœa, which constituted 11 out of the 13 cases, would be classed under diseases of the Digestive System amongst diseases of the intestines, and not under the head of "Miasmatic" or "General Diseases." During the summer months in Tasmania, diarrhœa always prevails with more or less fatality amongst young children, and occasionally as an epidemic. In the *Cachectic* or *Constitutional* class of diseases there were 5 deaths, 4 from *cancerous* affections of various organs, one from *Consumption*, a man aged 27 born in Tasmania. In diseases of the *Brain and Nervous System* there were 9 deaths; in diseases of the *Heart*, &c. 2; in the *Lungs*, &c., only 1; *Stomach*, &c., only 1; *Urinary* organs, 1; *bones*, &c., 1; *developmental*, 1; *old age*, 4; *violence*, 2. There were no Inquests. In the *Hospital* there were 11 deaths, one belonging to another registration district. At the *Cascades* establishment a man aged 81 died. At the *Brickfields Invalid Asylum* 3 men died, aged respectively 60, 72, 81.

REPORT

OF THE

ROYAL SOCIETY

OF

TASMANIA,

FOR THE YEAR

1871.

TASMANIA:

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

1872.

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C. TOMLINSON, Esq., F.R.S., F.C.S. &c., Highgate, near London.

G. BENNETT, Esq., M.D., F.Z.S., Sydney, New South Wales.

PROFESSOR G. NEUMAYER, Munich.

REV. JULIAN E. T. WOODS, F.L.S., F.G.S., F.R.G.S., &c., Penola, South Australia.

DR. W. O. SONDER, Foreign Hon. Sec. Society of Naturalists, Hamburg.

REV. J. J. BLEASDALE, D.D., F.G.S., Melbourne.

List of Fellows.

† Denotes Life Membership.

Abbott, Francis, F.R.A.S., F.R.M.S. ...	Hobart Town
Abbott, F., jun.	,,
Adams, G. P.	,,
Agnew, J. W., M.D.	,,
Allport, Joseph	,,
Allport, Morton, F.L.S., F.Z.S., C.M.A.I.	,,
Archer, William, F.L.S.	Cheshunt
Atherton, E.	Hobart Town
Atkinson, Rev. H. D.	Oyster Cove
Aubin, F.	Spring Bay
Aikenhead, Hon. J., M.L.C.	Launceston
Adams, R. P., Solicitor-General	Hobart Town
Bilton, H.	Glenorchy
†Barry, Sir R., Puisne Judge	Melbourne
Barnard, James	Hobart Town
Butler, Francis	,,
Butler, J.	,,
Bromby, Right Rev. C. H., Lord Bishop of Tasmania	,,
Bright, R. S., M.R.C.S.L.	,,
Butler, Hon. Henry	,,
Buckland, H. J.	,,
Browne, Justin McC.	,,
Baynton, W. E.	Kingston
Bomford, F. E.	Rheban, Swansea
Bailey, Rev. Brooke	Hobart Town
Chapman, Hon. T. D., M.H.A.	New Town
Cook, Henry	Hobart Town
Clarke, J. M.	,,
Creswell, C. F.	,,
Cotton, Francis	Swanport
Crawford, Lieut.-Colonel	Hamilton-on-Forth
Crosby, W.	Hobart Town
Crowther, W. E.	,,
Creasy, R. J.	,,

Cruttenden, Thomas	Woodsden
Castray, L. R., A.C.G.	Hobart Town
Davies, Ven. Archdeacon	Hobart Town
Davies, John, M.H.A.	,,
Dear, Rev. R. E.	,,
Dobson, His Honor Mr. Justice	,,
Dunn, Hon. J. A.	,,
Du Cane, His Excellency Charles	Government Houes
Dobson, H.	Hobart Town
Foster, Hon. John, M.L.C.	Hobart Town
Fysh, Hon. P. O., M.L.C.	,,
Giblin, Thomas	,,
Gould, C., F.G.S., late Government Geologist	,,
Gorringe, Thomas	Green Ponds
Greig, C. C.	Hobart Town
†Gunn, R. C., F.R.S., F.L.S.	Launceston
Graves, J. W....	Hobart Town
†Gellibrand, W. A. B.	River Ouse
Hall, Dr. E. Swarbreck	Hobart Town
Harris, Rev. R. D. P., M.A.	,,
Hunter, Henry	,,
Huston, G. F.	New Norfolk
Huybers, A.	Hobart Town
Hopkins, H.	,,
Hazell, C.	Carlton
Howell, F. G.	Hobart Town
Irving, M.H., M.A., &c.	Melbourne
Irvine, P.	Hobart Town
Isaacs, R. McIntosh	Hobart Town
Jackson, Adam	Ross
Jamieson, Mr.	Hobart Town
†Jeffery, Molesworth...	Bournbank, Lachlan
Jackson, J. A., M.H.A.	Hobart Town
Kennerley, Hon. Alfred, M.L.C.	Hobart Town

Knight, W., jun.	Sandy Bay
Kermode, W. A.	Mona Vale
Lewis, David, M.H.A.	Hobart Town
Legge, R. V.	Cullenswood
Maclanachan, James	Ballochmyle
Macfarlane, James	Hobart Town
Macfarlane, J.	,,
Mather, J. B.	,,
Maxwell, C. M.	,,
†Milligan, Joseph, F.L.S.	England
Moore, J. A....	New Norfolk
Meredith, Hon. C., M.H.A.	Hobart Town
Morrison, Askin	,,
Marsh, H. J.	,,
Mace, J. C.	Clarence Plains
Mace, G.	Spring Bay
Napier, G. R.	Hobart Town
Nelson, H.	,,
Officer, Hon. Sir Robert, M.H.A., Speaker	New Norfolk
Roberts, H. L.	Hobart Town
Read, R. Cartwright	Redlands, New Norfolk.
Rule, J.	Bellerive
Riddoch, A.	New Norfolk
Ross, R. J.	Hobart Town
Salier, G., M.H.A.	Hobart Town
Sharland, W. S., M.H.A.	New Norfolk
Solomon, Joseph	Hobart Town
Stephens, T., M.A., Inspector of Schools...	,,
Story, J. F.	Swanport
Storie, Rev. J.	Hobart Town
Susman, L.	,,
Scott, J., M.H.A.	Launceston
Scott, J. R., M.H.A.	New Town
Salier, F. G.	Hobart Town
Swan, J., M.H.A.	New Town

Smith, P. T.	Ross
Travers, S. Smith	New Town
Walch, James...	Hobart Town
Weaver, G.	,,
Whitcomb, G.	Hobart Town
Whyte, Hon. James, M.L.C.	,,
Wilson, George, jun.	Mount Seymour
Wilson, Hon. J. M., M.L.C.	Hobart Town
Wise, F. H.	,,
Wilkins, A.	England
Webster, A. G.	Hobart Town
Wright, Stephen P. H.	,,
Wilson, George	,.
Willes, C. J., M.R.C.S. Edin.	Oatlands
Walker, F. T.	Rhodes
Young, Russell	Hobart Town
Young, James	Bracknell

MINUTES of the ANNUAL GENERAL MEETING of the ROYAL SOCIETY OF TASMANIA, held at the Museum, Macquarie-street, at 7 o'clock p.m., on the 29th January, 1872: Morton Allport, Esq., F.L.S., F.Z.S., C.M.A.I., Vice-President, in the chair.

The CHAIRMAN having read the advertisement by which the meeting had been convened, called upon the Secretary to read the report.

The Report for 1871 was then read.

It was moved by Mr. BILTON, seconded by Mr. GIBLIN, and carried, "That the Report be adopted, and printed for circulation amongst the Fellows."

Messrs. F. Abbott, jun., and C. Belstead, having been appointed scrutineers, the meeting proceeded to the election of four members of Council, in place of those retiring.

The ballot resulted in the re-election of the retiring Members, &c. :—

SIR ROBERT OFFICER.
T. STEPHENS, ESQ.
H. J. BUCKLAND, ESQ.
J. BARNARD, ESQ.

Messrs. F. Butler and H. Cook were, on the motion of Mr. T. GIBLIN, seconded by Mr. F. ABBOTT, senior, re-elected Auditors of annual accounts.

R. J. Ross, Esq., after due nomination, was elected a Fellow of the Society.

Mr. T. GIBLIN observed that the Fellows had great reason to be pleased with the present position of the Society. The debt had been reduced during the past, and was likely to be entirely cancelled by the end of the present year. The

general business of the Society had been conducted in a most efficient and satisfactory manner, and for all these matters he was sure everyone present felt they were much indebted to the zeal and attention of the hon. secretary, who had devoted a very great deal of valuable time to the affairs of the Society. He therefore proposed that the best thanks of the meeting should be given to the hon. secretary.

Dr. AGNEW, in returning thanks, expressed the satisfaction he felt in being able to report that the Society was so nearly clear of the debt which had for so long a period embarrassed it. It was not, he said, to be supposed, however, because we had devoted a portion of income to clear off an old debt that we had no other use for it. In fact our income was still far below what it ought to be. Our Museum was increasing, and required increased expense to keep it up. To supplement and explain it also, many valuable works of reference were urgently required for the library, and as soon as we were clear of debt every effort should be made to procure them. He might also allude to the additional accommodation given by the new building, which would greatly facilitate the work of the Museum. More room would be available for the preparation and exhibition of specimens, and on the whole he was glad to be able to congratulate the Fellows on the present state of the Society, which financially and otherwise would bear very favourable comparison with its condition at any former period.

A vote of thanks, on the motion of Mr. CASTRAY, seconded by Mr. BELSTEAD, was accorded to the Chairman.

Mr. ALLPORT having returned thanks the meeting terminated.

REPORT.

"The session of 1871 was opened on the 14th March, when a paper by M. Allport, F.L.S., F.Z.S., entitled 'Observations on the Progress of the Salmon Experiment' was read. The following papers were brought forward at the various meetings during the year:—'Some Remarks on the Geology of Bruni Island,' by the Rev. H. D. Atkinson: 'On the Star η Argus and its Nebula,' by F. Abbott, F.R.A.S., F.R.M.S.; 'On the Cultivation of the Sugar Beet,' by F. Abbott, jun., Superintendent of Botanic Gardens; 'On Sheep Breeding,' by S. Smith Travers; 'On a Mode of Poisoning Rabbits on Sheep Runs, &c.,' by J. Bisdee; 'On the Geological Structure of Flinders Island,' by C. Gould, F.G.S.; 'On the Islands of Bass' Straits,' by the same author; 'On a New Genus of Freshwater Mollusks discovered in Tasmania,' by W. Legrand; 'Notes as to recent results arrived at by the Royal Astronomical Society relative to the Fluctuations of the Star η Argus and its Nebula,' by F. Abbott, F.R.A.S.; 'On a Process by which Vitality in Eggs (fowls') may be Preserved for an Indefinite Period,' by S. Smith Travers.

"In addition to the above papers the following subjects have been introduced and discussed during the session:—"Sericiculture' (with correspondence); 'The Cultivation of the Cork Oak in Tasmania'; 'Stone Alum, from Brook's Creek, Tasmania'; 'The Growth and Preparation of Cork in Europe and Africa'; 'The Management of the Mulberry Tree in China and Japan for Silk Culture'; 'The Extraction of Sugar from Beet-

root'; 'The Destruction of Rabbits in their Burrows,' &c., &c.

"Our monthly meteorological observations have been duly recorded, and the usual interchanges made with the Observatories of all the neighbouring colonies. The thanks of the Society are again due to all those who have so kindly assisted us in making these returns, and to whom special allusion was made in our last report. 'Notes on the Meteorology and Mortality of the Hobart Town Registration District,' by E. S. Hall, Esq., have been regularly received and printed.

"Our usual friendly intercourse with kindred Societies in various parts of the world has been kept up by exchanges of publications. In this respect, however, America has been by far the most liberal contributor to our library, valuable publications having been received not only from the Government, but also from the Smithsonian Institution and various scientific bodies.

COUNCIL.

"No vacancy has occurred during the year. The required list according to rule xxxii., as amended at the general meeting of 1868, has been exhibited in the library for the last fortnight.

FINANCE.

"As was anticipated in last year's report our debt has been greatly reduced during the year, and will, it is confidently expected, be entirely cleared off before the close of 1872.

"The total income from all sources was as follows: Government grant to Museum, £200; to the Gardens, £400; subscriptions, £142; sale of plants, &c., £67 5s. 8d. This, with £30 12s. in

the hands of the Superintendent of the Gardens for payment of wages, and £20 expected to be realised from arrears of subscriptions, will give a total of £859 17s. 8d. The expenditure and liabilities, as per balance sheet, amount to £885 12s. 2d., leaving a balance to debit of £25 14s. 6d.

"The current expenditure for the year has again been kept well within the income, as the following figures will show:—

	£	s.	d.
Total receipts from all sources	809	5	8
Total expenditure	781	3	11
Balance for meeting liabilities	28	1	9

GARDENS.

"During the past year a substantial boundary fence has been erected, and about three acres of ground added to the area of the Gardens. The esplanade and sea-wall, the work on which necessarily remained in abeyance during the erection of the fence, are in such a forward state that the labour of a few weeks only is required for their completion. When finished, this portion of the Garden promises to become, as has always been anticipated, exceedingly attractive.

"With a view of improving the main entrance to the Gardens various alterations have been made on the site occupied by the propagating yards, &c. It is expected that this work will be completed before the close of the present year, and it will greatly conduce to the convenience of visitors.

"About two hundred new plants, many of rare merit, were introduced during 1871. From the Royal Gardens, Kew, we received an important consignment of seeds, consisting of 88 Asiatic,

177 American, and 234 European species. Many of these have already germinated, but others requiring previous preparation will not be ready for sowing till the coming autumn.

"A considerable quantity of seed from the Silesian Beet was saved from plants grown in the Gardens. Practical information as to the value of the root for feeding purposes having been made public through the meetings of the Society, a great demand for the seed sprang up as soon as it was known that we had a supply on hand for gratuitous distribution. Upwards of a hundred applicants from various parts of the colony have received supplies, and we may therefore hope that the cultivation of this valuable plant will now be more generally established in public favour than it has ever yet been.

"The number of visitors to the Gardens during the year was estimated at 26,273, or an increase of 4,829 on the previous year.

MUSEUM.

"Our evening meetings have been made additionally attractive by some valuable donations to the Museum. We make special mention of the presentation of a mounted collection of Mammals, Birds, &c., from Europe, South Australia, and New Zealand, by Mr. H. Gomolka. Also of a fine collection of Minerals from the islands in Bass' Straits by C. Gould, Esq., F.G.S.

"From the South Australian Institute Museum, Adelaide, we have received a collection of bird skins, procured during the exploration of the northern territory of that colony.

"Specimens of the arms and war material available for use in the colony have been furnished by the Government for exhibition. These have

been placed on a suitable stand in the lower room, and have attracted much attention from visitors.

"The usual and varied work of the Museum has been steadily carried on. This work in future will be considerably facilitated by the acquisition of a large building now on the premises of the Museum. Possession has also been taken by permission of the Government of the cottage formerly the office of the Public Works Department. This affords a very suitable residence for the Curator, and its proximity to the Museum is in many respects convenient.

"The number of visitors during the year was 10,970, being an increase of 2,072 on that of the previous year."

STATEMENT of the Funds of the ROYAL SOCIETY OF TASMANIA for the Year 1871.

RECEIPTS.	£ s. d.	£ s. d.
Annual Subscriptions from 81 Members	121 10 0	
Arrears of ditto	10 10 0	
Life Members' composition	10 0 0	
Total Royal Society		142 0 0
MUSEUM.—Grant-in-aid from Treasury	200 0 0	
Total Museum		200 0 0
BOTANIC GARDENS.—Proceeds of Sale of Plants, Seeds, &c.	67 5 8	
Grant in-aid from Treasury	400 0 0	
Total Botanic Gardens		467 5 8
1872.—January 18.—Balance overdrawn at Commercial Bank		37 1 4
		£846 7 0

Note.—Dr.—To overdrawn Balance at Bank	£ s. d.	£ s. d.
	37 1 4	
Orger and Meryon, London, Balance due	19 5 2	
Wheatley & Co., to 31st December (not received), estimated at	20 0 0	
Total liability		76 6 6
Cr.—By Cash in hands of Mr. Abbott, Superintendent of Gardens	30 12 0	
Subscriptions due	20 0 0	
Total assets		50 12 0
Balance to debit		£25 14 6

EXPENDITURE.	£ s. d.	£ s. d.
Jan. 17.—Balance overdrawn at Commercial Bank, as per statement for 1870		61 12 10
Interest on overdrawn account, 1871, as per Bank Book		3 10 3
ROYAL SOCIETY.—Meteorological Instruments	4 11 6	
Printing and Advertising	46 4 11	
Postage, Parcels, &c.	3 14 11	
Collector's Commission on Subscriptions received, £132, at 5 per cent.	6 12 0	
Messenger for delivering Papers and Proceedings	1 5 0	
Furniture	1 11 6	
Library, Books, and Stationery	22 18 9	
Total Royal Society		86 13 7
MUSEUM.—Salary of Curator	125 0 0	
Wages of Attendant	50 3 4	
Premium of Insurance	6 7 6	
Purchase and Preparation of Specimens	8 0 0	
Water Rate	3 2 8	
Fuel and Light	5 1 11	
Sundries and Petty Cash	2 0 0	
Camphor, Spirits of Wine, &c.	8 13 6	
Ironmongery	3 5 3	
Freight and Carriage of Specimens	1 4 0	
Fittings, Repairs, &c.	11 4 4	
Sweeping Chimneys	0 13 6	
Total Museum		224 16 0
BOTANIC GARDENS.—Salary of Superintendent	150 0 0	
Wages of Foreman, Labourers, &c.	263 4 0	
Tools and Repair of ditto	12 1 8	
Freight and Carriage of Plants	4 9 8	
Stationery and Stamps	1 15 11	
Forage	3 3 0	
Ironmongery	9 13 11	
Repairs, &c.	2 10 0	
Seeds	3 10 6	
Sundries	19 0 8	
Total Botanic Gardens		469 9 4
		£846 7 0

6th February, 1872.

Audited and found correct { FRANCIS BUTLER, HENRY COOK, } Auditors.

BOOKS PURCHASED & PRESENTED DURING 1871.

[*Presentations marked thus* *]

Arts, Journal of Society of, Vol. 18, Nos. 937-8; Vol. 19, Nos. 939 to 988.
Arts, Transactions of Society of, Vol. 18; (November 18th, 1869, to November 11th, 1870.)
Athenæum, Parts 514 to 524. October 1870, to August 1871.
*Algæ of Tropical Shores of Australia. By Dr. W. Souder, Hamburg. From the Author.
*Africa, South, and its Resources.
*African Diamond Fields, Guide to.
*Barometer Manuel (Coast), 1870-1871. From the Director, Meteorological Office, London.
*Builder, The, current numbers.
*Bible, Barker's, printed in 1637. From Mr. W. Hatton, Hobart Town.
Conchologia, Iconica, Nos. 284 to 289.
*Census of Victoria, 1871. From Government of Victoria.
*Camphor, Motions of, on Water. By C. Tomlinson, Esq., F.R.S., &c.
Emigrants, Hints to. By H. M. Hull, Esq. From the Author.
Florist and Pomologist, Nos. 35 to 46, November, 1870, to October, 1871.
*Fossil Coniferæ, Observations on a new genus of. By Baron F. Von Müeller, C.M.G., F.R.S., &c., &c. From the Author.
*Fossilen Mollusken des Tertiær-Beckens von Wien. By Dr. M. Hornes. From Geological Society of Vienna.
Gardeners' Chronicle, The, current numbers.
*Humboldt, Address delivered on centennial anniversary of birth of. By Professor Agassiz. From the Boston (United States) Society of Natural History.
*Invertebrata of Massachusetts. By Dr. A. A. Gould. 1 Vol., bound. From the Boston (U. States) Society of Natural History.
*Islands in Bass' Straits, On the. Two Papers by C. Gould, Esq., F.G.S. From the Author.
Journal, Silliman's American, Vol. 50, No. 150. Vol. 1, n.s., Nos. 1 to 6, Vol. 2, Nos. 7, 9, 10.
*Journal, Agricultural of N. S. Wales, Vol 3, Nos. 1 to 11.
Journal, Quarterly of Science, Current Nos.
Journals of House of Assembly, Tasmania, Vols. 19 and 20.
*Journey to Musardu (Africa) .By B. Anderson, Esq., New York. From the Author.
*Journals of House of Commons, 1644.
*Literary Intelligencer, Walch's, Monthly Numbers. From Messrs. Walch and Sons.
Magazine, Country Gentleman's. Vol. 5, Nos. 29-30; Vol. 6, Nos. 31 to 36; Vol. 7, Nos. 38-39.
*Meteorological Returns, New Zealand, for 1869. From the Government of New Zealand.
*————————————, Monthly, September, 1870, to January, 1871. From ditto.
*————————————, Sydney, Monthly. From the Government Observer.
*————————————, South Australia, for 1869. From C. Todd, Esq., Government Observer.
*————————————, Hobart Town, Monthly. From F. Abbott, Esq., F.R.A.S., F.R.M.S.
*————————————, Swansea, ditto. From Dr. G. F. Story.

*Meteorological Returns, Westbury, ditto. From F. Belstead, Esq.
*————————, Port Arthur. ditto. From A. H. Boyd, Esq.
*————————, Melbourne, monthly. From R. J. L. Ellery, Esq., Government Astronomer.
*————————, New Zealand, ditto. From Dr. J. Hector, F.R.S., &c.
Natural History, Annals and Magazine of, Vol. 6, Nos. 35-36; Vol. 7, Nos. 37 to 44. Vol. 8, Nos. 45-46
*————————, Society of Wurtemberg, Annals of, 2 Parts, 1870.
Nature, Vol. 2, Parts 15 to 21.
*New Zealand Institute, Address of President of, 1871. From Dr. Hector.
*———————— Flax, Catalogue of Samples of Fibres prepared from. From ditto.
*———————— Birds, Catalogue of. From ditto.
Proceedings, Royal Society, London, Vol. 19, Nos. 123 to 129.
*————————, Essex Institute, Salem, Massachusetts, Vol. 6, part 1. From Institute. Also Bulletin of ditto, Vol. 1.
*———————— of American Philosophical Society, Vol. 11, No. 82. From the Society.
*———————— of American Academy of Arts and Sciences, Boston, Vol. 8. From the Academy.
*Patents, Victorian, Indexes of, Vol. 4. From the Government of Victoria.
*Reports of Mining Surveyors and Registrars Victoria 1870, and first quarter of 1871. From Victorian Government.
*———————— Quarterly Weather, Parts 2, 3, 4, 1869; Parts 1-2, 1870. From the Meteorological Office, Board of Trade, London.
*———————— of Meteorological Committee of Royal Society, London 1868-9-70. From ditto.
*Report of Inquiry into connection between High Winds and Barometrical Differences, 1869. From ditto.
*———————— on Meteorology of North Atlantic. By Captain Toynbee, F.R.A.S. From ditto.
*———————— on use of Isobaric Curves. By the same Author. From ditto.
*———————— on Barracks and Hospitals, American. By the Surgeon-General, U. S. Army. From the United States Government.
*———————— Annual, of Department of Agriculture, U. S. America, 1868. From the Department.
*————————, 3rd, of Commissioners of Fisheries, State of Maine, 1869. From the United States Government.
*————————, of Superintendent of United States Coast Survey, 1866. From the U. S. Government.
*————————, Monthly, of Deputy Commissioner of Revenue, United States, 1869. From the Government, U.S.
*———————— of British Association, 1869. From the Association.
*Statistics of Victoria, 1869 and 1870. From W. H. Archer, Esq.
*————————, Mineral, 1870. From R. Brough Smythe, Esq.
*Salmonidæ, History of Introduction of into Tasmania, by M. Allport, Esq., Esq., F.L.S., F.Z.S. From the Author.
*————————————————————, Additional Notes on. By the same Author.
*Society, Royal Asiatic, Journal of, Vol. 4, Part 2; Vol. 5, Part 1.
*————, Royal Geographical, Journal of, Vol. 39, 1869. From the Society.
————————————————, Proceedings of, Vol. 14, Nos. 2, 3, 4, 5. From ditto.

*Society, Geological of London, Quarterly Journal of Vol. 26, parts 1 to 4, Vol. 27, Part 1.
———— ——, List of 1870. From the Society.
*———, Zoological of London, Proceedings of, 1869. Parts 2 and 3.
*———, Linnean, Journal of, Vol. 10, No. 48, Vol. 11, Nos. 49 and 50 *(Zoology.)*
*—— ————————, Vol. 11, Nos. 53, 54, 55 *(Botany).*
*———— ——, Proceedings of 1869-70, 1870-71.
*————————, Additions to Library, 1869-70.
*———, Italian Geographical, Bulletin of, Vol. 6, 1871.
*Solutions, on Supersaturated. By C. Tomlinson, Esq., F.R.S., F.R.C.S. From the Author.
*————, Supersaturated Saline, Action of low temperatures on. By the same. From ditto.
*————, Sodic-sulphite, Constitution of. By the same. From ditto.
*Smithsonian Contributions to Knowledge, Vol. 16. From the Smithsonian Institution, Washington.
*————, Miscellaneous Collections, Vol. 8-9. From ditto.
*———— Report, 1868. From ditto.
Snakes of Australia. By G. Krefft, Esq., C.M.Z.S., &c., Curator of Australian Museum, Sydney.
*Shells, Land of Tasmania. By Mr. W. Legrand. From the Author.
*Salmon experiment, Observations on. By M. Allport, Esq., F.Z.S. From the Author.
*Star η Argus and its Nebula. By F. Abbott, Esq., F.R.A.S., &c. From the Author.
*Sugar Beet, The. By F. Abbott, junr., Esq., Superintendent of Botanic Gardens. From the Author.
*Sheep Breeding. By S. Smith Travers, Esq. From the Author.
*Salmon Trout, On the. By M. Allport, Esq., F.Z.S., &c. From the Author.
*Transactions of Institution of Engineers in Scotland, Vols. 13 and 14. From the Institution.
*———— of New Zealand Institute. From Dr. J. Hector, F.R.S.
*Temperature, Surface, of South Atlantic Ocean, Charts of. From the Director, Meteorological Office, London.
*Timber Trees eligible for industrial culture in Victoria. By Baron F. Von Müller, C.M.G., F.R.S., &c., &c. From the Author.

LIST OF PRESENTATIONS TO MUSEUM DURING 1871, WITH NAMES OF DONORS.

Abbott, Mr. F., jun.—A Blue Mountain Parrot *(Trichoglossus Swainsonii).*
Allison, Mr. A., Macquarie River.—An Eel of a bright golden yellow colour.
Allport, Master C.—Four Copper Coins and Tokens.
Allport, Mrs. J.—A collection of Ferns from Madras.
Adelaide (South Australian Institute Museum).—A named collection of Bird Skins from the Northern Territory (56 specimens, comprising 36 varieties.)
Atkinson, Rev. H. D.—Three Geological Specimens from Peppermint and Birch's Bays.
Allport, M., Esq.—Specimen of Kauri Gum from New Zealand.

Baynton, W. E., Esq.—Land Shells from Brown's River. A specimen of "Native Bread."

Buckland, J., Esq.—Skin of Monitor Lizard.

Boyes, Mr. Lukin.—A pair of Musk Ducks *(Biziura lobata)*. A small Bat.

Bailey, Master F. G.—Butterflies from Ceylon. A Purse from the same place.

Blacklow, Mr., Brighton.—A Wedge-tailed Eagle *(Aquila fucosa)*.

Butler, Mrs., Executors of the late.—230 Specimens of Shells. An Earthenware Lamp from a tomb at Misenum, Naples. Portion of a Human Jaw from Pompeii. A small Earthenware Cup from an ancient tomb at Athens. Mosaics, &c., from Baiæ Beach, near Cumæ, Naples, &c., &c.

Browne, Mrs. Fielding.—23 Silver and 22 Copper Coins and Tokens, viz. :—*Silver :* One 5 lire, Italy, Napoleon I., 1808 ; five 10 cents, ditto ditto, 1808 ; one 10 soldi, ditto, ditto, 1813 ; one franc, France, Charles X., 1826 ; one half ditto, ditto ditto, 1827 ; one ditto ditto, Louis Philippe, 1843 ; one ditto ditto, 1835 ; one coin, Spain, Philip V., 1738 ; one quarter dollar, ditto, Charles III., 1768; one ditto, ditto, Charles IV., 1799 ; one dime, America, 1845 ; ditto ditto, 1845 ; one half-crown, Bank of England token, George III., 1808 ; one shilling, colony of Essequibo, George III., 1808 ; one quarter, ditto ditto, 1816 ; two quarters (cut) of Spanish dollar, 2 unknown. *Copper :* One penny, George III. (?) ; one half ditto, George II., 1735 ; ditto, Prince of Wales (no date) ; one half anna, East India Co., 1845 ; one 20 cash, ditto, 1803 ; one coin, French Republic ; one coin, Isabella II., Spain, 1836 ; one ditto, Brazil, 1828 ; two ditto, Russia, 1831, &c. ; one 10 cents, Napoleon I. ; two doits, Java, &c. ; seven English and Colonial tokens.

Campbell, Mr. W. M., Port Cygnet.—A White Hawk *(Leucospiza Novæ Hollandiæ.)*

Clark, Mr. J.—A common Rat caught by a mussel on a pile of the Fish-market Wharf.

Chisholm, Mr. D.—An Arabic or Persian Coin, found at Clarence Plains. Specimens of Syngnathus and Hippocampus.

Cassidy, Mr. J.—A Spirifer (silicified) from Point Puer, Tasman's Peninsula.

Clifford, Mr.—Two Skulls of Wild Boars from New Zealand.

Dove, Mr. S.—A large Mussel Shell from the Derwent.

Dinham, Mr. G.—A Crown Piece of the "Gun Money" of James II., 1690.

Edgar, Mr. F. S.—Two Turtle Shells.

Fisher, Captain of the "Wild Wave."—Part of Tusk of Mastodon, from Siberia.

Felmingham, Mr.—A Cat Fish *(Uranoscopus sp.)*

Giblin, Mrs. W.—Two Specimens, Male and Female, of the Sydney Parrot, or King Lory *(Aprosmictus scapulatus)*.

Gates, Mr., Jerusalem.—A Diving Petrel *(Puffinaria urinatrix)* caught in a cornfield.

Gage, Mr. John.—A human skull, probably aboriginal, found on Mount Direction, Risdon.

Giblin, Mr. R.—A Kingfisher *(Alcyone azurea)*.

Gatenby, Mr. R., Macquarie River.—A male specimen of the Native Tiger *(Thylacinus cynocephalus)*.

Gourlay, Captain.—Two very large and fine shells of the Pearl Oyster, from the Solomon Island Group in the Pacific.

Graves, J. W Esq.—A Photographic Copy of the deed of conveyance of Franklin Island by Lady Franklin in favour of the Tasmanian Acclimatisation Society. An English Sparrow.

Gomolka, Mr. H.—An extensive and valuable collection of New Zealand Birds (80), Fishes (13), Crustaceans (27), Shells (36); European Mammals (5), Birds (12), and South Australian Birds (7), Shells (33). These specimens were all collected, prepared, and mounted by the donor. Also a Mineral Specimen (Chromate of Lead) from Dun Mountain, New Zealand.

Hull, Master.—Nest and Eggs of Honey-eater.

Handley, Mr. T. B.—A Harpoon, much twisted, found in a whale captured off Macquarie Harbour by Captain Smith of the "Maid of Erin."

Hedberg, Mr. Oscar.—Tanned Skin of a Jaguar (?)

Holmes, Mr., Jerusalem.—A Green Parrot, unusually marked.

Haywood, Master A.—A Portugese Copper Coin, 1814.

Huston, Dr.—A Paradise Duck.

Hissey, Mr.—Skeleton of a Fox *(Canis vulpes.)*

Josephs, Mr. W.—A small Copper Coin, probably Persian, picked up at Clarence Plains.

Jefferson, Master Wm., Fernshawe, Victoria (per J. W. Graves, Esq.—Nest and Egg of Lyre Bird *(Menura superba)*, and four other nests, with eggs, from same locality.

Leefe, Lieut.—A small collection of Shells from Fiji.

Moir, Mr. J. G.—Fossils from the limestone near Brown's River.

Maclanachan, Hon. J., Esq., M.L.C.—A Carolina Duck *(Dendronessa sponsa)*. A ditto ditto.

Mitchell, Mr. J.—A French coin (dix centimes), Napoleon III, 1856.

Nash, Mr.—A German Lottery Ticket.

Officer, Sir Robert.—A large Geological Map. A Land Rail *(Rallus pectoralis)*.

Pearce, Mr. J.—Two American Notes ("Greenbacks,") value 50 cents and 10 cents.

Rowntree, Mr.—Polished Specimen of Native Myrtle *(Fagus Cunninghamii)*.

Read, R. C., Esq.—Specimen of Black Marble from the Florentine Valley, River Gordon, Tasmania. Specimen of Swainson's Lorikeet, shot at New Norfolk.

Reid, A., Esq., Ratho.—An Albino variety of the common Quail.

Ross, Mr., Battery Point.—A Snake said to be from Fiji.

Scott, Jas., Esq., M.H.A.—Nine Stone Implements made by the Aborigines of Tasmania, from Macquarie River.

Seal, M., Esq. (on behalf of the United Happy Valley Gold Mining Company).—A specimen of auriferous Quartz from Christmas Reef (very rich); ditto from new reef, Ovens, Victoria.

Smith, Mr., Port Davey.—Portions of Skull of Sperm Whale, two Pelvic bones of ditto, ear bones of ditto; curiously twisted saplings; nest and eggs of White Shafted Fantail *(Rhipidura albiscapa)*.

Stokell, G., Esq.—A perfect Skeleton of a Sandwich (?) Island Native.

Seal, M., Esq.—Fossil Seeds from a recent tertiary formation at Haddon, near Ballarat, Victoria.

Shone, T. A., Mr., Back River.—A curious horny growth from the haunch of a sheep.

Stephens, T., Esq.—A fine specimen of the large Australian Volute *(Voluta magnifica.)*. Travertine from Dunrobin.

Simpson, Mr. W.—An unusually large Egg of the Domestic Goose.

Saunders, Mrs. J., Hobart Town.—A singularly shaped Sponge from Recherche Bay.

Travers, S. Smith, Esq.—Collection of specimens illustrative of the carboniferous system of New South Wales; with notes on the same by W. Keene, Esq., F.G.S.

Tapp, Mr., ship "Figaro."—A Danish Coin, 1 mark.

Thorne, Mr. R., Pittwater.—Two specimens of Spine-tailed Swift *(Acanthylis caudacuta)*.

Tonkin, H. B., Esq.—Six fossils from Risdon.

Williams, Captain, of American whaler "Osmanli."—A collection of Shells, and a War Club, from Fiji. Four Shells from East Coast, Tasmania. An English Halfpenny Token, 1788.

Walker, E. T., Esq. —A Bow, 6 Arrows, and a branch of Coral used as a club, from Tanna, New Hebrides. Two Clubs, 2 pieces of Tapa Cloth, 3 Mats, a Pillow, 3 pieces of Sponge, sample of Sugar Cane, a piece of the root of a plant from which the drink called "Kava" is made, and two Beetles, from Fiji.

Wright, Mr. R., Glenorchy.—A Spine-tailed Swift.

Whitcomb, Mr. G.—A fine specimen of Kauri Gum from New Zealand.

Watchorn, Mr. W.—A Spider Crab.

Webb, Mr. B.—A Bronze Coin; a Copper ditto, Guernsey, 1834.

Wood, Mr.—A Whip Snake found alive in a hollow log of firewood.

Webb, Mr. E. J.—Two White Cockatoos *(Cacatua galerita)*.

Wiggins, Mr.—A species of Carp from Mauritius.

Weymouth, Mr.—A small Map of Tasmania published in 1830 by Ross. (This copy is believed to have been used by John Batman, whose name it bears.)

PLANTS AND SEEDS RECEIVED AT THE ROYAL SOCIETY'S GARDENS DURING 1871.

May 11th.—From Mr. E. B. Heyne, Seedsman, Adelaide.—21 packets seeds.

May 18th.—From Miss Huybers, Hobart Town.—20 packets seeds.

May 27th.—From Dr. R. Schömberg, Director Botanic Gardens, Adelaide.—One case containing 29 plants.

May 31st.—From Mr. C. Hollinsdale, Seedsman, Hobart Town.—57 varieties imported hyacinth.

June 23rd.—From Baron Von Müeller, Director Botanic Gardens, Melbourne.—One case containing 33 plants.

July.—From Dr. Hooker, Director Royal Botanic Gardens, Kew.—One box containing 499 packets seeds.

September 1st.—From Mr. G. Brunning, St. Kilda, Victoria.—One box containing 31 plants.

September 15th.—From Mr. J. Jones, Seedsman, Melbourne.—22 packets seeds.

November 3rd.—From the Melbourne Botanic Gardens.—One box containing 18 plants.

December 28th.—From J. R. Scott, Esq., New Town.—26 varieties bulbs.

PLANTS AND SEEDS SENT FROM THE ROYAL SOCIETY'S GARDENS DURING 1871.

January 21st. By Her Majesty's ship "Blanche," to Dr. Schomburgh, Director of the Botanic Gardens, Adelaide.—One Case containing 42 plants.
February 18th.—Per "Runnymede," to Mons. J. Linden, Royal Zoological and Horticultural Gardens, Brussels.—Three Plants Dicksonia antarctica.
May 11th.—Per "Wagoola," to Mons. J. Linden, Brussels.—Three Plants Dicksonia antarctica.
May 31st.—Per "Harrowby," to Mons. J. Linden, Brussels.—Two large Plants Dicksonia antarctica.
September 6th.—To Mr. G. G. Brunning, St. Kilda Nurseries, Victoria.—Thirty Plants, 24 packets Seeds.
September 6th.—To Baron Von Müeller, Director Botanic Gardens, Melbourne.—24 packets Seeds.

TENCH SUPPLIED FROM THE POND IN ROYAL SOCIETY'S GARDENS DURING 1871.

February 14th.—J. Lord, Esq.—12 fish.
" 18th.—Mr. Witt.—6 fish.
May 2nd.—Rev. Canon Sharpe, Bathurst, New South Wales.—24 fish.
Total, 42 fish supplied during 1871.

PLANTS SUPPLIED FROM THE ROYAL SOCIETY'S GARDENS DURING THE YEAR 1871 FOR THE PLANTING OF PUBLIC PLACES.

July 5th.—For the Church of England Grounds, Bothwell.—100 Plants.
July 11th.—For the Grounds of the Roman Catholic Cathedral, Hobart Town.—140 Plants.
July 11th.—For the Grounds of the New Norfolk Asylum.—61 Plants.
July 11th.—For the Longford Church Grounds.—80 Plants.
July 14th.—For the Grounds of the Cascade Asylum.—140 Plants.
August 4th.—For the House of Correction, Hobart Town.—24 Plants.
August 4th.—The Public Works Office, for Franklin Square, Public Buildings, &c.—48 Plants.
August 8th.—For the Grounds of the Public Buildings, Launceston.—18 Plants.
August 8th.—For the Church Grounds, Green Ponds,—100 Plants.
August 18th.—For the Government House Grounds.—50 Plants.

PLANTS INTRODUCED INTO THE ROYAL SOCIETY'S GARDENS DURING 1871.

Abrus precatorius
Abutilon luteum erectum
" petunicæ florum
" vexillarium
Acanthus latifolius
" spinosus
Acer tataricum
Amaranthus melancholicus ruber
Amirola nitida
Aquilegia truncata
Aristolochia labiosa
Artemisia gracilis
Azalea pontica
" " globosa
" " grandiflora
" " macrantha
" " princeps
" miniata
Bahia lunata
Berberis asperima
" chinensis
" hypoglauca
" iberica
" sinensis
Betula fruticosa Gymelina
Bomaria multiflora
Bowenia spectabilis
Cassia grandiflora
Cassia Mary landica
" Senna
Caryota sobolifera
Centaurea Babylonica
" Clementii
Chenopodium scoparium
Chacnestes longipes
" officinalis
Cistus canescens
" dauricus
" incanus
" laurifolius
Clerodendron affine
Clivea nobilis
Colchicum byzantium
" striatum
" variegatum
Cotoneaster obovata
Crataegus Paul's scarlet
Crocus sativus
Cupressus Kewensis
Cydonia vulgaris
Cytisus alpinus
Delphinium Candalabrum
Dianthus deltoides
" dentosus
Diplacus Verchaffeltii
Echeveria bracteata
" retusa
Erica Candolleana
" Gilede
" Peteveri
" physoides
" stricta
" vagans
" willmoreana
Erinus alpinus albus
Erodium Muscarii
Gaultheria Shallon
Genista aphylla
" virgata
Gentiana acaulis
Gillia linifolia
Gloriosa virescens
Godetia Whitneyii
Grevillea manglesii
Helenium grandiflorum
Hibiscus Lambertii
Hypericum Kalmianum
Iberis tenoreana
Kunzea peduncularis
Leptosiphon roseum
Livistonia olivaeformis
" rotundifolia
Lonicera Xyltosteum
Lycium Ruthenicum
Macleana calcagalli [globosa
Menziesia polifolia purpurea
Myrica cerifera
Ophiopappus rubiginosus
Papyrus antiquorum
Pharbitis Huberii variegata
Philadelphus Gordonianus
" grandiflorus
" " florabundus
" " laxus
" " speciosus
" tomentosus
Phleum pratensis variegata
Phytosperma Alexandrae
" rubicola
Poa pratensis variegata
Pyrethrum Schihatchewii
Pyrus sineusis
Rhus copallina
Rhus toxicodendron radicans
Ribes glutinosum
" atrosanguineum
Rubus Balfouriana
" biflorus

Rubus Borrerii
" Cordifolium
" leucostachya
" Lindlyanus
" Macronulatus
" occidentalis
" parvifolius
" rhamnifolius
" rudis
" Sprengelii
" suberectus
" thyrsoides
Salvia candalabrum
Schizanthus papilionaccus
Silene Schafta
Solanum robustum
Spiræa canescens
" canœfolia
" nutans argentea
" Nobleana
" opulifolia
" opulifolia nana
Statice spicata
Tacsonia Dr. Wylde
Thunbergia javanica
Tilia europæa glauca
Venideum calendulaceum
Ziriphus mucronulatus

ROSE.

Baron Gonella
Camille Bernardin
Charles Rouillard
Climbing Devoniensis
Elie Morel
Fisher Holmes
Lady Emily Peel
Leopold Hausburg
Lord Herbert
Madame Barriot
" Boutin
" Calliat
" Jeanne Marix
" Pulliat
Souvenir d'Elise Varden

GERANIUM.

Carolina Longfield
Countess of Warwick
Duke of Edinburgh
Grand Duchesse Marie
L'Elegant
Madame Rose Charneaux
Princess Thyra
Rose Rendlater
Sparkhill Beauty
Sunset
Surpasse Beauty Suresnes
Tom Peuce Cerise
William Pfitzer

COLEUS.

Acquisition
Bewitching
Hon. Mrs. DuCane
Matchless
Prince Leopold
Refulgens

RANUNCULUS.

Calypso
Cicoque blanc
Enchantress
Fireball
Gloria Mundi
La Merveille
Leon d'Orange
Ophir d'Or
Orange Maxima brilliant
Perle blanc
Persiana
Regina Flora
Rougeater
Saturnus
Temple Van Opollo
Theodora
Utopia

F. ABBOTT, Jun.

PRINTED AT THE "MERCURY" STEAM PRESS OFFICE.

MONTHLY NOTICES

OF

Papers and Proceedings

OF THE

ROYAL SOCIETY

OF

TASMANIA,

FOR

1872.

TASMANIA:

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

1873.

Contents.

Errata.

Page 23.—Presentation No. 2. For "addressed Lord Monteagle," read "addressed to," &c.
Page 31.—Third line. For "increasing," read "increase in."
Page 86.—Thirty-fourth line. For "Eclimus" read "Echinus."
Page 87.—Fourth line from bottom. For "seeding" read "seedling."

ROYAL SOCIETY.

MARCH, 1872.

The first evening meeting of the Society, for the present session was held on Tuesday, the 12th March, M. Allport, Esq., V.P., in the chair.

Among the Fellows present were Dr. Agnew (Hon. Secretary), Dr. E. S. Hall, Messrs. Justin Browne, T. Stephens, J. M. Clarke, J. Macfarlane, John Macfarlane, A. G. Webster, L. R. Castray, L. Susman, C. Belstead, F. Abbott, jun., J. Rule, G. R. Napier, J. Barnard, F. Abbott, sen., &c.

Mr. Frederick George Howell, who had been previously nominated by the Council, was, after a ballot, declared duly elected as a Fellow of the Society.

The SECRETARY submitted the following monthly returns :—

1. Visitors to Museum during January, 1,506 ; during February, 1,252.
2. Ditto to gardens ditto, 3,180 ; ditto, 2,089.
3. Time of leafing, flowering, and fruiting of a few standard plants in Society's Gardens during February.
4. Books and periodicals received.
5. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.—Tables, &c., for January and February.
2. Port Arthur, from A. H. Boyd, Esq.—Ditto.
3. Swansea, from Dr. Story.—Ditto.
4. Westbury, from C. Belstead, Esq.—Ditto.
5. Lighthouses and other stations on Tasmanian coast, from the Hobart Town Marine Board.—Monthly tables from July, 1870, to December, 1871.
6. Sydney, New South Wales, from the Government Observer.—Printed tables for October and November, 1871.

The SECRETARY read an analysis of the Meteorological observations for Hobart Town, with a health report for the month, by Dr. E. S. Hall.

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

1. From Miss Burgess.—Skin of a large Bengal Tiger *(Felis tigris)*, killed by the Hon. R. H. Drummond, Commissioner of Bareily, and Captain Burgess in 1851.
2. From Captain Williams.—Shells from East Coast of Tasmania.
3. From Mr. Montgomery.—A Belgian Canary, prepared and mounted.
4. From Mr. P. Allen.—An almond tumbler Pigeon, prepared and mounted.
5. From Mr. W. Legrand.—A large sponge from Recherche Bay.
6. From Hon. J. Maclanachan, Esq.—A Hen Pheasant.
7. From Master E. Hood.—Three Eggs, probably of a species of Petrel, from Bird Island.
8. From Mr. J. W. Kellaway.—Two hair balls from the stomach of a calf.
9. From Mr. Williamson.—A boulder taken from the solid rock at Anderson's Quarry.
10. From Mr. R. J. Ross.—Two specimens of the Indian Boa *(Python tigris)* from Ceylon.

11. From Mr. Rayner.—A Hawk with unusually coloured plumage shot at River Styx.
12. From Mrs. T. Giblin.—Two green operculæ of shells *(Turbo sp.)* from Fiji.
13. From Master Allport.—An Irish farthing, George III., 1806.
14. From Master Hull.—Nest of the White Eye *(Zesterops dorsalis.)*
15. From the Rev. H. D. Atkinson.—Rock specimens from Trial Bay. One specimen of Carboniferous Limestone, with fossils, from Arch Head, mouth of Huon River; sample of Iron Ore from Three Hut Point.
16. From J. Meredith, Esq.—Skin of a Musk Duck *(Biziura lobata.)*
17. From Mr. H. Owen.—A Japanese Coin.
18. From Mr. W. Blythe, Honeywood.—Skin of Black Snake (*Hoplocephalus curtus*).

The SECRETARY directed the attention of the meeting to a large and valuable donation of books lately received from the Government of the United States, and from the Smithsonian and other scientific institutions in America. He also informed the meeting that, in consideration of the very liberal presents which have on various occasions been received from America, it had been determined, at a late meeting of the Council, to have a case set apart in the Library, and appropriately labelled, for their reception.

The following valuable publications presented by the Royal Astronomical Society of London, in continuation of a former donation, were also brought under notice :—

Monthly Notices of Royal Astronomical Society, vols. 28 to 31 inclusive (1867 to 1871), with Index to first 29 vols. (1827 to 1863).

Memoirs of Royal Astronomical Society, vols. 35 to 39 inclusive (1865 to 1871).—Index to first 38 vols.

As to the specimens sent by the Rev. H. D. Atkinson *(Presentation No. 15)*, Mr. ALLPORT remarked that they were of great interest as giving some reason for believing that the mineral bearing Silurian Rocks are to be found six miles nearer Hobart Town than heretofore supposed. The felspathic rock was apparently identical with that found at Port Cygnet, and which seems to be there associated with the small quantity of gold, and traces of copper found in the neighbourhood. The dark coloured sedimentary rock which comes from the same place had not yet yielded any fossils, but Mr. Atkinson was fully aware of the importance of searching for them as they alone could positively determine the geological age of the formation in which the felspathic porphyry occurs. He had hoped Mr. Atkinson would have been present at the meeting, but in his absence begged to call attention to the following extracts from a letter received from him on the subject :—

"I write to say that the rock of which I brought up specimens is much more extensively distributed than I expected. I have traced it up two creeks at Oyster Cove, and have seen some boulders excavated from a shaft fifteen feet deep. I am of opinion that it is Felspar Porphyry, and I believe the rocks at Oyster Cove, &c., are of the same formation as the Port Cygnet specimen.

"The Felspar Porphyry (if it be so) underlies the carboniferous series at Oyster Cove, Little Oyster Cove, and Trial Bay; the rock immediately overlying it is a sort of clay slate (vide specimen) about 200 feet thick. In several places the Porphyry (?) seems to merge into *Trap* which is the characteristic igneous rock of the neighbourhood."

Mr. STEPHENS fully endorsed the remarks made by Mr. Allport as to the interesting character of the rock specimens from Oyster Cove, one of which closely resembled the felspar porphyry of Port Cygnet, but from atmospheric exposure had undergone partial decomposition. As

to sedimentary rocks, it was necessary to use great caution in expressing an opinion upon the age of any rocks in which no fossils have been discovered, but the characteristic flexures of stratification, and direction of strike would often help to distinguish between rocks of upper and lower Palæozoic age. In the older rocks it was often very difficult to detect any fossils, although some, especially the limestones, were fully charged with the remains of teeming organic life. In such cases the indications of shells, corals, and other bodies embedded in the rocks, had been obliterated by a partial metamorphism. One might examine for hours the freshly broken surface of such rocks without finding a trace of any fossils, and there would be little chance of success except in those portions which exhibited a weathered surface. Here the traces of the embedded organisms might often be detected standing out in low relief, the result of atmospheric disintegration. As an instance of this Mr. Stephens exhibited a weathered fragment of limestone recently obtained from the Black River, Circular Head.

In reference to presentation No. 18, Mr. STEPHENS observed that it was interesting, as it showed in a very marked manner the appendages (? rudimentary extremities) near the vent, which some writers have supposed to be confined to the Pythonidæ and other harmless snakes. Fatal mistakes might be committed were this supposition acted on as correct, as probably no more deadly snake than our black one *(Hoplocephalus curtus)* is found in these colonies.

Mr. ALLPORT remarked that these appendages were very common in our black snakes.

A fine specimen of flax grown at the Huon, and an enormous sunflower, in reference to which a paragraph appeared in *The Mercury* a few days ago, were brought under the notice of the meeting.

Mr. M. ALLPORT read a letter from the Secretary of the Royal Museum of Natural History of Belgium, returning thanks for our "Papers and Proceedings," and specimens of Natural History, forwarded by the Society and by Mr. Allport himself. The Secretary referred to other Societies in Belgium which would be happy to make interchanges with us.

Mr. F. ABBOTT, senr., read some notes on the Results of five years' Meteorological Observations, made at his private observatory, Hobart Town. With these were included the twenty-five years' Results already published, the whole being a series of observations extending over a period of thirty consecutive years, and terminating at the end of 1870.

Dr. HALL, read a very elaborate and carefully drawn up paper on the Climate and Vital Statistics of Tasmania for fifteen years, 1857—71. Introducing the subject the author observed that the Royal Society of Tasmania might well be proud of its Meteorological publications, as he could state that they were greatly commended by the highest authorities on the subject at home. The abstracts now before the meeting embraced an uninterrupted series of observations far beyond that possessed by any other British Colony. They show incontestably that although the climate of Tasmania has always been recognised as being salubrious it is so in reality to a higher degree than we have hitherto supposed. Its advantages to invalids and others have indeed been underrated, and it would be conducive to the bests interests of the colony if this fact were made more generally known. Accurate statistics of all kinds were valuable, but none were of such personal interest to each of us as Vital Statistics, bearing as they do on the probabilities of human life at all ages; with the influences, favorable or unfavorable, exerted upon it by surrounding circumstances. The intelligent recognition of these influences, with their mode of action, was of the first importance to the Sanitarian, whose object was the promotion of the

public health. Without this great boon of health, even wealth and position were but of little avail to their possessor, or, to go further, "What," as has been facetiously remarked, "is the whole world to a man whose wife is a widow?" (A laugh.) He (Dr. Hall) was glad to take the present opportunity of heartily thanking the officers of the Registration Department for the great courtesy he had invariably received from them, and he would especially name Mr. Seager, who had on all occasions afforded him the most willing and valuable assistance in searching the records of the office.

Mr. BARNARD moved a vote of thanks to the donors of presentations, with special thanks to Mr. Abbott and Dr. Hall. Dr. Hall's communication, he observed, was one which concerned our most vital interests, and was of such a nature—involving as it did such long and elaborate calculations and comparisons—that nothing but the fact that it was a labour of love could have enabled him to carry it on to completion. We were much indebted to him for the proofs that our climate is the finest of that of all the Australian colonies, and the most conducive to long life. To have this generally established must be of benefit to the colony, and it would redound to the credit of the Royal Society to be the means of propagating such information. With the names of Dr. Hall and Mr. Abbott he would associate that of the Curator of the Museum, Mr. Roblin, the value of whose assistance in making the innumerable calculations and reductions required for these returns, was only known to those who were engaged on the subject.

The motion was supported by Mr. GIBLIN and others, and carried unanimously.

The Secretary having intimated that the Microscopical Meeting had been, unavoidably, postponed till the month of May, the proceedings terminated.

APRIL, 1872.

The monthly evening meeting of the Society, was held on Tuesday, the 9th April. M. Allport, Esq., in the chair.

In addition to the members of the Society, the following visitors from Victoria, were present, viz. :—Messrs. Wanliss, of Ballarat, and Lewes, of Geelong.

E. C. Nowell, Esq., who had previously been put in nomination, was after a ballot, declared duly elected a Fellow of the Society.

The Secretary brought under notice the usual monthly returns, viz :—

1. Visitors to Museum during March, 1075.
2. Ditto to Gardens ditto, 1813.
3. Plants and seeds sent from Gardens ; to Botanic Gardens, Adelaide, 66 plants ; to Botanic Gardens, Cape Town, Cape of Good Hope, 20 packets seeds; to Mr. Wilson, St. George's Park, Port Elizabeth, 25 packets seeds ; to Dr. Hooker, Royal Gardens, Kew, 60 packets seeds.
4. Plants received at Society's Gardens—From Mr. Salier, one case plants from Howe's Island.

Meteorological Returns -

1. Hobart Town, from F. Abbott, Esq., Table, &c., for March.
2. Port Arthur, from A. H. Boyd, Esq., ditto.
3. Westbury, from F. Belstead, Esq., ditto for February.
4. Sydney, from the Government Observer, printed Tables for December, 1871, January, 1872.

The Secretary read the usual "Analysis of the Observatory Records, with a Health Report for the Month," by Dr. E. S. Hall.

The presentations to the Museum were as follow :—

1. From Mr. R. Gatenby, Macquarie River :—A small "Tiger Snake," (*Hoplocephalus curtus*) ; a "Grass Snake." (Probably a young specimen of *Hoplocephalus curtus*) ; forty-eight eggs taken from a Black Snake (*Hoplocephalus curtus*), eggs of so called "Iguana" of Tasmania (*Cyclodus nigroluteus*), two Lizards (Tasmanian), one ditto from Kemp's Lake, two Rock Lizards, a Lizard (*Gecko*) from Ballarat, tongue of Echidna, round worm (*Ascaris sp.*) from intestines of Kangaroo, a deformed Kitten, chrysalis of Moth, Centipedes and Scorpions from Ballarat.
2. From C. M. S. Chichester, Esq.—A specimen of the recently discovered species of Volute (*Voluta Elliotti*) from Western Australia.
3. From Mr. W. Peacock, Sorell.—A Pelican (*Pelecanus conspicillatus*).
4. From Mr. J. G. Kroskel.—A Brazilian silver coin (Mille reis.)
5. From Mr. Niels C. F. Solomon.—Five Danish coins, (3 copper, 2 bronze.) A fossil Echinus, and Flint Arrow Head from Denmark.
6. From Mr. G. Taylor, Valley Field.—A White Hawk, (*Leucositta Novæ Hollandiæ*).
7. From Mr. Littlechild, Lindisfern.—4 Spine-tailed Swifts, (*Acanthylis caudacuta*).
8. From Mrs. Hebblewhite.—A portrait of Dr. Leichardt, framed and glazed.
9. From J. W. Graves, Esq.—A freshwater Crayfish, from Gordon River, Macquarie Harbour.
10. From Mr. F. Ellwell.—Sample of Copper Ore, partially smelted in a blast furnace. Probably from Adelaide.
11. From Mr. W. Legrand.—Specimen of the rare spotted Irish Slug (*Geomalacus maculosus.*)
12. From Mr. O. H. Hedberg.—The Atlas of a Sperm Whale.

The Chairman remarked that he had received the following very

interesting communication on Pisciculture in Tasmania from Judge Francis, who would be recognised by all as an authority on the subject, and he had much pleasure in bringing it under the notice of the meeting :—

"My Dear Sir,— You know how fully I have shared your wishes and hopes with regard to Tasmanian pisciculture. I have now seen a good deal of its very satisfactory results, and am sure you will listen favourably to a few suggestions for rendering its success even more brilliant."

"As regards two of the fish now thoroughly naturalised, the tench and the perch, everything seems to have been done to establish them in their appropriate waters. Only I think some pains should be taken to make the people of this island aware that they are not summer fish. I have heard several persons complain that specimens which they have tried have not been good fish for the table. They catch them, say in December, when lank and sickly after spawning, and then wonder to find them soft and flabby. It would be wonderful were they otherwise. Reckoning by analogy from their respective times in England the perch ought to spawn in October, and the tench towards the end of November. The tench "comes round" I think the quicker of the two, and I have little doubt that both of them, for various reasons which your own better knowledge will supply, recover flavour and firmness quicker here than at home. Still, March should be regarded as the earliest month in which either can be really in season, and both will be at their best during the winter months. Perch-fishing *in the deeps* from May to August ought to give excellent sport followed by a no less excellent repast. Tench I have caught chiefly in soft cloudy spring days ; they are good about up to their spawning time. If caught in a muddy water they should be kept a week or a fortnight—the longer as their colour is darker—in the clearest water obtainable a hoop-net or rabbit-hutch makes a good purgatory.

"We come now to the trout. These are doing remarkably well in point of size, and fairly, though very unequally, as regards number. In accounting for this difference, I should say generally that I think the stock have been placed too much in the lower and heavier reaches of the rivers, and not supplied liberally enough to the upper, fleeter, waters, where the best spawning beds are mostly found. No doubt this is in a measure remedied by the ascending instinct of the fish towards breeding-time ; but this rarely carries them far, and is weakest in the case of heavy, well-fed fish like those of the Derwent pools. I have no doubt, for instance, that a vast deal of unproductive spawn has been deposited in coarse stony gravels in the lower reaches of the Derwent, Ouse and Clyde. In all these, the deeps—those of the Derwent especially—contain very large trout, but there are no small trout, or next to none, on the shallows where they ought, by this time, to be swarming. On the other hand, the fish turned out in the upper waters of the Clyde have multiplied greatly. So have those in the Russell's Falls stream, which affords fleet water and good breeding ground from its very mouth. I know also one or two rivulets where they are doing well. On these grounds I would strongly recommend that of the next disposable stock a supply should be sent : First to the neighbourhood of Dunrobin Bridge, and that of the fine gravel beds near the mouth of the Styx. Secondly, to the Ouse, say a mile and a half above Cawood. Thirdly, to the Russell's Fall stream, some way about the Fenton Forest dam. The ford, where the road crosses about $4\frac{1}{2}$ miles from Fenton Forest, would be an excellent place. If more should be available then, turn some out as far as may be above the 'Cataract,' which is passable for salmon, but not for trout. You know all about Lake St. Clair, and

I will merely remind you that the roughness of a road is the greatest possible help towards conveying trout alive. As long as the tubs or cans containing them are well jolted about the water will be constantly aerated, and the fish kept in health. If any be carried up to that noble lake they should be turned out on the gravels at the upper end where the feeder enters, that they may be near their spawning ground. A few hundred fish would I think be well bestowed on the Lachlan above the point whence the supply for New Norfolk is dammed off. They have bred below, but the bed is too stony and the waters too hungry for any great results—there is much better feeding as well as breeding water above the fall. Four or five miles up the Styx is another likely place.

"I must again urge what I pointed out before, the importance of having—not necessarily at the Plenty, but somewhere—a feeding-pond for the stock-fish, where they may be nursed till they are 4 or 5 inches long; large enough to be safe from all finned enemies, especially from those abominable sand-fish. This plan would also, I am convinced, save them a year by bringing them earlier up to the breeding point. I will not here enter into details as to such a pond, but should much like to talk the matter over with you and some other earnest *ichthyotrophists* (?)

"Before quitting the trout question, I wish to say a few words as to the Plenty, which has had great advantages in being early and well stocked, and will always be the stream resorted to by visitors who long to kill a trout and have but few days to spare. That stream—I speak advisedly—was most abominably poached last season, and large captures made with the silver hook after the stream had been plundered. I believe the evil has much abated during the season now drawing to a close, but still the show of fins is not what it ought to be, especially on the upper waters. Better watch ought to be kept, and some of the long shaded pools, fit only for the night-line, ought to be carefully staked, a process with which I am practically familiar. But beyond this, it ought, I think, owing to its peculiar history, to be kept distinctly as a sportsman's river, and fished only with the artificial fly. This restriction, once established, and the stream well looked after, there will be fish for the fair angler any day and every day throughout the season, which in that river at least ought to close with the 31st of March. I hear it said that such a rule could not be enforced, I can only reply, that it is enforced without difficulty in many English streams, and that sundry visitors to the Plenty have expressed their regret and surprise at its absence. The long deep below the bridge, which is in effect a part of the Derwent, might still be left for the grasshopper. I take this opportunity of assuring you from my own experience that large fish—larger than the Plenty (which is not a first-rate feeding-water) can ever bring to perfection—may be caught with the fly in Tasmanian streams; the lakes are yet untried, but fly-fishing in these is always comparatively simple.

"There is nothing at present to be said about the sea trout. Whenever they become pretty numerous they will make themselves seen and felt. But with regard to the salmon, I am very anxious to see something done, and that speedily. There may be some in the river even now; any day may bring news of a capture. But having never seen or heard of a parr or a smolt, and having in vain looked long and often for the break of a 'fish,' I cannot think that salmon are numerous, or have bred freely. Surely it could do no harm to make assurance doubly sure by a fresh importation of ova for two or three years in succession. This would not only render the successful acclimatisation of that noble fish a certainty, but would afford an opportunity for trying with *salmo salar* the same experiment of breeding in confinement which has proved so brilliantly successful in the case of *salmo trutta marina*. With the larger

as with the smaller migratory species constant feeding may prove an effective substitute (as far as propagative vigour is concerned) for migration to sea-water. To establish this principle, and reap all the practical advantages of its application, would be a great triumph for Tasmanian pisciculture. And I cannot but think that so near the salt-water the experiment might be aided by supplying the detained fish with shrimps and other marine diet.

"I fully admit that the question is mainly one of pounds shillings and pence. A sum of not less than £500 should be raised by private subscription before any further call is made on the public revenue. The amount sounds large, but I feel sure it could be raised if the right men were appealed to in the right way. In the course of a little casual canvassing for this object, I have met with a great deal of encouragement from Tasmanians, and am convinced that many who like myself have derived health and enjoyment from their occasional visits to the island will also gladly become subscribers. Indeed, I believe that on the one hand the requisite funds will be forthcoming if the enterprise be purely Tasmanian, while on the other hand Melbourne would gladly join in the enterprise should her co-operation be invited. And it should be remembered that the repetition of a process which has twice been carried through with perfect success will be neither so costly nor so difficult as the original experiment, The great point will be to set the subscription on foot without delay, and to communicate with England if possible by the next mail. There should I think be two subscription lists, one for residents and another for visitors ; the latter class of subscribers may else be discouraged by the large amounts which some Tasmanians will, I know, contribute. Before quitting the salmon question, I wish it to be clearly understood that I still believe there are some salmon, though but a few, in the tideway and the river. But this, as I have already said, is no reason in a matter so important why we should not "make assurance doubly sure ;" and accelerate a result which if in course of attainment is still being arrived at very slowly.

"And now let me revert to our friends the trout. Generally, I would urge that with any stock-fish turned out hereafter, the neighbourhood of good gravel beds should be especially attended to. Had the fish thus far been placed where they could have bred as freely as they have fed they would have been swarming. The fishing season should, I think, also be modified. For a year or two to come, it might with advantage be limited to the 5 months from November 1st to April 1st ; after that, October 10th to April 10th, would be a reasonable extension for all streams but the Plenty, which, as long as it continues the head-quarters of the establishment, should be exceptionally restricted. By the way, it would be an excellent thing if mullet fishing were also stopped from April 1st until, say, September 1st. These delicious fish are now reappearing, and will again, the trout notwithstanding, become numerous throughout the island if treated fairly and not killed wholesale when spawning or "shotten."

It would much raise the general estimate of your naturalised fish if people knew when they are in season (of which I have spoken already) and also how to cook them. The trout served up at the farewell dinner to the late Governor were left soaking in cold water for hours after they were gutted ; a blunder worse than many crimes. No fresh water fish —a trout least of all—should be washed after opening. They should be wiped out with care, and if boiled, be plunged at once into boiling water pretty strong of salt. Fish up to 1½lbs. may be fried or boiled ; above that size, boiled or baked. A large trout is much improved for the table by crimping the instant he is killed. A very large one may be cooked in thick slices like a salmon. If people will have sauce, caper

sauce, or a very little anchovy sauce, in cream, suits the trout best. But I must pull up here, especially if my remarks are to come before a learned body! Seriously, I ought to apologise for a very loose and rambling scrawl; but the fact is, that I can write but half-an-hour at a time, and I find it difficult to keep any order in my remarks. Perhaps, however, they may still contain something useful; if so, pray deal with them in any way you please. Should any active steps be taken in the matter of the salmon ova, I will be a subscriber and canvasser in my small way. Forgive me if I have tried your patience, and believe me, my dear Sir,

"Yours very faithfully,
"H. R. FRANCIS.

"Morton Allport, Esq.

"P.S.—I still am strongly of opinion that the man who should import the larvæ of the Green Drake, and also those of some of the larger English *Phryganiæ* (*e.g.*, the Stone-fly and Alder-fly) would deserve well of Tasmanian pisciculture. All the *Ephemeræ* I have seen here have been very small; *Phryganiæ*, none. They could be brought in an aquarium without difficulty—they both retain their aquatic state very long."

Conversation ensued, in which many of the Fellows present, as well as the visitors from the neighbouring colony, took part. As to a fresh importation of salmon ova the general opinion was that it would be impracticable at present to raise the amount of money required, and Mr. M. Allport thought that the introduction of *Ephemeræ* on a scale to be of practicable benefit was accompanied with so many chances of failure that it was not likely to be undertaken.

A suggestion, which met general approval, was made to the effect that the introduction of ova to stock one of our large rivers—the Huon, Gordon, or Davey—might be undertaken by an English company, if the sole right of fishing such river or rivers was secured to them.

Mr. Justice DOBSON, after referring to the value of some of the presentations, and to the interest attached to the paper which had been under discussion, proposed the usual vote of thanks. This having been carried the meeting terminated.

MAY, 1872.

The monthly evening meeting of the Society was held on Tuesday, the 14th May, M. Allport, Esq., in the chair.

R. J. Lucas, Esq., who had previously been nominated by the Council, was elected by ballot as a Fellow of the Society.

The SECRETARY, Dr. Agnew, submitted the usual returns for the past month as follows :—

1. Visitors to Museum, 1,100.
2. Ditto to Gardens, 1,771.
3. Plants received at, and sent from, Gardens.
4. Leafing, &c., of a few standard plants in Royal Society's Gardens.
5. Books and periodicals received.
6. Presentations to Museum.

Meteorological Returns—

1. Hobart Town, from F. Abbott, Esq., table, &c., for April.
2. Westbury, from F. Belstead, Esq., tables for March and April.
3. Swanport, from Dr. Story, tables for February and March.
4. Melbourne, from R. J. L. Ellery, Esq., printed tables for February.
5. Sydney, from H. C. Russell, Esq., B.A., ditto.
6. New Zealand, from the Government, tables for November.

The SECRETARY read Notes on the Meteorology and Mortality of the Hobart Town Registration District during the month of April, 1872, by E. Swarbreck Hall.

The presentations to the Museum were as follows :—

1. From J. Whitehead, Esq., M.H.A., specimen of the Australian Egret, *(Herodias alba.)*
2. From J. Maclanachan, Esq., M.L.C., a specimen of the "Green Leek" Parrakeet of New South Wales (*Polytelis barrabandi.*)
3. From Mr. J. Watson, Muddy Plains, a pair (M. and F.) of Widgeon, or White-eyed Ducks (*Nyroca Australis.*)
4. From Dr. Huston, New Norfolk, a pair of Paradise Ducks of New Zealand.
5. From Mr. G. Paul, a mass of drift conglomerate, from near Bridgewater.
6. From Revd. H. D. Atkinson, Two specimens of Echini from Three Hut Point.
7. From Mr. Manion, specimen of Copper Pyrites from Adelaide.
8. From W. Hodgson, Esq., M.H.A., Burnside, a specimen of the Native Bread.
9. From Mr. Aldred, curiously shaped Fungus from Watchorn's Hill.
10. From Mr. Simpson, a Butterfly Gurnard.
11. From Mr. Maning, a ditto ditto.
12. From Mr. G. Everett, Cape Barren Island, per Mr. Legrand, curious abnormal growth of Horse's Hoof from Preservation Island, Bass's Straits. (No particulars furnished with this specimen.)
13. From J. Barnard, Esq., Catalogue of Agricultural Exhibition, New South Wales, 1872; six specimens of auriferous conglomerate from Rouse's Paddock gold diggings, Guntawang, Mudgee, New South Wales ; specimen of Auriferous Quartz from ditto ; 2 specimens of Sandstone with dendrites ; sample of Gum of an indigenous forest tree of New South Wales.
14. From Mr. Conrad Sidelin, 250 Danish coins (silver and copper.)
15. From Mr. Wickborg, skin of a Toucan from Brazil.
16. From Captain Williams, a Bittern (*Botaurus Australis*), from East Coast, Tasmania.

Mr. E. C. NOWELL read a paper on Political Economy. The author threw out some suggestions as to the education of our youth, which, if carried out, would, he thought, be of great practical value, especially to those who in future might be called upon to take a part in the work of Government. Touching the labour question, he indicated certain arrangements which might be effected, and which he thought would be of mutual benefit to employers and employed, &c.

No discussion ensued, as the members were obliged to proceed to the Microscopical Exhibition which was being held in the Museum, a detailed report of which appeared in *The Mercury* of the 15th inst.

The Microscopical meeting was largely attended by visitors (introduced by members) and a great number of interesting objects were brought under notice. Thirteen microscopes were exhibited. The exhibition, which was both scientific and popular in character, afforded the greatest satisfaction, and at its close hopes were generally expressed that the Society would be enabled still to continue in the future years to hold similar meetings as heretofore.

A vote of thanks to the author of the paper, and for the presentations, terminated the proceedings.

POLITICAL ECONOMY.

By E. C. Nowell, Government Statistician and Clerk to the Legislative Council. Read 14th May, 1872.

Few subjects are so generally misunderstood as political economy; and not only among the masses is ignorance of its simplest principles found, but even among those who aspire to be the leaders of public opinion. And yet, no branch of knowledge is more necessary for that large class of men whose province it is to direct or to influence the destinies of States by wielding the Executive and Legislative powers, by instructing the people, and by ministering in the way of commerce, to its wants. Our educational systems are much to blame for this defect. For while such sciences as philology, geology, botany and zoology, which have a *comparatively* remote bearing on the welfare of a country, receive, and justly receive, a full share of attention, that of political economy, which closely concerns the supply of our physical wants, and in consequence, our material well-being, and has even an important bearing on our moral condition; which shows how communities are bound together in the bonds of brotherhood by the ties of a common interest, teaching in the most practical manner that each is but a part of the whole; and how on the other hand by setting itself in antagonism to the laws established by supreme wisdom, mistaken self-interest not only breeds discord between different countries, but causes a serious loss of national wealth,—this science, I say, has been greatly neglected. "God meant man," says one of the most able and earnest of living writers, "to learn more and more continually of his need and ministry of other men for the completion of his life. He meant to bind the tribes and the nations together in a sweet interchange of gifts and influences, man leaning on man, people on people, continent on continent, each increasing the other's store, and gaining in return increase of its own. . . . .

"Commerce has failed signally in her peaceful and benign ministry, because her activity has been degraded into a selfish scramble for profit. She will never comprehend her true position until she understands that she holds a commission from God to minister to the brotherly intercourse, and to cement the brotherly relations of men." ["Buying, Selling, and Getting Gain," by Rev. J. Baldwin Brown, p. 9.]

If the mission of Commerce be so lofty and so beneficent, the laws to which it is amenable, it must be an object of the deepest importance to discover; and this is one of the branches of Political Economy.

Could men be induced to act upon these just and noble

conceptions of commercial ethics as applied to the relations of States, there can be no question that the interests of all parties concerned would be greatly promoted. A miserable example of the contrary we have in the mode adopted of dealing with the subject of the border duties as between New South Wales and Victoria; and, in a less degree, in the war of tariffs between the colonies generally. The only remedy for such a state of things is to observe in affairs of State the same rule as all men of high morality consider themselves bound to observe to individuals—that is, to treat them as they would themselves wish to be treated. A thorough, intelligent study of the principles of political economy will demonstrate that the commercial intercourse of individuals and nations is quite as much promoted by the practice of the great Law of Love as is their moral welfare. It is an old idea that commerce is the handmaid or pioneer of civilisation; and Livingstone wisely made it a part of his scheme to establish commercial relations with the natives before he set about the task of Christianising them.

The older countries have had to work out through centuries many a social and commercial problem, and have arrived at a satisfactory solution only after many mistakes. The facts thus gained often stand instead of principles,

> "Till old experience do attain
> To something like prophetic strain;"

axioms become established; opinions fixed; and there is a practical creed from which public men do not think it safe to depart unless for well considered reasons. But in new countries the case is different; the circumstances are novel, the conditions varied; and the mind needs a special education before it can realise the fact that there are certain *fundamental* principles at work deep down below the surface of things, which are the same in all countries, in all ages, and in all circumstances. In the old countries there is a large sprinkling of men whose minds, even if they have had no special training, are yet prepared by high cultivation to appreciate the force of the abstract truths of philosophy; but in the new, the number is much smaller, and the general tendency is to superficiality, the result of very imperfect acquaintance with first principles; and it is therefore far more necessary in the latter that a science of such vital importance in Government and legislation as political economy, should be made a part of the higher studies of youth. It has always appeared to me, therefore, to be a serious defect in our Tasmanian Council of Education and Scholarships Act, and in the regulations made under it, that they do not include Political Economy in the subjects of examination prescribed

for the Scholarships and the Associates' Degree. If we are ever to ensure a succession of men really fitted for the work of dealing with public affairs, it is only in this way that they can be obtained. Our lawyers must study law, our doctors must study medicine and surgery, our clergy must study theology and bibliology, and give proof of competent knowledge of those subjects before they are allowed to enter their several professions, in order that the interests of the public may be protected against the wild work of ignorance. Why then should state-craft be the only profession in which no special preparation—no study of its principles—is demanded?

The lawyer, the doctor, and the clergyman, deal with individuals only; the statesman with the whole population and interests of a country. To require from the three first a particular training, but from the last none,—is it not to allow that a part is greater than the whole? As long as the governing body in the State is chosen by the popular suffrage, it is of course impossible to bring it about that none shall be placed in a position of power but such as are prepared by a course of special training; but what I design to urge is that, as our future rulers will in the course of things be chiefly taken from those who have passed through the highest educational institutions of the Colony, it seems a public duty to prescribe such subjects of study as shall as far as possible conduce to give the youth that skilled education which he requires on his entrance into political life; and of this education Political Economy is an indispensable part.

These remarks have been suggested by an article *apropos* of the reduction of wages by the companies at the London Docks, in an English journal (*Keen's Bath Journal*, December 2nd, 1871), in which these passages occur:—"Labour insufficiently paid by those who have its profits is not political economy in an enlarged sense. It is not political economy in the sense of those who relieve the poverty consequent thereon." "What a difference then is there in political economy as to practice!" "Political economy individually considered is one thing; but nationally considered, it is somewhat different. While it is prudent for everyone to sell in the dearest market and buy in the cheapest, this alone would not be political economy in the true sense." "Political economy in this sense would profit the employers; but it would be at the cost of the London charities and of the nation." "Political economy for the nation is the prevention of pauperism and crime, and the sustentation of the working power of the country."

There is here a confusion of ideas, by which the abstract is put for the concrete. Mathematics do not build a bridge,

although it is perfectly true that a bridge is built upon mathematical principles; neither does political economy regulate the affairs of trade and commerce, or make or mar the welfare of a people, although it is wise to be guided by its principles in dealing with such subjects. It is in consequence of this misapprehension of the nature and scope of political economy, that it has been decried as visionary and selfish, much as geology used to be supposed by many well-meaning people to be antagonistic to revealed religion. "Hitherto," says Newman, "the value of the science has been great in dispelling false and injurious theories, but very small in originating positive benefit: and for this it has been scoffed at; but very unjustly. The same may be said of physic and of politics. Physicians are themselves ready to allow how unsatisfactory are the practical results of their *art* in curing diseases; yet their *science* is of great value in repressing false pretenders and mischievous treatment. Were there no educated physicians among us, we should be deluged with astrology, charms, and magic. . . . In political economy the danger of quackery is immense; as the history of opinion shows; and those who have not studied systematically the works of men who have devoted themselves to the science, are (here as in other branches of human knowledge) apt to trust their own theories, and to name all others *mere theorists*." ["Lectures on Political Economy, p. 19.]

In the beginning of the newspaper article quoted, political economy is truly said to be "a science of rigid logic;" and it is that science which discovers the laws that regulate the production, the distribution, and the exchange of wealth. Newman is inclined to "call it simply *The Theory of Wealth*."

Political economy being a science, before we can fix the true limits of its functions, we must enquire what is a science? The best definition I have seen is in the Encyclopædia Britannica: "Science (*scientia*), in its strictest sense, is a body of organised knowledge, whose phenomena are arranged so as to exhibit the reasons or causes by which they are influenced, in their legitimate connection and interdependence. That science which deals with the succession of reason and consequent is entitled an *abstract* science; while that which deals with causes and effects is called, for the most part, a *natural* or *physical* science. Those sciences which are supposed to be complete are called *exact* sciences, such as geometry. But the great majority of what are called sciences —that is, all those branches of knowledge in which discovery is possible—hardly deserve the name, being only a bundle of theories or of facts, bound together with more or less exactness, and which a fresh discovery may any day untie. Science

not only sees, and sees with certainty, but the distinguishing characteristic of it is, that it *foresees*. Thus it is distinguished from *art*."

In its simplest enunciations, political economy is nearly as much an exact science as mathematics; as for example, when it lays down the proposition that *the demand creates the supply*, or that *competition lowers prices*, for these are matters of pure reason, and are universally true; but when facts have to be observed, and disturbing elements are introduced, its character becomes more mixed; but it is always a *science* still, and never an *art*.

As there is a good deal of confusion in the popular mind as to the relative meaning of these terms, it may be as well to say a few words by way of distinguishing them.

Science discovers law, and systematises or interprets facts, which are, so to speak, fragments of law. Art is the application of the principles discovered by science to purposes of utility. Thus perspective, in as far as it treats of the angles made by an object when viewed in different positions, is properly a part of mathematical science, but in as far as it is applied in the delineation of objects, it is an art. So also chemistry, when it discovers the laws which regulate the combination of matter in different forms, is a science: but when it is applied to the useful arts, it becomes itself an art. Science *discovers* or *demonstrates* something; art *does* something. Science *enunciates* principles; art *applies* them. Science is therefore theoretical; art practical. The difference between science and art is pretty nearly the same as between a theorem and a problem.

The determination of the relations existing between capital and labour may be called a theorem, and is a proper function of political economy; how to regulate them so as best to reconcile the interests of both is a problem, which is beyond its real scope.

From all this it will be seen that those persons who expect political economy to settle the disputes between capital and labour, to equalise the burdens of taxation, or *directly* to interfere in any way in government or in the social relations, simply look for that which, in the natureof things, can never be. When men are on strike, for example, political economy can never give them better wages, but it may show them the consequences of their action, and make both their masters and themselves more ready to accept a rational solution of the difficulty.

We may compare this and other abstract sciences to a monarch who, choosing to lead a contemplative rather than a practical life, contents himself with laying down, as the fruit

of his meditations, certain general principles for the government of his dominions, leaving it to his ministers and subordinates to carry them into practice. But, it may be asked, if political economy must never soil her hands with practical work ; if she be a mere abstraction—an incorporeal essence—instead of a creature of flesh and blood, bones and muscles ; of what use can she be in the ordinary work of life, and why do you plead so strongly for the study of the science as a part of our higher education ? Let me answer this question by asking another. What is the use of physiology, which is only a systematised collection of facts and inferences relating to the functions of the living body, which merely shows, in fact, how the organs work ? Yet this purely theoretic knowledge is the basis of much of the physician's practical skill, and his constant guide in the treatment of disease. And just as physiology is necessary to the physician, so political economy is necessary to the publicist in order that his practice may be founded upon correct principles.

The intention of the article upon which this paper is founded was to treat of a question of labour ; and I shall, therefore, not be travelling far out of the way if I add a few suggestions, with the view of obviating some of the difficulties in regard to labour and pauperism, which are felt in this colony.

In order to transfer the unemployed from the two principal towns into the country, where there would be a constant demand for their labour, I would propose the following plan. A labour office to be established in connection with the arrangements for dispensing State Relief, in Hobart Town, and another in Launceston. Any person in those towns in want of work should go to the Labour Office, and have his name, age, qualifications, references, number of children, and any other necessary particulars, registered. Printed forms should be sent to, and be obtainable from, every head of police, and every postmaster in the country districts, in which should be entered the name and residence of any one who might state his desire to procure labourers, the description of labour required, and any other like particulars. If the form were filled up by the police or postmaster, at the request of the applicant, a small fee, not exceeding sixpence, might be paid by him to the person performing the service for him. The forms thus filled up should be sent, franked by the Wardens, or by some one else authorised to do so, to the nearest labour office. The next step would be to select and forward suitable persons from among those registered, who are not, or from those who are, receiving relief for themselves or their families from the public funds. In the first case they might

be sent either at their own, or at their employer's expense, as might be arranged, or in order to keep them or theirs from becoming objects of charity, some help might be given from the public purse; and in the second, the State would often be a gainer by bearing the whole cost of their transit, if it were thereby relieved of all further expense on their account; but whenever the cost of transport could be recovered, it should be done. A notification of the despatch of any such person should be posted to the employer, containing a directed and franked form, on which he should be requested to note the arrival of the person so sent, then to return the form, as addressed, to the Labour Office. Any person whose passage had been paid, who had thus been forwarded to an employer, and who without valid excuse, had failed to present himself, or had left his service before the time of his engagement had expired, should, if he were found idling or begging, be sent to the House of Correction to hard labour; and with this view, the co-operation of the municipalities should be solicited. Such an arrangement could, however, be much better worked if the police were under the control of the general Government.

By thus bringing employers and unemployed into connection, the towns, where there is a surplus of labour, would be cleared of able-bodied men who are really desirous of getting work, but either know not where to obtain it, or have not the means of finding their way into the country; and those who are too idle to work, and prefer to prey upon others, would be seen in their true colours, and treated accordingly.

Relief should never be given in the form of money if it can be given in kind, and whenever practicable, a certain amount of work should be required as an equivalent, from women and children, as well as from men. The former might be employed in making up clothes, or washing for the children in the Queen's Asylum, the Hospitals and other Government establishments; the men in public works—stone breaking, &c. The avoiding money payments, the helping people to help themselves, and the exacting a *quid pro quo* in the shape of labour, would conduce to preserve the feeling of self respect, which is always impaired if it be not altogether destroyed, by the acceptance of eleemosynary aid, and to foster or form habits of industry, and might be regarded as one mode of industrial education for the more indigent classes.

A well-organised system such as that established in Boston, and described in *Macmillan* for November last, would do much to relieve the public funds, the charge upon which for

charitable purposes has increased to so serious an extent, and will probably be still further augmented.

Since these remarks were written I have met with the following passage in an article entitled "The secular studies of the Clergy," in *The Contemporary Review* for December, 1871. The writer is speaking of the value of various secular studies to clergymen:—"So too with political economy. I suppose no one can be blind to the terrible evil of English pauperism, but I am afraid a majority of the English clergy through their ignorance of political economy, are quite blind to the large share they have in maintaining and propagating that pauperism by their unwise and indiscriminate almsgiving, which is as far removed as possible from true charity. The same Apostle who wrote that famous panegyric of charity which has commended itself to the heart of all Christendom, is also he who has laid down the stern rule, 'He that would not work, neither should he eat.' The fatal encouragement of sloth and dirt, of lying and theft, of ignorance and disease, from generation to generation, through clerical neglect of this Apostolic law, has done incalculable harm to the morality and progress of the country. And, on the other hand, Canon Girdlestone's example has taught us that a careful observance of the laws of political economy may enable a man to confer permanent benefits on his poorer neighbours, instead of merely giving them continual and useless sops; for he struck at the root of the local pauperism in an overcrowded rural district, by providing means for the transfer of labour to places where work was abundant and well paid, but men scarce."*

If some such plan as this were adopted, the constant applications to Government for work by "the unemployed" would be avoided; and by equalising the supply and demand in regard to labour, the productive power of the country would be materially increased, as well as its power of consumption.

But it may be urged on the other side, that in establishing such an arrangement, Government would be overstepping the proper limits of its functions, and that supply and demand ought to be left to adjust themselves. Theoretically this is true; but the theory is pushed aside for the time by a disturbing force, just as a comet is drawn out of its orbit by the attraction of some other body. When the supply of labour in the towns greatly exceeds the

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* Until my scheme had been matured and committed to paper, I was not aware that it had occurred to any one else. That it has been tried, and has succeeded elsewhere, makes me feel the less hesitation in proposing its adoption here.

demand—that is, when work is more than usually scarce—Government is asked to provide it, and does so. But such relief is only temporary. Since then Government must interfere, the only question is, how may it do so most permanently and effectually? And the answer is—by cutting up the evil at the root, and taking measures to prevent people from becoming paupers, rather than by giving them alms when they have become so.

"A stitch in time," says the old saw, "saves nine;" and the needle of political economy, judiciously plied, may save many an ugly rent in the garments of the body politic.

ROYAL SOCIETY.

JUNE, 1872.

The monthly evening meeting of the Society was held on Tuesday, the 11th June. M. Allport, Esq., in the chair.

The following returns for the past month were brought under notice:—

1. Visitors to Museum, 1,054.
2. Ditto to Gardens 1,500.
3. Plants supplied for decoration of public places :—
   a. For Church of England grounds, Longford, 70 plants.
   b. For ditto, Campbell Town, 83 ditto.
   c. For ditto, Broadmarsh, 84 ditto.
   d. For ditto, Avoca, 55 ditto.
   e. For Jews Synagogue, Hobart Town, 64 ditto.
   f. For grounds of High School, Hobart Town, 64 ditto.
4. Plants received at Gardens. From Melbourne Botanic Gardens 100.
5. Plants sent from Gardens, per Wynaud. To Mons. J. Versehaffelt, Ghent, Belgium, six tree ferns.
6. Leafing, flowering, &c., of a few standard plants in Botanic Gardens during the month.
7. Books and periodicals received.
8. Presentations to Museum.

Meteorological Returns.—

1. Hobart Town, from F. Abbott, Esq. Table and Summary for May.
2. Port Arthur, from A. H. Boyd, Esq. Ditto for April.
3. Tamar Heads, from R. Henry, Esq. Ditto, for May.
4. Sydney, from the Government Observer. Printed tables for March and April.
5. Melbourne, from R. J. L. Ellery, Esq. Ditto, ditto.

Statistics.—

1. Statistical Summary of Victoria, from 1863 to 1870 inclusive.

The Secretary read the following note, which he had received from Dr. E. S. Hall :—

"Melville-street,
"11th June, 1872.

"My Dear Dr. Agnew,—I have had my time so much engaged, that I have not been able to complete my usual Health Report. The deaths were 51, being + 11 1-15th above the June average for the previous 15 years. Curiously enough the female deaths were one more than the male. Only 7 under 20 years old; 15, 60 and upwards. No particular disease prevalent. Great variations of temperature, the principal abnormal condition. The mean daily range of temperature being + 4·94 above the average.

"During the flood last Tuesday, I measured in my rain-gauge 5·91 inches in the 24 hours. In *all* June, 1842, had before the highest rainfall 4·41 inches. In 1854 flood there fell 8 inches in 38½ hours.

"Very truly yours,
"E. SWARBRECK HALL.

"Dr. Agnew, Hon. Secretary
"Royal Society."

The presentations to the Museum were as follows :—

1. From Mr. F. E. Nichols, Gould's Country. Two specimens of chain cut with a pocket knife from solid pieces of Honeysuckle wood.

2. From Captain Fisher, a Boa found alive on board the brig "Wild Wave," nine days after leaving Sourabaya.
3. From Mr. R. Gatenby, Macquarie River, a Native Devil (*Sarcophilus ursinus.*)
4. From Mr. Sydney Thorne, an Egret (*Herodias alba*) shot at Sorell.
5. From Mr. Roblin, specimens of Echinida and Haliotis, from East Coast, Tasmania.
6. From Mr. R. J. Lucas, a fish from Sandy Bay (*Cheironectes politus.*)
7. From Mr. G. Wilson, sample of Tin Sand from the Ovens, Victoria.
8. From Mr. Conrad Sidelin, a Copper Medal of Peter the Great of Russia; a Danish Copper Coin.
9. From the author, Baron F. Von. Müeller, Fragmenta phytographiæ Australiæ. Vol. 7.

The SECRETARY called attention to a specimen of the Whistling Duck (*Dendrocygna eytoni*), lately received from Bridgewater, being, as far as was known, the second of the kind found in Tasmania. It appeared, however, that it was perhaps becoming more common, others of the same species having been recently heard of at Sorell. It was formerly supposed their true habitat was the north west coast of Australia, where they were very common. They are also found on the lagoons in the interior (*Gould's Birds of Australia, Handbook vol. II., p. 376.*) That the range of habitat, however, of this beautiful duck extended further than was formerly supposed, was evident by the fact that it was found in New Zealand, both on the Thames on the Northern, and as far south as Otago on the Southern Island. (*See Catalogue of Birds of New Zealand, by F. W. Hutton, page 35.*)

Dr. AGNEW brought under the notice of the meeting two specimens of diatomacea (*Licmophora sp.*), discovered by Mr. Hannaford on Tasmanian algæ, and beautifully mounted for the microscope by Mr. Harrop, of Launceston.

Mr. F. ABBOTT read a paper entitled, "Observations on some additional changes which have taken place in the Nebula surrounding the star η Argus."

Discussions of a conversational character ensued, and the meeting terminated with a vote of thanks to Mr. Abbott, and to the donors of presentations.

JULY, 1872.

The monthly evening meeting of the Society was held on Tuesday, the 9th July. The Right Rev. the Lord Bishop of Tasmania in the chair.

R. Gatenby, Esq., of Macquarie River, was after a ballot, declared duly elected a Fellow of the Society.

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

1. Visitors to Museum, 1,059.
2. Ditto to Gardens, 1,345.
3. Plants &c., supplied from Gardens; to Royal Gardens, Kew, 101 packets seeds indigenous to Australian Colonies; to Public Offices, Launceston, 21 plants; to Public School, Bagdad, 60 plants.
4. Time of leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
5. Books and Periodicals received.
6. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., Table for June.
2. Westbury, from F. Belstead, Esq., Table for May.
3. Swansea, from Dr. Story, Tables for April and May.
4. Port Arthur, from A. H. Boyd, Esq., Table for June.
5. Melbourne, from Government Observatory, Tables for May.

The presentations to the Museum were as follows:—

1. From Captain Clinch—A Bow, nineteen large, and twenty-seven small poisoned arrows, a head-dress, neck ornament, &c., formerly belonging to a chief of New Guinea.
2. From Mr. Cearns—Fac simile of the letter addressed Lord Monteagle, which occasioned the discovery of the gunpowder plot.
3. From J. W. Graves, Esq.—Photographic copy of the portrait of Mr. G. A. Robinson, the protector of the aborigines.
4. From T. R. J. Ross, Esq.—A plumed Bronze Wing Pigeon (*Ocyphaps lophotes.*)
5. From Mr. Luckman, Sorell—A pair of Shoveller Ducks (*Spatula rhynchotis.*)
6. From Mr. Groom—A bronze Portuguese Coin.
7. From Mr. R. W. Stuart—Eleven specimens of Garnets found near Table Cape.
8. From W. A. B. Gellibrand, Esq.—A preparation of the gravid uterus of the Kangaroo Rat, shewing the fœtus so far advanced as probably to be within a few days of removal to the pouch.

[Mr. M. ALLPORT observed that this presentation which had been carefully dissected by the curator, was of great interest. It was known to the members that the mode of development of the fœtal marsupial was for a long time a disputed point; and even at this late date many who had not had the opportunity of studying the writings of Owen and others, still believed that the fœtus was developed on the teat in the maternal pouch. An inspection of the preparation now on the table would, however, satisfy the most sceptical that up to a certain period the fœtus was developed in the uterus. How it was removed from the uterus to the pouch and applied to the nipple was still a matter of doubt, some observers thinking it was effected by the mouth, and others by the paws of the mother. Perhaps it was effected in each way by various species according to the fitness of the formation of their mouth or paws for such purpose.]

9. From Mr. F. J. Salier—A War Canoe, from the Solomon's Island Group, South Pacific.
10. From Mrs. Willett—A small Snake, and a young Viper from the Cape of Good Hope.

The SECRETARY called attention to a specimen of iron smelted from Tasmanian ore, which had just been received through *The Mercury* office.

The Rev. H. D. ATKINSON brought under notice two shells which he thought were new, and which he obtained by dredging near Partridge Island, at a depth of thirty-five fathoms. One is a *Modiola*, and the other, Mr. Legrand thought, was a *Diplodonta*, each being a new species. Mr. Atkinson hopes to obtain other specimens of these shells for presentation to the Museum.

Dr. AGNEW exhibited an apple, from the Cascades garden ; a portion of which was covered with a growth that on a cursory view appeared to be a species of blight. Under the microscope this was seen to consist of a series of very fine filamentous stems each supporting a small sac which was the receptacle of an ovum. *(On the table were two microscopes exhibiting the object.)*

Mr. M. ALLPORT stated that the ovum was that of a small green fly, with a very brilliant eye. Mr. Swan had noticed the same deposit of ova on the leaves of the Bay and other shrubs.

Mr. GOULD called the attention of the society to some specimens of two rocks, somewhat unusual in the island, porphyries from the neighbourhood of the Black Bluff Mountain, near the Middlesex Plains; one variety consisted of felspar porphyry, characterized by small crystals of pink orthoclase felspar, and of glassy felspar ; the other is a quartz porphyry, and both differ materially from the felspar porphyry occurring in the neighbourhood of Port Cygnet, and also as elicited by recent observations of the Rev. H. D. Atkinson, at Oyster Cove. He also referred to some large specimens of Iron Pyrites, taken from a vein in the neighbourhood of the Leven, exhibiting crystallisations in the form of the pentagonal dodecahedron, which he remarked had been exploited by him to some extent in the hope of discovery of underlying ores of copper. The pyrites had been tested for gold, which it was not found to contain.

The BISHOP speaking in reference to the specimen of smelted iron upon the table adverted to the immense advantage likely to accrue to the country if the ores stated to be so abundant could be profitably worked, and asked Mr. Gould whether he had any acquaintance with the Ilfracombe district.

Mr. GOULD stated that he had carefully examined the district, and made a very full report upon it some years ago, and that it was in consequence, as he understood, of that report having attracted the attention of Mr. Lennard that this gentleman had come over for the purpose of inspecting the locality and ascertaining the correctness or otherwise of the statements contained in it. He understood that Mr. Lennard was a gentleman of practical experience in the smelting of iron ores ; and that his opinion of the quantity easily available was so favourable that he had induced a Melbourne capitalist to subsequently visit the district, who had been equally satisfied with the abundance of material, and had assured Mr. Gould that on his return to Victoria he should initiate steps for the employment of capital in the reduction of the ores and manufacture of iron in this colony. Mr. Gould considered that although some years since the prices of iron hardly permitted its profitable production in this colony, the present great increase in its value rendered worthy of very serious consideration, the question of the possibility of the production at a profitable rate of malleable iron by a direct process

by means of charcoal. The Melbourne gentleman before referred to, had estimated that charcoal could be produced in the locality at a cost of ten shillings per ton ; and if so, no doubt it would be desirable to entertain the question very fully. The ores were of two kinds, magnetic oxide, yielding by assay, 70 per cent. of iron, and brown hematite having a rather less per-centage, both are in great abundance, and their point of occurrence fully described in the report upon the iron ores of Ilfracombe, by Mr. Gould, in the library of this society.

Mr. STEPHENS said that he had to report an interesting addition to the Flora of Tasmania, a Tree Fern (*Cyathea affinis*) lately discovered on the North Coast. During a journey to Circular Head in February last, his attention was called by Mr. S. B. Emmett to an unusually tall and slender tree fern, which on examination appeared to be quite distinct from the two *genera* already described. The general character of the fern, its great height (40 feet, or thereabouts), and the mode of its occurrence brought to recollection one of a similar description discovered a few years ago in the Cape Otway ranges by a party of the Geological Survey of Victoria, and then named *C. medullaris*. The Circular Head specimen, however, differed in some points from Hooker's description of *C. medullaris*, which is common in New Zealand, but as no frond exhibiting the fructification could be discovered all speculation as to its generic character was futile. Some months later Mr. Emmett succeeded in obtaining a seed-bearing frond, and forwarded it to Mr. R. C. Gunn, who identified it as a species of *Cyathea*. Mr. Gunn forwarded the frond to Baron von Mueller who has removed all doubt by pronouncing it to be *Cyathea affinis*, under which name he also describes the tree-fern from Cape Otway. Baron von Mueller further stated that it is still an open question, which he hopes soon to settle, whether *C. affinis* is really distinct from *C. medullaris*.

In answer to a question from Mr. Gellibrand who thought that the interesting stranger must be identical with a noble tree-fern of New Zealand, which was highly esteemed as a food producer by the Maories, Mr. Stephens stated that *Cyathea medullaris* was famous for a preparation resembling arrowroot, which was obtained in great abundance from the heart of the stem.

Mr. M. ALLPORT proposed a vote of thanks to Mr. Walter Gellibrand for his very valuable and interesting donation. He was glad Mr. Atkinson had commenced deep dredging, and that he had already been rewarded by a discovery. He hoped that other naturalists would follow in the same course, as he was fully persuaded that it was one which must be attended with very brilliant results.

Thanks having been accorded, the meeting separated.

AUGUST, 1872.

The monthly evening meeting of the Society was held on Tuesday, the 13th August. His Excellency Charles Du Cane, Esq., President, in the chair.

T. Westbrook, Esq., who had previously been nominated by the Council, was after a ballot declared duly elected a fellow of the Society.

The following returns were brought under notice :—

1. Visitors to Museum during July, 1,399.
2. Ditto to Gardens, ditto, 1,542.
3. Plants received at gardens :—From Melbourne Botanic Gardens, 50 plants of the Red Gum of Victoria (*Eucalyptus rostrata*) ; from Mr. G. Brunning, St. Kilda Nurseries, Melbourne, 30 Gladioli.
4. Plants, &c., sent from gardens :—To Melbourne Botanic Gardens, 30 packets seeds ; to Mr. G. Brunning, 32 plants, and 50 packets seed.
5. Plants supplied for decoration of public places during July :—For Castray Esplanade, 17 elms ; for New Cemetery, Cornelian Point, 286 plants.
6. Time of leafing, flowering, &c., of a few standard plants in Society's Gardens during July.
7. Books and periodicals received.
8. Presentations to Museum.

Meteorological Returns—

1. Hobart Town, from F. Abbott, Esq., Table, &c., for July.
2. Swansea, from Dr. Story, ditto for June.
3. Westbury, from F. Belstead, Esq., ditto July.
4. Port Arthur, from A. H. Boyd, Esq., ditto June and July.
5. Tamar Heads, from R. Henry, Esq., ditto, ditto.
6. Sydney, from the Government Observatory, Printed Tables for May, and "Results of Observations made during 1871."

The presentations to the Museum were as follows :—

1. From Mr. Hissey, a Cape Barren Goose (*Cereopsis novæ hollandiæ*), prepared and mounted.
2. From Mr. R. Gatenby, Macquarie River, a recent specimen of the Native Tiger (*Thylacinus cynocephalus*). A specimen of Native Bread (*Mylitta australis*).
3. From Mr. Thorne, a Parakeet from Brazil.
4. From Captain Williams, Skin of Avocet (*Recurvirostra rubricollis*).
5. From Mr. J. Horne, a French Passport of the year 1819.

Mr. M. Allport (in the absence of the author) read a paper by C. Gould, Esq., F.G.S., "On the existence of large animals (probably fresh water seals) in the upland lakes of Tasmania."

The paper, which was of considerable length and of much interest, was listened to with great attention, and, after a conversational discussion on the subject treated of, a vote of thanks was accorded to the author.

The meeting closed with a vote of thanks to the donors of presentations.

η ARGUS.

ALTERATIONS WHICH HAVE TAKEN PLACE IN THE NEBULA, &c., SURROUNDING η ARGUS, FROM FEBRUARY, 1871, TO FEBRUARY, 1872.

By F. Abbott, F.R.A.S., F.R.M.S.

(Read 11th June, 1872.)

If it were not for the certainty that many and important changes have of late years taken place in connection with the star η in Argo Navis, and the surrounding nebula, I should feel some diffidence in replying to the queries set forth by the late Sir John Herschel and the Astronomer Royal.

Sir John Herschel, when he wrote the Cape observations, expressed a desire, in different parts of the book, that any astronomer who followed him would carefully observe certain points in connection with nebulous matter, in order to ascertain if any such alterations as those referred to did take place. If Sir John, at the time he wrote, had thought the nebula inflexible, he certainly would not have expressed such a desire. Why, then, is this wish ignored? and against such observations as have been made on the nebula up to the present time, why has so much negative evidence been offered by astronomers who have not even seen the object? and who offer no inductive evidence to disprove the alterations, but from the evidence they have examined (what evidence?) have come to the conclusion that no change has taken place. This result was not arrived at by the Astronomer Royal after examining the evidence produced.

It is scarcely likely that Australian astronomers will relax observing so interesting an object, which they have the opportunity of seeing every fine night through the year, and of the changes in which much strong corroborating evidence is being adduced when only brought in comparison with the few casual observations made at Bangalore and Cordoba; or with any such reasoning as that offered by Mr. Procter, which must have been conceived by him since he wrote the article ("The Great Nebula in Argo") in Fraser's Magazine for December, 1868. This kind of reasoning reminds me of that fine double star η Coronæ first seen double by the late Dr. Herschel. Many a star-gazer has turned out on a bitterly cold night to inspect η Coronæ, and, being unable to divide it, arrived at the conclusion that no one had seen it double.

In a letter received from Mr. Severn, dated 29th June, 1870, the following passage occurs:—"Have you seen the tenth and new edition of the Outlines of Astronomy, in which it is

stated that no alteration has taken place in the star η or its surrounding nebula since Sir John Herschel was at the Cape." Was it here Mr. Severn changed his mind when he wrote to the Astronomer Royal?

In the English *Mechanic*, No. 352, December 23rd, 1871, an article from Mr. Procter appeared, in which (after using a not very scientific term) he states his belief that he has found out the cause of this imaginary discovery! After carefully examining the evidence adduced he found the result to be that Mr. Abbott's field was 1 degree 7 minutes in extent, while Sir John Herchel's drawing embraced a space of 28 minutes in polar distance, and 32 minutes in arc of right ascension, and this he considers to cause all the confusion. Mr. Procter is under a great mistake if he thinks that either the size of the telescope, or the diameter of the field will prevent the effect of any alterations, which may have taken place in the nebula, being seen. And this fact the most sceptical will soon have to admit; alterations in the object have been detected even with the naked eye. All my own observations and drawings have been made with the one telescope, and without reference to the Cape drawings, how does Mr. Procter account for this?

Lieutenant, now Captain Herschel in a letter to Sir J. F. Herschel thinks I must use low powers as I never mention the lemniscate; this is true, I do use a low power with large field and plenty of light for the drawings; but I saw the object with the large Melbourne reflector in June 1869, and was unable to detect the lemniscate of the late Sir J. Herschel. At that time the so called lemniscate as seen with my instrument had two openings, one at each end; shortly after three openings, next four, then five, and now six, as seen in the present drawing.

In the same letter Captain Herschel enquires, "is it rash to suspect that Mr. Abbott has mistaken the star η." This question is answered in the notes and queries of the Astronomer Royal, for if I had mistaken the star it is clear that Captain Herschel had also mistaken it or the question asked by the Astronomer Royal "has Mr. Abbott copied Lieutenant Herschel's drawing of 1868?" would not apply. It was from nightly watching the reduction of this star that the rapid fluctuations in the nebula were observed.

Mr. La Sueur discovered great changes in the nebula on first applying the large Melbourne reflector to the object, and comparing it with Sir John Herschel's Cape drawing; and in following up his observations during his stay at the Observatory has left certain drawings, finished and unfinished,

which show unmistakably that frequent alterations were then going on in the object.

Since Mr. La Sueur left Melbourne the large telescope has been under the charge of Mr. Farie McGeorge whose careful research has brought more recent alterations to light,of which he has given drawings down to the present time.

Mr. H. C. Russell, B.A., of the Sydney Observatory, has produced a large drawing showing considerable changes in the object as seen with the Observatory telescope, which if I rightly remember, is a seven feet achromatic.

The *good quality* of an instrument best suited for showing minute changes in nebulous matter is more important than its size. *Light*, *definition*, and *penetration*, will show *depth* and *outline* most distinctly. Two dissimilar instruments will seldom shew configurations of nebulous matter alike. Powell and Leyland's 1-16th immersion lens, and Tolles' 1-6th ditto, will resolve Noberts' 19th band on his new test plate, when many superior instruments and higher powers have failed to do so. This difference in size and magnifying powers does not prove that Noberts' 19th band is irresolvable—nor does the size and magnifying power of the telescope prove that the Nebula around η does not fluctuate.

Sir J. Herschel did not wish to longer endorse the theory of the concretion of nebulous matter into isolated stars; this, however, is not without its supporters. M. Delaunay, *Cours Eléméntair Astronomie*, 4th Edition,—"In adopting the idea of Herschel concerning the progressive condensation of nebulæ, and their transformation into stars, and applying these ideas to our planetary system, Laplace arrived at the most satisfactory mode of explaining their formation. "*Exposition du systeme du Monde.*"

Mr. Procter releases himself by a correction given in *Nature*, for October 19th, 1871, page 487, from longer considering that the fluctuations may be accounted for by an increased or decreased distance in space, but that the object is nearer than it was formerly supposed to be.

Another opinion offered is that of Mr. La Sueur, while observing the object with the Melbourne reflector. "The star η now shines with a light different from other stars in the field, and more the colour of burning hydrogen," and, Mr. La Sueur thought, "had consumed the nebula."

How were the small coloured stars, seen lying on the dark ground of the sky along with η produced ?—M. N., vol. 24, page 5. They must either have been concreted from the nebula as it drifted away, or by underlying it became visible with the telescope when the nebulous matter was removed.

Mr. Powell, of Madras, does not seem to have observed

these minute coloured stars, when informing the Royal Astronomical Society that η was out of the Nebula and in the dark space. They were seen here and at the Melbourne Observatory.

No communication, excepting my own, has appeared in reference to η having been seen some months later in quite a different portion of the Nebula, after it had left the dark ground of the sky. This is one amongst other changes which has certainly been misconstrued, as very shortly after the account of it reached England a statement appeared in the *Quarterly* and other journals to the effect that the star η remained in the thick of the nebula—where it was in the Cape drawing—which was not true.

Owing to a continuation of dry and hot weather, followed by wet and cloudy nights through the month of February and part of March, the present drawing was not completed until the object had reached near the zenith, consequently for checking and completing it, a total reflecting prism by Cook and Sons, with an orthoscopic eye-piece by Ross, was used. With this adoption no sensible difference could occur, as both the size of the field and the definition were much the same as in the case of the other drawings.

The same means for ascertaining the distance of the stars, as adopted in 1871, were again used on the present occasion. The bars of a Cook and Sons Micrometer were traced on the drawing paper so as to just fill the field of the telescope. The value of each bar of the micrometer is sixteen seconds of time. The stars were then pricked down on the paper and the distance of each ascertained by the lines traced from the bar micrometer, which is then taken out of the telescope, and the original eye-piece inserted to finish the drawing. By these means, little or no sensible error can, I apprehend, occur.

The cardinal points have been omitted in the present drawing, and the meridian line only approximately inserted. The telescope used being a refractor, the drawing will require reversion to bring the object into its true position.

It will be found, on comparison with former drawings, more especially with that of 1871, that although considerable alterations have taken place in the position of the stars surrounding η Argus, still sufficient similarity exists to allow of their identification, as, for instance, in the case with the four stars convex to η (alluded to by Professor Airey).

The four stars marked $\delta, \gamma, \epsilon,$ and ξ, the small adjacent ones marked $\eta, \rho, s, \tau, \chi, \psi,$ and the small stars immediately surrounding η, though agreeing very closely with the drawing

of 1871, have but little agreement with Sir J. Herschel's monograph.

It will also be observed that a very considerable increasing the number of stars has taken place, there being now visible in the field of the telescope one hundred and seventy of the 7th, 8th, and 9th magnitude, as compared with one hundred and thirty-four in the drawing of last year.

The boundary of the dark space has now six openings, as shown in the drawing, but is gradually becoming less distinct.

For the purpose of seeing the original lemniscate, eye-pieces of 60, 80, and 130 powers were used, but without avail.

[In the present drawing, the term "line of sight" has been omitted, some exception having been taken to it, but I find it is still in use —*Fraser's Magazine* for January, 1872. The term occurs twice in Mr. Procter's article, "New Survey of the Northern Heavens," page 91.]

LARGE AQUATIC ANIMALS.

The following paper on the existence of large animals, (probably fresh water seals) in the upland lakes of Tasmania, prepared by C. Gould, Esq., F.G.S., was, in Mr. Gould's absence, read at the last meeting of the Royal Society:—

I wish to lay before the Society a statement of facts, which is full of interest and surprise, and which will show, if corroborated by further investigations, that the existence of rare, perhaps undescribed, animals may be generally unknown, and entirely so to science, for long periods after the occupation of a country.

It may be noted that while easy credence cannot be given to the tales of aboriginals who too often fancy that their only chance of evading the dominating intelligence of their conquerors rests in their endowments of low cunning and mendacity; yet that many of the wonderful stories which such aboriginals relate and which, when handed in turn to those who are unappreciative of the infinite diversity of the forms of animal life are considered to be mere "traveller's tales," are in reality entirely true or substantially based upon fact. The investigator of natural science will, therefore, never entirely abandon the enquiry in such cases until some completely satisfactory disproof or explanation has been arrived at, and he will be the more resolved in this upon reflecting that the specific features of the savage intellect consist in the possession of great powers of observation rather than in those of originality or invention. Hence the traditions or myths of uncivilized countries are more susceptible of direct tracement to an origin than the transmitted stories of more instructed nations who conserved knowledge under the form of allegory or fable—the true meaning or explanation of which was understood only by the few—and has, in many instances been completely buried under the successive increments of time.

It will be only necessary to instance, as examples upon the one hand, the distorted accounts which have travelled from the interior of Africa, and of Madagascar, of the Rhinoceros, and the Epiornis, and to which we are indebted for the story of the Unicorn, and of that most wonderful bird the Roc. Again the Eastern story of Sinbad familiarizes us with a liberal interpretation of the Chimpanzee or Gorilla under the form of the "Old Man of the Sea." And the Kraken is simply an enormous exaggeration of the gigantic species of cuttle fish known or believed to exist in the Indian Ocean.

The Anaconda of South America has supplied the Indians of the Amazon with the fable of the "Spirit of the Waters;"

while the Moa of New Zealand has only been checked from expanding into some horrible prodigy by the fortunate fact of its bones having been secured as unimpeachable witnesses of its true nature and dimensions.

But on the other hand, the history of the Golden Fleece guarded by dragons, the object of the expedition of Jason and of the Argonauts, is the result of an entirely different operation of the mind, and may be well considered (as suggested by Sir Redmond Barry) as being merely an allegory depictive of the jealous care with which the diggers at Colchis concealed a productive placer, and of the methods used by them for the purpose of collecting fine gold, viz., by placing sheepskins in the streams as is done in South America with ox-hides for the same purpose at the present day.

It will be unnecessary for me to illustrate my meaning by other examples, and I, therefore, pass at once to the confession that I have never considered the question of the Australian Bunyip as completely disposed of, but have always fancied that a satisfactory explanation of the tradition of the natives, might some day be arrived at by the discovery of some species hitherto unfamiliar to us.

In regard to the northern portions of the continent there is no great difficulty in the matter—the presence of huge, hideous alligators would explain this or any other horrible story. But the belief in the Bunyip was just as prevalent among the natives in parts hundreds of miles distant from any stream in which the alligators occur, and among tribes who could have no communication with those to the northward. Some other animal must be sought for, therefore, as the source of the story in these localities. And the question then resolves itself into whether this should be some already known animal appearing in unusual haunts, or an undescribed species. With a view to the consideration of these points, I now place the Society in possession of statements in regard to which I cannot, of course, pledge myself further than by expressing my personal belief in them.

Having heard rumours, ever since my arrival in this colony, of some large and unusual animals being occasionally observed in the lakes in the great central plateau, I had often projected a trip of exploration to them, which circumstances have continuously prevented. However, I always bore the point in mind, and, therefore, when passing the evening at Constable McPartland's hut at the Picton, while on an expedition to the Cracroft, knowing that he had been for a long time stationed at the Great Lake, I made enquiry whether he had seen any strange animals in the lake. He told me instantly that he never had himself, but his son, who was much more about the lake,

had done so several times, and calling him, desired him to tell me at once all about them.

I find from my notes that the date of our conversation was September, 1870, and that young Francis McPartland, who was an extremely intelligent and apparently truthful youth, stated that "two years previously he had several times seen water animals in the lake at different places; he had a good view of them off the shore of Swan Bay; going from the station towards Mr. Smith's Neck. They were within a stone's throw of the shore, and seemed to be three or four feet long, they were three or four in number, and seemed to be playing about; they did not jump out, but were splashing about, and sometimes threw the water seven or eight feet up in the air. They showed their backs above water, also their heads, which were round, "round like a bull dog." They were darkish in colour; he had seen them several times, once one alone, but generally two together; they swam about, keeping the head above the water, you can also see the shoulders; they show the back when they are splashing. These were always seen by McPartland in some part or other of Swan Bay; sometimes near the shore, sometimes in the middle.

Immediately on my return I asked Mr. John Forster to favour me with a few lines to the chief constable of the lake district, and through his hands I received the following statement:—

Steppes,
25th October, 1870.

Sir,—With regard to your memo. of the 23rd of September last, relative to animals reported to have been seen in the Great Lake by young McPartland, and supposed to be seals, having made their way from the sea up the Derwent and Shannon Rivers,

I now beg to inform you that I have made enquiries amongst the shepherds in the vicinity of the Lake, and I find that several of them have seen an animal swimming in the Lake very much resembling a black sheep dog with only its head above the water. I cannot find that more than one has been seen at a time. I do not think it possible for seals to make their way from the sea to the Great Lake, in consequence of a very considerable water-fall being in the Shannon near its junction with the Ouse, unless being amphibious they could escape the fall and reach the river above by land.

The people that have seen this animal in the Lake maintain that it is not a platypus, but twice as large and much darker, but as it has never been very plainly seen, and considering the difficulty of any sea animal getting as far as the Lake, I think it must undoubtedly be a very large platypus. Mr. Headlam's shepherd saw one at the very top of the Lake, which he say was four or five feet long, with a very large black head. A shepherd of Kermode's also

saw one. Ryan saw one at Swan Bay in the moonlight. Ridgers the contractor, has also seen them, and I am told Mr. Kenrick Flexmore saw one at the Sandbanks.

I am, Sir,
Your obedient servant,
JAMES WILSON,
Chief Constable.

John Forster, Esq.,
Hobart.

Mr. Morton Allport having informed me that Mr. Charles Headlam had seen such a beast in the lake, proceeded to correspond with that gentleman, from whom I furnish the Society with the following note. I need hardly say the testimony of so well known a gentleman as Mr. Charles Headlam is unimpeachable :—

Egleston, Macquarie River, Tasmania,
29th April, 1872.

Dear Sir,—Yours of the 25th inst. I have, asking for information in reference to an animal I saw in the Great Lake some years ago. I have looked over my journal, which I have kept for the last 32 years, and find that it was on Monday, 25th January, 1863, that I saw the animal. My son Anthony was the only person with me at the time ; the time of day was about 11 o'clock. The lake was very rough, and we were pulling our boat against a strong head sea, when my oar nearly came in contact with a large-looking beast, about the size of a fairly-developed sheep dog. The animal immediately started off at great speed towards an island in the Great Lake known as Helen Island. It appeared to have two small flappers, or wings, which it made good use of, as I should think it went at the rate of 30 miles per hour. We watched it as far as the eye could reach, and it appeared to keep on the face of the water, never appearing to dive. I never remember seeing such an animal before or since. My sons have just returned from the Great Lake, and crossed over the lake twice in the boat, but saw nothing of our strange friend. It was in the middle of the lake where we saw the animal, and in deep water. Should I ever fall in with the beast again I will not fail in securing him *if I can*, and you shall then see him in person.

I remain, yours sincerely,
CHARLES HEADLAM.

Morton Allport, Esq.,
Hobart Town.

Having arrived thus far, I was much gratified by seeing in *The Mercury* of the 26th of April, 1872, an extract from the *Wagga Advertiser*, which I copy as follows:—

What is the Bunyip? (inquires the *Wagga Advertiser*). There really is a Bunyip, or a Waa-Wee, actually existing not far from us ; and others probably nearer than we imagined. The animal has been seen by many persons whose veracity is unimpeachable, and whose intimate acquaintance with the *Fauna* of the Murrumbidgee, coupled with their general intelligence and observation, puts it altogether beyond doubt that in the Midgeon Lagoon,

sixteen miles north of Narandera, there exists an animal which in every respect tallies with the description of the creature frequently reported as seen in various places. Here is the account of a gentleman who had a quiet half-hour's view of this strange nondescript. "A few days since, Mr. A., who was driving sheep across country to Melbourne, camped on the lagoon. He called at my house and asked what the animal was that we had in our swamp and proceeded to describe something which had alarmed him and the shepherds? I ridiculed his report, and he got angry, inviting me to come down and see for myself. I went down early next morning, between six and seven o'clock, accompanied by two other persons, and had not waited long before I heard the sound as of a body rushing rapidly through the water, making a noise as loud as that caused by a North Shore steamer. Looking in the direction of the sound I saw a creature coming through the water with tremendous rapidity, and directing its course immediately towards us. We stood still, deeply interested, and watched the approach of the animal, which having, as we presumed, lately risen to the surface, was evidently not aware of our presence. It came on with great swiftness until it was scarcely 30 yards from the edge of the lagoon, when it appeared suddenly to catch sight of us, and stopped instantly. It lay on the water then perfectly still, and I had a splendid view of a creature that surprised me more than anything I had ever before seen in my life. The animal was about half as long again as an ordinary retriever dog, the hair all over its body was jet black and shining, its coat was very long—the hair spreading out on the surface of the water for about five inches, and floating loosely as the creature rose and fell by its own motion. I could not detect any tail, and the hair about its head was too long and glossy to admit of my seeing its eyes; the ears were well marked. It made no noise, but kept its position for half-an-hour, surveying us, no doubt, leisurely, although its visual organs were hidden from us. At length it turned quietly round and swam off easily, without any manifestation of alarm, and we watched it moving leisurely along the surface of the lake until it was hidden by the distance. We have been greatly excited by its appearance, and I have offered £20 for its dead body, and £50 if captured alive." This statement may be relied upon, and there can be no doubt whatever the gentleman saw all he has described. Could not a party be fitted out to earn the reward, and ennoble Wagga in the annals of Natural History?

And I was still more interested by the spontaneous information received a few days back that several townsmen of this city had seen a remarkable beast in Lake Tiberias, while on a shooting expedition. My information is from Mr. Howe, market gardener of Campbell-street, a keen sportsman and a lover of natural history, evidently a good observer and not likely to mistake a tadpole for a crocodile, who states that in company with Messrs. Shadwick and Currie of New Town, and five others, he was at the Lake Tiberias on the 17th July last, and that while on the shore at the north-east end, he observed swans, and creeping to the edge of the lake, fired at them, imme-

diately on the report of the shot, a great splash was seen, and some large beast started off in the water from a point about 100 yards distant, dashing towards some rushes, and forming great wave by his passage through the water. The rushes swayed about violently as he passed through them, and one of the party who had the opportunity of seeing the beast more distinctly than the other, estimated the length at 5 or 6 feet, and the breadth of back at nearly two feet. About one hour afterwards the party saw, what they believed to be the same beast behind the rushes and out in the lake, splashing up the water to a height of ten or twelve feet; this was noticed several times. Enquiries made by Mr. Howe of persons in the neighborhood, elicited no information beyond that loud roarings had been heard at night.

Mr. John Butler of Shene, Bagdad, informs me that when on a visit to Lake Echo, in company with the Rev. H. D. Atkinson, some years back, they several times saw water thrown eight or ten feet high in the air, without any obvious cause; this happened right out in the lake, and was considered by them unaccountable. The only other information I have is from Mr. Morton Allport, to the effect that some aquatic beast, as big as a calf, was reported several times last summer as being in the deep pools of the Jordan River.

The evidence then shows that in the Great Lake, possibly in Lake Echo, certainly in Lake Tiberias, some unusual animals of large size have been seen at various times answering in general description to a seal, but not corresponding with any species hitherto described.

In regard to Mr. Headlam's estimate of the rate of speed of the animal seen by him, and which might be considered an exaggeration, I append an extract from a popular account of seals contained in the "Museum of Animated Nature," at page 222.

"The common seal can remain under water for about five minutes, and swims so rapidly that if alarmed, it will proceed nearly half a mile during that period."

While the description of the ursine seal "lowing like a calf," and of the sea elephant "in which the voice is deep, hoarse, and terrific," may give the clue to the mysterious sounds said to have been heard at night issuing from many of the Victorian lakes, and notably, if my memory serves me correctly, from Lake Werribee.

Now even should the animals, whose existence seems proved upon such good testimony, simply prove to be known seals, a good and substantial foundation for the Bunyip story will have been arrived at. The mysterious appearance and horrible sounds will be fully accounted for, and a very interesting and

novel page in the chapter of seals supplied to us; how much more interesting then will be the discovery should they prove to differ specifically or even generically from any hitherto described form, and to be some fresh-water-inhabiting mammal analogous or allied to "the otter-like or seal-like animal," whose existence in the rivers and lakes of the mountain districts of New Zealand has recently been established by Dr. Haast without doubt. See Hochstetter's New Zealand, page 161. Dr. Haast writes, in June 1861, "At a height of 3,500 feet above the level of the sea, I frequently saw its tracks on the Upper Ashburton River, in a region never before trodden by man. They resemble the tracks of our European Otter, only a little smaller. The animal itself, however, was likewise seen by two gentlemen who have a sheep station at Lake Heron, not far from the Ashburton, 2,100 feet high. They describe the animal as dark brown, of the size of a stout cony. On being struck at with the whip, it uttered a shrill yelping sound, and quickly disappeared in the water among the sea grass."

I may, in conclusion, mention that, while on a recent visit to Sydney, I saw in the Museum a young specimen of a species of seal entirely new to me, of which the colour was black like that of the Wagga individual, but concerning which Mr. Gerard Krefft was unable to give me further information than that it was caught near Newcastle, New South Wales. Mr. Krefft also tells me that one seal in that collection had lived on platypuses, and must have been a great distance from salt water.

ROYAL SOCIETY.

SEPTEMBER, 1872.

The monthly evening meeting of the Society was held on Tuesday, the 10th September. M. Allport, Esq., in the chair.

C. H. Grant, Esq., who had been put in nomination, was after a ballot declared duly elected a Fellow of the Society.

The Hon. Secretary, Dr. Agnew, brought under notice the usual monthly returns, viz. :—

1. Visitors to Museum during August 1,340.
2. Ditto to Gardens 1,930.
3. Plants received at Gardens :—
   - *a.* From Botanic Gardens, Melbourne, 20 species of Eucalyptus (new varieties), and other plants.
   - *b.* From Mr. J. Baily. 30 imported plants, including 11 new varieties of holly.
   - *c.* From Mons. J. Verschaffelt, Ghent, Belgium, 170 plants, of which all but 30 were dead on arrival.
   - *d.* From Mr. G. Brunning, 18 varieties of Fuchsia, and 12 ditto of Verbena.
   - *e.* Time of leafing, &c., of a few standard plants in Botanic Gardens during the month.
   - *f.* Books and Periodicals received.
   - *g.* Presentations to Museum, &c.

Meteorology.

1. Hobart Town, from F. Abbott, Esq., Table and Summary for August.
2. Port Arthur, from A. H. Boyd, Esq., Table for August.
3. Westbury, from F. Belstead, Esq., Table for August.
4. Tamar Heads, from R. Henry, Esq., ditto.
5. Swansea, from Dr. Story, ditto.

The presentations were as follows :—

1. From H. S. Lewes, Esq., A collection of weapons, &c., of Aborigines of Victoria.
   - *a.* A Stone Tomahawk of Mulgoa Tribe, near Penrith, N. S. Wales.
   - *b.* A ditto, dug up on site of a very ancient camp at Buckley's Basin, River Barwon.
   - *c.* Basket made by Aboriginal women at the Protector's Camp, Upper Yarra, Victoria.
   - *d.* Shield, Waddy, and Club, of natives of the Lower Murrry District, Victoria.
   - *e.* Two Waddies, and two Clubs, from Lower Loddon District.
   - *f.* Boomerang, Waddy, and Club, from Upper Yarra, Victoria.
2. From C. Degraves, Esq.—Sample of Tin Ore and metallic tin smelted from the same, from Brisbane, Queensland.
3. From Mrs. Robinson, Cascades—Tin Ore from New South Wales.
4. From Mr. F. Abbott, jun.—A Blue Mountain Parrot (*Trichoglossus multicolor.*)
5. From Captain G. McArthur—Lower Jaw of Square-headed Grampus(*Orca* sp.)—Lower Jaw of Cestracion from Jervis Bay—24 specimens of land shells (*Bulimus* sp.) peculiar to Howes Island.

6. From J. W. Graves, Esq.—Cast of face of Timmy, an Aborigine of Tasmania; Cast representing an interview between G. A. Robinson and a group of Tasmanian Aborigines.
7. From the Zoological and Acclimatisation Society of Victoria, Proceedings of the Society, Vol. 1.
8. From Mr. F. J. Salier—A "Frigate," or Man-of-War, Bird.
9. From Lady Dry—A specimen of the Superb Fruit Pigeon *(Lamprotreron superbus)*, shot at Quamby by the late Sir R. Dry, after a heavy northerly gale.
10. From Skelton Emmett, Esq. — A young specimen of a Tree Fern *(Cyathea affinis)* from Circular Head.

As to presentation, No. 9, the Secretary remarked that this pigeon was not indigenous to Tasmania. The preparation was that of a young bird, which consequently had not been able to contend against the "heavy northern gale," and had been blown across the Straits. An extract from Gould's Handbook, Vol. II., page 108, was read, pointing out the extreme beauty of the bird. Its habitat is the northern portion of Australia, and the islands of the Pacific.

The presentation (No. 11) of the *Cyathea affinis* was brought under particular notice as being a specimen of the Fern which formed the subject of Mr. Stephens remarks at the July meeting.

Bearing on the subject of Mr. Gould's paper, read at last meeting, the CHAIRMAN read the following letter from Mr. Joseph Barwick of the Tea Tree :—

(Copy.)

"Tea Tree.

"September 2nd, 1872.

"DEAR SIR,—Having seen a copy in *The Mercury* of a paper read by yourself at a meeting of the Royal Society, written by Mr. Gould in reference to a large unknown animal supposed to exist in some of the lakes of Tasmania, and having positively known of such an animal, I take the opportunity of sending an account of as near as possible under what circumstances I became aware of its existence. In the autumn of 1852 I was lying in ambush near Lake Tiberias for wild ducks. It was a fine moonlight night, when my attention was attracted by a commotion in the water some 15 yards from me among the debris of a fallen tree. I noticed a large animal, which, after watching him for some time, I concluded must be a large devil. I fired at him, which caused him to flounder in the water. I saw he was seriously wounded and went in to secure him, but when I got within 3 yards of him I saw to my surprise it was quite unlike any animal I ever saw before, his length appeared to be about 4ft. or 4ft. 6 inches, colour black, with a remarkable round bull dog like head, and what surprised me at the time was, instead of his making for the land he made for deep water. I had only a single barrel gun or I could have shot him again, and I have regretted ever since I had not hit him with the gun, even though I had broken it. Upon my reporting the circumstances the following morning in Oatlands, the late Mr. Burbury and two other gentlemen, accompanied me to the lake. I feel certain I must have mortally wounded the animal, but our search proved unsuccessful, but we found large quantities of his hair some having been cut off with shot, and some when making his escape against the timber. Some of this hair we took with us, and showed it to a Mr. Dean (known as Dr. Dean) who was making a collection of Tasmanian birds and animals, and had at the time I believe a specimen of every known animal in the colony, and also a large bush experience, and his opinion was that it was from some unknown animal, and he then offered £20 for the animal from which the hair came. The hair was unlike that described by Mr. Keach, as

it was only about 2 inches long, quite black and glossy at the outside, but of lighter colour near the skin. Dr. Dean was most anxious to possess the hair, and stated his intention of making enquiries about the stranger, but he left Oatlands soon afterwards and I do not know what became of his collection. The animal I speak of must have had very short legs, as there was only 15 inches of water in the place where I saw him, and his back was not much above the water.

"I must apologise for sending this to you. I intended to send it to Mr. Gould, but do not know his address.

"I may remark that at the time I saw this animal I had never heard of anything of the kind having been seen, and but for the hair, I believe my friends were disposed to consider it the result of nervousness, but this hair was considered quite conclusive.

"Yours obediently,
"JOSEPH BARWICK.

"Morton Allport, Esq.,
"Hobart Town."

Mr. M. ALLPORT read a very interesting paper by J. R. Scott, Esq., M.H.A., being an account of an exploratory tour from Port Esperance towards Adamson's Peak in March last. Mr. Scott on this occasion discovered a supposed new species of tree fern (*Alsophila*), specimens of which accompanied the paper.

The attention of members was directed to the object under the microscope on the table, the young of the brown trout, which had been hatched out ten days' previously in a tank in the Museum. The circulation of blood in the net work of vessels covering the umbilical vesicle was very clearly shewn.

(This object will be exhibited at the Museum during the present week, when visitors will have an opportunity of observing it.)

After a vote of thanks (on the motion of Mr. GIBLIN, seconded by Mr. STEPHENS) to the donors of presentations, a special vote was accorded to Mr. Scott and Mr. Barwick. The meeting then terminated.

OCTOBER, 1872.

The monthly evening meeting of the Society was held on Tuesday, the 8th October, M. Allport, Esq., in the chair.

The following gentlemen, who had been previously nominated by the Council, were, after a ballot, declared duly elected as members of the Society :—Mr. J. S. Dodds, Hobart Town ; Captain H. O'Reilly, Brisbane (corresponding member).

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

1. Visitors to Museum, 1,460.
2. Ditto to Gardens, 2,276.
3. Seeds, &c., received at Gardens :—From Mr. W. Ball, London, 141 packets of choice flower seeds. From Royal Gardens, Kew, 511 packets seeds of hardy trees, shrubs, and herbaceous plants.
4. Time of leafing, flowering, and fruiting of a few standard plants in Society's Gardens.
5. Books and periodicals received.
6. Presentations to Museum.

Meteorological Returns :—

1. Hobart Town, from F. Abbott, Esq. Table and Summary for September.
2. Swansea, from Dr. Story. Table for August.
3. Tamar Heads, from R. Henry, Esq. Table for September.
4. Sydney, from the Government Observer. Printed tables for July.
5. New Zealand, from Dr. Hector. Monthly tables (printed) from September, 1871, to June, 1872.

The presentations to the Museum were as follow :

1. From Captain O'Reilly, Brisbane, Queensland. Two perfect skeletons of the Dugong (*Halicore dugong*).
2. From Mr. J. Bidencope. Six samples of tin ore, from New England, New South Wales (assay from 71 to 76 per cent. of tin). Two specimens of stanniferous quartz from same locality. Two ditto of topaz, from New South Wales. Specimen of Hartley bituminous shale from New South Wales. Rock specimen from the Blue Mountains. Specimen of iron ore (magnetic oxide) from the Leven District, Tasmania.
3. From Mr. John Page, Lemon Springs. Specimen of "Native Bread " (*Mylitta Australis*) and the skin of an usually large domestic cat.
4. From Mr. Davis. A brass weight 5dwt. 6grs., being the correct weight of the guinea of 1772.
5. From the Government of Netherlands, India, Vol. 1, of Magnetical and Meteorological observations made at Batavia.
6. From Mr. H. Sale—A Brazilian copper coin.

The SECRETARY requested the special attention of the meeting to presentation No. 1. It was a great acquisition for the Museum and of considerable intrinsic value. The Council felt much indebted to the liberal donor, and had thought it their duty not only to forward a special vote of thanks to Captain O'Reilly, but also to recommend him for election as a corresponding member of the Society.

The SECRETARY read a letter from the principal librarian of the British Museum, intimating that the trustees of that institution had presented to the library of the Royal Society of Tasmania, a valuable series of Natural History publications, comprising about sixty-five volumes and 1 arts.

A letter from Mr. H. V. Barclay, of Spring Hill, was read, relative to

the origin of the so-called tidal wave which caused so much destruction on the west coast of South America on the 13th August, 1868, and the effects of which were felt on these coasts on the 15th of the same month.

The following letter from Mr. A. Johnson, Gould's country was read :—

"September 12th, 1872.

"Sir,—I do not know if you will think the following particulars worthy of being brought under the notice of the Society. Four years ago I brought from Scotland a white kind of potato called "Patterson's Victoria" a seedling then, as now, in great repute as prolific and of first-rate quality. I have grown these potatoes here for the last three years, but last year I noticed that the blossom had changed from white to a pale blue, but there was no difference discernible in the potatoes. This year, however, upon lifting them, they had pink eyes, not unlike a very white Californian potato, and their general shape appeared to have altered from round to a flattish kind of oval.

"My own opinion is that they are probably a hybrid, and that they are returning to the kind from which the blossoms had been inoculated.

"I may add that I have grown these potatoes each year on new ground.

"I am, &c., &c.,

"A. JOHNSTON.

"The hon. secretary Royal Society."

The CHAIRMAN stated that the flowers of the Hydrangea, grown in the part of the colony referred to, invariably turned blue, probably from the presence of iron in the soil, and it might be that the blossom of the potato was changed to blue by the same cause.

Dr. AGNEW remarked this would not account for the change in the shape of the potato. This rather favoured the idea that the plant might be reverting to an original type. He would be glad to know if the common white Epacris, or other white flowers, existed in the district. If so, the circumstance would be unfavourable to the theory as to the effect of iron on the blossom.

Mr. GIBLIN observed it was well known that the colour of the blossoms of the Hydrangea could be changed to blue by adding a small quantity of an iron solution to the water supplied to the plant. This experiment had frequently been tried, with success.

A second letter from Mr. Johnston was read, being a very favourable report of the sugar beet from seed supplied from the Society's Gardens.

On the same subject, Mr. BARNARD read the following extract from a letter from a settler on the Leven :—" The sugar beet is a complete success, notwithstanding the unfavourable season for other crops, and most useful in fattening pigs and all kinds of stock. Some sixteen pigs that we have killed were entirely fed with the beet, and, although running about, were quite fat. The poultry, too, were very fond of it. My son purposes growing a large quantity next year." Mr. Barnard proceeded to remark that seed, he believed, had been distributed by the Royal Society to about one hundred persons, upon the simple condition that they would report to the Society the degree of success which had attended the experiment. But as only one or two reports had been received, he thought a circular should be addressed to those who had beeu supplied with the seed, asking for a statement of results ; as he felt convinced that, were the great advantages of this crop more fully known, its cultivation would become the rule, instead of as now the exception. It was useless to expect the manufacture of sugar from beet until the root became generally grown ; it was putting the cart before the horse. As soon, however, as the exception became the

rule, and an adequate supply of the roots could be depended on, there is no doubt there would be some one in advance to initiate the manufacture; and capitalists would be found with sufficient enterprise to engage in an undertaking fraught with such benefits to the country. He was glad to see that four pounds was the average weight of the roots in Mr. Johnston's crop, as this was just the standard weight likely to contain the proper quantity of sugar. Mr. Barnard added that he had procured the most recent work on making sugar from the beet, and would be happy to give full information on the subject to any intending manufacturer.

Mr. T. GIBLIN observed that many years ago he grew the beet largely for feeding all sorts of stock, for which it was admirably adapted. Although the roots singly were smaller than those of the mangold the weight of the crop per acre was really greater. He had had as much as twenty-six tons from the acre.

At the request of several members present, Mr. Barnard promised to prepare a paper on the subject, from the latest authorities, for the next meeting.

The CHAIRMAN read the following letter :—

"Black Brush,
"September 6th, 1872.

"Morton Allport, Esq.

"Sir,—I have to acknowledge receipt of a letter from Mr. Charles Gould, soliciting information from me of a strange animal seen in the pools of the Jordan. My reason for not complying with the request before, was, that I was not able to see the parties in consequence of the dreadful state of the weather and the flooded state of the river Jordan. I have since obtained the information required, and will now state what I know of the affair.

"It was first seen about 2 years ago in the large pool at Mr. Munday's farm at the Black Brush by Mr. Munday himself. He states that it was like a seal with round head and two flippers, and plunged into the river. It was afterwards seen by the Messrs. Tonks further up the river; it was then seen by the Cox family near their house; and by several others afterwards in the large lagoon under the rocks opposite my house, and by Mrs. Chaplin on the bank of the river close to the cows in the meadow. When approached it bounded into the river. She describes it as having a round head and flippers; that it was about four feet long, of a dark grey colour, and made a noise like "hu" "hu" I have myself seen the water thrown up, but could not account for it. Others have seen the same—Mr. Gunn and the Messrs. McLaren. It was afterwards seen farther up the Jordan by Mr. Collis's shepherd, who states that it was lying by a log, and when disturbed it went into the river. It has not been seen lately, my impression is that it has made its way up the Jordan, perhaps as far as Lake Tiberias. At night was the time it was heard to make a noise. It very much alarmed one of Mr. Cox's sons when watering his horses at the Jordan. He thought it was one of the cattle which had fallen in the river; he has seen nothing of it since. Should I hear anything further I will communicate with you.

"Your obedient servant,
"EDWARD CHAPLIN."

"P.S.—Tuesday morning, 10th September.

"Mr. Fane Cox was at my house this morning, and informs me that going home a few nights since, when passing by the rocks opposite the lagoon by my land, some large animal went down the rocks into the river, making a loud noise and throwing up the water. He waited

some time thinking it would make its appearance again ; it did not and he could not tell anything about its description. He thought it was a beast of some kind, it made he says a loud gurgling noise like that a horse would make.

"E. C."

Dr. AGNEW thought this description pointed pretty clearly to the assumption that the animal seen was a Seal.

Mr. M. ALLPORT read an interesting paper on the "Irregularity in the growth of the young salmon," and subsequently called attention to the young trout occupying a slate trough in the large room of the museum, and said he did so with great satisfaction, because they were placed there as ova, not merely to gratify a little idle scientific curiosity, but to enable those of the public who had small streams or rivers in their neighbourhood to judge for themselves with what ease such streams and rivers could be effectually stocked, at far less cost to the salmon commission than when fish are sent. Any person expending a few shillings in the construction of a wooden trough on the principle of that in the next room, will be enabled next season to obtain a few hundreds of ova ready to hatch within a fortnight of their being placed in the trough. The number of people (many hundreds) who had inspected the process of artificial hatching carried on in the museum, proved that the Society had done a wise and useful thing in taking this extra trouble to induce the public to assist in spreading the fish throughout the colony. Another object which the council of the Society and the Salmon Commissioners had in view, was to demonstrate the advantages to be derived from feeding the young fish in their early stages on living animalculæ, larvæ, and small crustaceans, rather than on dead food ; the young trout, like the young of all predaceous fish, much preferred living food, and though it is quite true that they can be taught to take the grated liver upon which they are usually fed, whilst the particles are moving through the water, when once those pieces which are not eaten get amongst the gravel they are left undisturbed and become fertile sources of mischief in destroying the quality of the water ultimately causing disease and death to the fish. Unquestionably much of the mortality in piscicultural establishments was due to this cause, and, therefore, young gentles were always used at the Plenty for feeding the fry as they crawled about till devoured; even with the gentles, however, some would escape and die among the gravel, causing more or less mischief, but with the larvæ of mosquitos and gnats and small crustaceans no such mischief could occur, as being in their proper element, they roamed about devouring minute particles of vegetation and doing positive good to the water, till their inevitable turn came and they fulfilled one object of their being by furnishing food for others.

To obtain an ample supply of such food it was only necessary to use a fine muslin net in any stagnant weedy pool or ditch and enough minute creatures could thus be obtained in a few minutes to last many hundreds of young fish a week.

The usual vote of thanks having been accorded to the donors of presentations, and to Mr. Allport, a special vote was given to Captain O'Reilly for his valuable donation to the Museum.

The meeting then terminated.

NOVEMBER, 1872.

The monthly evening meeting of the Society was held on Tuesday, the 12th November, M. Allport, Esq., V.P., in the chair.

The Secretary, Dr. Agnew, submitted the following returns for the past month :—

1. Visitors to Museum, 1,421.
2. Ditto to Gardens, 2,349.
3. Seeds received at Gardens.
4. Time of leafing, flowering, &c., of a few standard plants in Botanic Gardens.
5. Books and periodicals received.
6. Presentations to Museum.

Meteorological Returns :—

1. Hobart Town, from F. Abbott, Esq.—Table, &c., for October.
2. Swansea, from Dr. Story—Ditto, for September.
3. Westbury, from F. Belstead, Esq.—Ditto, ditto.
4. Port Arthur, from A. H. Boyd, Esq.—Ditto, ditto.
5. Melbourne, from R. L. J. Ellery, Esq.—Ditto, ditto (printed).
6. Sydney, from H. C. Russell, Esq., B.A.—Ditto, August, (printed).
7. Queensland, from E. McDonnell, Esq.—Printed tables, for various stations, from December, 1871, to June, 1872.

The presentations to the Museum were as follow :—

1. From Jas. Scott, Esq., M.H.A.—16 Stone Implements of Aborigines of Tasmania found at Mount Morriston.
2. From Captain Bailey.—An Albino Pheasant from New Zealand, prepared and mounted.
3. From Mr. J. Chisholm—*New South Wales Government Gazette*, 1833, vol. 2, bound.
4. From Mr. Bromfield—A Beaver Rat, (*Hydromys chrysogatser.*)
5. From W. V. Legge, Esq., R.A., Ceylon—Two nests of the Weaver Bird.
6. From R. Gatenby, Esq.—Two Native Tigers, (*Thylacinus cynocephalus.*)
7. From Mr. Blythe, Honeywood—Specimen of *Antechinus swainsonii.*
8. From Mr. C. Sprent, Table Cape.—Twelve Mineralogical Specimens from vicinity of Mount Bischoff, with a note.
9. From Mr. T. C. Just, Launceston.—A small bar of Malleable Iron manufactured from Tasmanian ore.

The following note from Mr. Just accompanied this presentation :—

"By post to-day I send you a small bar of malleable iron, manufactured from earthen brown hematite and magnetic ore, from the ground of the Tasmanian Charcoal Iron Company at Anderson's Creek. I may state that this iron has never been smelted, but merely burnt from the ore in a forge, and the particles welded together in the form in which you now see it. It was, in fact, treated on the Catalan forge principle which the company is about to adopt for the production of malleable iron from the richer class of ores.

"I may mention that the company's ground is not at Ilfracombe, as erroneously stated by some correspondents, but about three miles to the westward, and about the same distance south-east of York Town.

"Please place the specimen in the Museum, and oblige."

10. From Mr. H. Pearce.—A Tippet Grebe (*Podiceps australis*) shot at New Town.
11. From Mr. J. M. Clarke.—A specimen of *Gordius aquaticus*, from River Plenty.
12. From Mrs. Stokell.—A piece of South Sea Island Tapa cloth.
13. From T. Stephens, Esq.—A sample of Bituminous Shale from Piper's River.

Dr. Agnew produced a fern which had been sent to the Museum for the purpose of determining the nature of the small scales which were thickly distributed all over it, especially on the stems. He had placed two of these apparent scales under microscopes where the Fellows could perceive they were in fact small animals of the *Coccus* tribe. The following extract which he would read from "Carpenter's Zoology," Vol. 2, p. 191, clearly explained their nature. "The bark of many of our trees often appears warty, by reason of a great number of small oval or rounded bodies, like a shield or scale, which are fixed to them, and in which no external traces of the insect are to be observed. These, however, are larvæ belonging to the tribe (*Coccus*) in question. Some of them are females ; others young males, which are similar to them in form. At a subsequent period they all undergo singular transformations. The males fix themselves to the plant, and pass into the pupa state, in which they remain completely at rest, and at last emerge as winged insects, coming out of their cocoons backwards, with the wings extended flatly over their heads. The females on the other hand remain attached to the plant, and increase in size, in consequence of the development of a large number of eggs in their interior, but they undergo scarcely any other change. The eggs are deposited between the lower side of the body, and the surface to which it is attached; the latter having been previously covered with a sort of cottony secretion. The parent then dies, and her body dries up and becomes a solid cocoon, which covers the eggs. Here the eggs are hatched ; and young larvæ, which are at first active in their habits, quit their envelope, and ascend to the extremities of the branches ; there they affix themselves by their sucking beak, gradually increase in size, and lose their activity. In this condition they pass the whole winter ; and it is not until the succeeding spring that the characters of the sexes, which are henceforth to be so distinct, begin to show themselves."

Several reports from farmers who had planted sugar-beet seed, furnished by the Society, were read, the general experience being highly in favour of the root as being very productive and excellent for fattening stock of all kinds.

Mr. BARNARD read his promised paper describing, in detail, from the latest authorities, the best method of extracting the sugar from the beet. The cost of machinery capable of using up the produce of five hundred acres was given and its mode of action explained.

Discussion ensued, when the general opinion of the members seemed to be that it would be imprudent at present to advise the establishment of a manufactory. It was thought that the culture of beet should in the first place be much more extensively introduced, so that Tasmanian farmers should become familiar with its growth.

It was also remarked that much practical experience would be gained from the results of the large beet-sugar manufactory now in operation near Geelong. Mr. Justin Browne mentioned that Mr. S. P. H. Wright, of Glenorchy, informed him that machines of about the value of £150 were made for the purpose of manufacturing small quantities of sugar, and if such machinery could be purchased, and made use of by private individuals, it would be of great interest to have some definite information as to their action.

Mr. STEPHENS called attention to the specimen of bituminous shale from Piper's River, and described its geological position. It was chiefly interesting as affording a new link in the carboniferous series of Tasmania, and its discovery might eventually lead to important results.

Mr. STEPHENS also remarked that it was desirable there should be on the records of the Society some account of the recent landslip near

O'Brien's Bridge, and mentioned some of the conclusions arrived at during a recent examination of the interesting phenomena connected therewith. The subject would afford good material for a future paper.

Discussion followed in which various opinions were expressed upon the original cause of the landslip.

A letter from Colonel Crawford (of Castra) was read in reference to two parcels of seed from India, sent for planting in the Society's Gardens. One, the "Raggee" *(Eleusina coracana)* was extremely productive, and a staple article of food for the poorer classes in India, in the hilly and wilder districts, and Colonel Crawford thinks it might be very valuable for forage in the form of green stuff or hay.

The other "Coltee" (*Dolichos uniflora*) was a sort of bean which furnishes the ordinary grain ration of horses in Southern India. It does very well in Victoria, where it is specially valued for its yield of green fodder.

A letter was read from Mr. Davis, Ark Inn, above New Norfolk, giving a description of some very large fish, thirty or forty in number, which had recently been seen on several occasions, and on each occasion higher up the stream. The general belief was that they were salmon on their way to spawn.

The CHAIRMAN read the following extract from a letter written by a lady in New Zealand :—

"Sometimes the surf rolling upon the beach after a storm is magnificent. About ten days ago two gentlemen were riding along the beach, when they came upon a huge monster cuttle-fish, which was rolling about in the surf quite dead, having been washed up by the storm. It was so large they could not possibly drag it up on the beach. They said it must have weighed six hundred weight at least. It had eight feelers or arms, one of which was fourteen feet, the others eleven feet long. They could not turn it over to see its eyes, but they must have been terrific. I think it must have been carried out to sea again, for only some small portions of its arms are to be seen now (on the beach)."

[The beach referred to is on the east coast of the North Island, about 80 or 100 miles north of Cape Palliser.]

Dr. AGNEW had been informed by one of the whaling captains out of this port that these creatures are the principal food of the sperm whale, which, when severely wounded, frequently throws up large quantities of them. The whale appears to eat little more than the body of the cuttle-fish, the greater portion of the arms being left untouched. These float on the surface of the water, and when seen indicate that sperm whales are in the vicinity. Cuttle-fish (inclusive of the arms) twenty and thirty feet long are frequently seen, but they are reported to have been observed at least double this size, especially in the Japan Seas, which are therefore favourite "feeding grounds" of the whale. Dr. Agnew further remarked it would be of great interest to have accurate measurements made of some of these horrible monsters, and that Captain McArthur had promised he would endeavour to accomplish it.

Mr. J. SWAN introduced a subject of great practical interest—the economic growth of Angora Wool. In doing so he exhibited a series of fleeces ; the first from a cross between a pure Angora ram and the common goat. This was gradually improved by the same ram until the fourth cross, and the fleece of each cross was brought under the notice of the meeting. Few objects could be of greater interest than these fleeces, the last, especially, affording a long silky staple of almost pure Angora wool, valued at not less than four shillings and sixpence per pound. Other fleeces were also brought forward which exhibited several peculiarities—the results of cross breeding—but in all, the gradual disappearance of the hair of the goat, and the gradual substitution for

it of the beautiful Angora Wool was very striking. These and other points connected with the subject were noticed and lucidly commented upon by the speaker, whose remarks throughout were listened to with marked attention. At the request of several of the members Mr. Swan promised to resume the subject next session, when he hoped to treat it at greater length and with fuller details, as he felt he had done little more than introduce it on the present occasion.

The usual vote of thanks, proposed by Mr. GIBLIN, was seconded by Mr. SHARLAND, who felt specially indebted to Mr. Swan for bringing so important a matter as the production of Angora wool before the Society, and through it, the public. He was very glad indeed that Mr. Swan was still at work on the subject, and he would look forward with the greatest interest for the more detailed information which Mr. Swan had kindly promised to lay before the Society at an early date next session.

The vote having been passed the proceedings terminated.

ACCOUNT OF AN EXPLORATORY TOUR FROM PORT ESPERANCE TOWARDS ADAMSON'S PEAK.

By J. R. Scott.

(Read September 10th 1872.)

According to promise I send, for the Royal Society, specimens of an *Alsophila* tree-fern, which I found near Port Esperance, and of which R. C. Gunn, to whom I applied for its name, wrote as follows:—

Newstead, 1st August, 1872. . . . "Your fern is an *Alsophila*, but does not agree well with my specimens of *A. Australis*. It may be *A. Leichardtiana** a very slender species." The specimens consist of—(1) the extreme tip of a frond; (2) one of the pinnæ from near the base of a frond; (3) a pinnule; and (4) a piece of the rachis of the frond showing the prickles. I beg you will particularly understand that I did not go "botanising" or take any appliances for collecting plants. My sole object was, by way of exercise, to reach Adamson's Peak, sometimes called "The Cow and Calf," and go farther if possible. Accordingly specimens (1), (2), and (3), were carried in my pocket memorandum book, which will account for their damaged condition, and (4) has been subject to all sorts of rough usage, knocking about in my knapsack. It has contracted in drying, and they have all lost their natural bright green colour.

The individual plant from which these were taken was growing among *Dicksonia* tree-ferns by the side of a small creek, probably without any stream in the summer, and in a spot shaded from the sun by trees and underwood, just such as naturally suits the *Dicksonia*, whereas the *Alsophila Australis*, although nominally "shade-loving," is often seen in Tasmania in open situations where a *Dicksonia* would not attain perfection. I was made aware that this was not an ordinary tree fern by suddenly finding my hands hurt by the sharp spines when breaking down branches &c., to make a track through the scrub. The spines become smaller and blunter after passing the second pair of pinnae from the base, and gradually disappear. The fronds were from 8 to 10 feet long, and more graceful in appearance than *Dicksonia*. The trunk was about 6 feet high, very similar in proportion and appearance to *Dicksonia*, being fibrous, and the marks of

* Mr. Abbott writes me that a description of *Alsophila Leichardtiana* will be found in the *Gardeners' Chronicle* of 20th October, 1866, where it is said to be synonymous with *A. Mooreii* and *A. Macarthurii*. I have not addressed Mr. Gunn, again, knowing his time to be much occupied.

fallen fronds not more conspicuous. The other tree ferns in the same neighbourhood also attained a height of about 6 feet only, so that no criterion of the average or extreme height of this *Alsophila* can be obtained from this specimen. The situation was not high, (probably 150 feet, or so, above sea level), and just at the foot of a low ridge or spur extending easterly from Adamson's Peak, and from which several small streams run to join the Creekton Rivulet. A short account of my trip will possibly best explain the locality, and the reason why I did not search to ascertain if there were any more specimens near.

I started from Port Esperance on the 15th of March last, with one companion, Frank McPartlan (well known as a good "bushman") and, passing Andrewartha's mill, followed the Southport road for about three miles beyond the bridge, until, at a small plain recently burnt, the peak was almost West. We then steered for it by pocket-compass, deviating occasionally as a spur or other natural feature promised more easy walking.

The first piece being burnt, was easy enough for about quarter of a mile; then a short piece of *Bauera* scrub, under trees, brought us to the Creekton Rivulet, which we crossed; and pushing through or rather over, some very tall *Bauera*, we reached a long plain clear of large timber. The first hundred yards was over heath and button-grass, a relief after the *Bauera*, but the remainder (half a mile at least) was a dense mass of tea-tree and very tall cutting-grass, with blind creeks and hidden spars under foot, the pleasantness of which can be imagined. After crossing this we entered timbered country, which continued all the way. The creek were I found this fern was just within the timber. The trees are principally stringy-bark, with sassafras, blackwood, &c., and the most frequent under-growth is either *Bauera*, or else the fern *Lomaria procera*, with plenty of dead timber and fallen logs.

After being detained a couple of days by rain at this creek, we took into consideration the nature of the country and vegetation, the weather, and the heavy loads we carried in anticipation of a more extended trip beyond the Peak, and determined to mark a track by which we could return quickly. Our system was to start unimpeded in the morning, and cut and break down the under-wood for about six hours, then to return and bring the knapsacks, tent, &c., to the farthest spot along the route suitable for camping. We had but one tomahawk, which McPartlan carried, while I used hands and pocket-knife on the smaller obstacles; and when so employed laid hold of this fern.

The spur continues at a nearly uniform height of about 500 feet to the foot of the steep ascent, at the top of which is a plateau or table land about 3,000 feet high,—the Peak itself, 4,017 feet, rising above it. Our course led us up and then along this spur, crossing numerous small runs of water flowing to the Creekton Rivulet. The shrubs we had to cut through were chiefly pepper, *Anopterus*, *Correa*, *Eucryphia*, &c. We had also to cross several extensive patches of Weinmannia or horizontal scrub (*Anodopetalum*), where our track will be seen for considerable distances a long way above the ground;—the peculiar growth making it easier for us to walk along the top, like monkeys, than to cut or force a passage below. The stems invariably grew from the roots down the slope of the hill, never inclining upwards. Most of them were at least 60 feet long, sending out their thin, tough, perpendicular branches every yard or so, but the sight of the luxuriant growth of the *Prionotes* repaid the whole of the toil: in large patches, along a distance of two or three miles, this prince of heaths grew in profusion, covering every prostrate log, twining up large trees and shrubs, and, at the height of 10 or 20 feet, bending over so as to resemble festoons from tree to tree, covered with long red flowers, in all shades from flesh colour to bright carmine. The effect was enhanced by the sun's rays being able to penetrate to these spots, an unusual occurrence along the rest of our route.

At the foot of the steep ascent were a few beech, and blue gum took the place of stringy bark. The *Anopterus* disappeared, and *Cenarrhenes* and *Agastachys* were found in place—*Bauera*, *Correa*, &c., still continuing. About half way up, we passed through a thicket of *Richea pandanifolia*, palm-like plants, 30 to 40 feet high, generally growing upright, a few almost horizontal. Those upright were almost all clothed down to the ground with the dead leaves, and looked like thick posts, instead of presenting their usual graceful appearance. Some had the *Prionotes* twining up to the very top.

After scaling two sandstone cliffs we got among stunted timber and bushes of tea-tree, &c., and soon reached the Table-land, which, about 3,000 feet high, extends to the base of the Peak, and beyond westerly nearly level, to the Picton Valley, stretching northward to the Hartz Mountains, and southward to Mount La Perouse. There are here many shallow pools and springs and clumps of dense bushes, chiefly tea-tree, and dwarf *Richea*. The *Eucryphia*, here a round bushy shrub, was at this time a mass of white blossoms, and very conspicuous. The common mountain shrubs were present, such as *Gaultheria*, *Decaspora*, *Bellendena*, *Persoonia* and others, but I did not see a single plant of the Waratah,

although we passed many spots favourable to its growth. There were many tracks of kangaroo, some of large size.

A short walk brought us to the Peak, which is of trap rock, very much laminated, many large stones being not more than an inch thick, and the exposed boulders all showed signs of regular cleavage. Many were clothed with the native cherry, *Exocarpus humifusa*, like a covering of moss. The Peak is surmounted by a trigonometrical-survey Tower of stones, telescope shape in two tiers, with 6 or 7 stakes fixed on the top, altogether about 20 feet high. I remarked that the stakes and also all the shrubs on the Tableland have a decided leaning towards the south-east.

The view from the top is very extensive. Mount Wellington and its range to Mount Field West, with the Dromedary showing through a gap. Mount Picton and the Arthur Range seemed quite close, and the broken mountain scenery from La Perouse to the south-west was very grand. On the other side was the Huon at Victoria and Franklin, and the southern part of D'Entrecasteaux Channel, a coast line remarkably beautiful, but almost destitute of signs of civilization. But for a few bush fires and small green specks near some point or bay I could hardly realise the fact that I was looking over a district so long inhabited.

We would not have been Britons if we had not marked our names ; and accordingly they may be found, written on paper and corked up in a bottle, under a heap of stones at the base of the Tower, on the eastern side. We found a line of stakes placed in crevices of the rocks, evidently to mark a track, leading to the south-east. They were well bleached by the weather, and must have been there a long time.

The weather frustrated my intention of proceeding farther west, so we returned by the track we had cut, reaching the main road by a walk of 8 hours. We were out once on the Table-land during a wet windy night, under the lee of a bush, having left our camp and rugs at the foot of the hill, and being overtaken by darkness before we could get back. Except on that night leeches and mosquitoes were abundant and voracious as usual. The birds were very tame and confident, especially a yellow-breasted honey-eater.

I have tried to keep this paper short, a most difficult task in writing about scenery or personal adventures, as one feels inclined to expatiate upon incidents and mention occurrences of little interest to any except the members of the party. With regard to the fern,which has been the cause of my writing, —if it proves to be an *Alsophila*, and not the *A. Australis* (the only species hitherto known to inhabit Tasmania), I will be delighted, in summer time, to conduct any gentleman,

who likes a little "roughing," to the spot to obtain better specimens and a more accurate description; as I did not pay much attention to the plant, feeling certain that, although it might be new to me, Mr. Gunn could at once supply its name as one long since discovered and described.

I cannot conclude without asking for the origin of the name, "Adamson's" Peak. Who and what was Adamson? In an old MS. chart in my possession, made by Captain Welsh in 1827, I find Port Esperance designated Adamson's Harbour; which latter appellation I am happy to say has not been adopted, and the Port still commemorates the visit of Labillardiere in retaining the name of the ship Esperance, commanded by Captain Huon Kermandée, as Recherche Bay still bears the name of the sister vessel.

IRREGULARITY IN THE GROWTH OF THE SALMON.

By M. Allport, F.L.S, F.Z.S., &c.

(Read 8th October, 1872.*)*

In the proceedings of the Zool. Soc. of London for 1870, Part 1, which reached our library only a few weeks back, I find a paper by Dr. James Murie, F.L.S., Prosector of the Society, entitled "Additional Memoranda as to Irregularity in the Growth of Salmon," so completely bearing out my often expressed conviction that the difficulty of determining the various species of the salmonidæ from immature specimens amounts almost to an impossibility, that an extract may prove interesting

Dr. Murie's paper refers more particularly to two fish, reared in the Zool. Gardens, and figured in F. Z. S., 1868, Plate xxiii. In the present paper full details are gone into showing the grounds for believing these fish to be the young of true salmon (*S. salar*), the weak places in the evidence being also fully pointed out. On the whole, the evidence seems in favour of these fish being genuine salmon, and this view is curiously confirmed by the wonderful resemblance between one of these fish and the specimen in our Museum, hatched from the eggs of *S. salar*, which specimen died, after being detained in fresh water for two seasons, after first assuming the smolt scales. Dr. Günther, after a careful examination of the two English fish, came to the conclusion that they were *not* young salmon, but probably hybrids, and based his opinion (amongst other reasons) on the fact that the number of the pyloric appendages in them differed from that found in *Salmo salar*. After a most elaborate consideration of the subject in all its details, Dr. Murie says :—

"It seems to me also a legitimate inference that the two fishes reared in our aquarium are Salmon, inasmuch as they differ in a far greater degree from all other European species than from *S. salar*. Indeed, as is broadly admitted in the British-Museum Catalogue, p. 3, of the genus *Salmo*, 'The almost infinite variations of these fishes are dependent on age, sex and sexual development, food, and the properties of the water;' hence this very same reasoning which demonstrates peculiarities in the twe Salmonoids and brood in question, logically polnts to their immaturity, retardation, or masking of the normal adult characters of the species. If their entire growth has been prejudicially influenced by continuous retention in fresh water, so may a defect or abnormal number of scales (two traversely) and pyloric appendages (three or four) be but the concomitant effect of unnatural development."

With this paragraph of Dr. Murie's paper I was much struck, because early in 1871 I sent to England a salmon trout (*S.*

trutta) which had been hatched from an English ovum, and which had spawned in this colony, after being unnaturally detained in fresh water, and Dr. Günther wrote to Mr. Youl in reference to this fish as follows :—

"(1.) The larger specimen is very interesting ; it is a female fish, with the ovaries well developed. With regard to the external characters, it agrees perfectly with the migratory sea-trout ; it has the dentition and scales, caudal fin, and præoperculum of that species ; it shows also ten parr makes, a number met with only in migratory species.

"On the other hand, it has only thirty-six pyloric appendages, a number which I have never met with in purely bred migratory salmonidæ, but very commonly found in the river-trout and hybrids between river and sea-trout. (See my Catalogue of Fishes, &c., p. 27.) I think that this specimen does not serve to convince the sceptical that one species of migratory salmon will thrive in fresh water. The coloration of this specimen is altogether peculiar, and I have never seen a fish marked with spots so deeply black, so large, and so numerous as in this specimen. In ordinary sea-trout of the same size the parr marks would have disappeared, but here they are present, and their co-existence with the black spots gives to this specimen quite a peculiar appearance."

On the 1st August, 1871, I wrote Dr. Günther the following letter :—

" Mr. Youl kindly sent me a copy of your remarks on the salmonoids, last sent to the Zool. Soc. I feel personally greatly obliged to you for the trouble you took in examining them, and see no difficulty in reconciling the peculiarities of colour in the large specimen with the fact of its being a salmon trout, the presence of parr marks is due entirely to the unnatural detention in fresh water. Here we detained a few smolts of the salmon (*S. salar*) in the same way, and the parr marks returned after the season for migration was past, but the fish never arrived at the plump healthy appearance exhibited by the salmon trout under the same circumstances. I cannot at all account for the deficiency in the number of pyloric appendages, but have found the number exceedingly variable in specimens of *S. fario*. Do the number vary at different ages ? Would the detention in fresh water cause the normal number to diminish ?

" One of the parent fish, a male, died 12 months before that sent to England. I carefully counted the pyloric appendages, and found 47."

It will thus be seen that I had myself arrived at much the same conclusion as Dr. Murie, as to the doubtful value of the number of pyloric appendages as a specific test. As Dr. Murie specially solicits information from pisciculturists at home or abroad, I purpose sending the specimen of salmon smolt which died after the long detention in fresh water, for his inspection.

ON THE TECHNOLOGY OF A BEET SUGAR FACTORY, FOR WORKING UP THE PRODUCE OF FIVE HUNDRED ACRES OF BEET.

By J. Barnard.

(*Read November 12th*, 1872.)

"In tracing the history of any great enterprise, it will rarely appear that success has been attained all at once, but in most instances the progress gained has been slow and gradual; and it has generally been found to be a work of time to wear down prejudices, alter the course of habitual thought and practice, as well as to overcome that *vis inertiæ* which is opposed to all innovation and change. The cultivation of the White or Silesian Beet, with its many attendant advantages in relation to agriculture, and as a sugar-producing root, has proved no exception to this ordinary experience. In support of this, it may be well, before passing on to the particular object of this paper, to draw attention to what has been done towards the establishment of the important industry now under consideration.

"In 1868, a Select Committee of the House of Assembly, inquiring into the best means of encouraging manufactures, reported in favour of a subsidy of £500 being paid to the producer of every 500 tons of sugar manufactured from beetroot, under certain conditions; and so impressed were the committee with the great advantages to be derived from its introduction, that they added the recommendation to re-print an excellent treatise by Arnold Baruchson, 'for the information and guidance of the colonists.'

"The Government promptly carried these suggestions into effect, by printing and widely circulating throughout the community an abridgement of Baruchson's pamphlet; and they also, in the succeeding session, introduced and passed a measure to encourage this among other manufactures, which enacted that 'there should be paid to the person or company who first manufactures, to the satisfaction of the Governor-in-Council, 200 tons of good marketable sugar in any one year from beet or other product grown in Tasmania, the sum of £2,000.'

"Several able leading articles have also, from time to time, appeared in *The Mercury* newspaper, urging upon public attention the special importance of cultivating the sugar-beet.

"The little share that I have had in the same direction, I may now be permitted to mention, without, I hope, any imputation of undue egotism.

"In June, 1869, after my return from Sydney, I read a short paper before the Royal Society, describing the simple and inexpensive, if somewhat rude, process which was adopted by a

settler in the interior of New South Wales for extracting the sugar for his household from this invaluable root.

"In August following I supplemented that paper by another communication giving some account of a cheap American machine for making beet-sugar upon a somewhat larger scale, but still within moderate limits. At the same time I furnished some statistics, affording a sound basis for the encouragement of all practical agriculturists.

" Having cleared my way by these few preliminary remarks, I now advance a step further, and place before the Royal Society the requisite data for the establishment of a sugar factory, calculated to work 150,000lbs. of beetroot per 24 hours, during a campaign of 100 days, and corresponding to the average product of the cultivation of 500 acres in beets. The scope of this paper may be described as the technology of the manufacture, with its estimated cost of buildings and machinery, and working expenses, together with the probable results to be annually realized, derived from the most recent and reliable publication on the subject.*

"1. *Production of steam.*—Beetroot sugar works consume a large amount of steam for driving engines, which propel root-washers, hydraulic pumps, and presses, pulpers, water pumps, centrifugals, &c. Steam also conveys the juice and syrups from one place in the building to another, and is the agent used for evaporating and boiling them. The steam department of a 500 acre beetroot sugar factory comprises three steam boilers of 40 h.p. each, with two internal pipes and one flue; two steam drums, with fittings complete; and one 4 h.p. donkey engine, driving two feed pumps. The total cost of the appliances for the production of steam is stated at £925.

"2. *Washing and Pulping the Beets and Extracting the Juice.*—Operations, in Tasmania, should be commenced early in April, when steam should be got up in the boilers to 40 or 45 lbs. pressure, and the beets should be regularly carted in. An exact account should be kept of each load entering the works, and of every pound of beet consumed. The beets as they are brought in are placed in piles alongside of the beet-root washer, which is a long cylindrical drum revolving in an iron tank, furnished below with a man-hole door, for allowing it to be occasionally cleared out; the refuse being carted off as manure. The proper speed for a root-washer is from 20 to 30 revolutions per minute. The more water employed in washing the beets the better, but the supply of both roots and water must be regular. On leaving the root-washer, the beets are pitched

* The work referred to is entitled " On the manufacture of beetroot sugar in England and Ireland. By William Crookes, F.R.S., editor of the Chemical News.—Longmans, 1870.

into the jaws of the pulper, where they are seized between revolving cylinders armed with knife blades, which speedily reduce them to fragments. These fragments pass into the pulper proper, to which consists of a double revolving drum, driven by belting; and the speed of this drum is 600 to 700 revolutions per minute. The pulp is received in front of the pulper in a small reservoir. The next stage is extracting the juice from the pulp by hydraulic presses worked by steam power, and is at once simple, easily managed, and efficient. For this purpose the pulp is put into wool bags, 33 inches deep by 22 inches broad, in a quantity not to exceed, when slightly flattened, the thickness of a finger. These bags, or sacks, are piled up one over the other, separated by sheet iron trays, and, after some preliminary pressure, are transferred to the hydraulic presses, where the remainder of the juice is squeezed out.

"The cake obtained after this pressure is used as fodder for cattle, or in the manufacture of brandy and vinegar, as well as for the manufacture of paper, for which it is increasingly in demand.

"The total cost of the machinery and implements employed in the washing, pulping, and pressing department to work 150,000 lbs. of beet per 24 hours is stated to be £1,967.

"3. *The Woollen Sacks.*—From 900 to 1,000 sacks are sent to the washing machine every six hours; and the price of a sack varies from 2s. to 3s. The first cost of a full set of them for a 500-acre factory is £400. About 2,000 trays are required, costing about £200; and the price of a sack-washing machine and connections is £20; making a total under this head of £620.

"4. *Defecation of the Juice.*—After the liquid product has been collected into a special reservoir, there are various impurities to be eliminated, some of which can be removed before crystallisation of the sugar by the combined action of heat and the use of lime. This operation is known as defecation of the juice, when a certain portion of the sugar combines with some of the lime used, forming the saccharate of lime; and from this saccharate the sugar has to be freed by the action of carbonic acid gas, which, having a greater affinity for the lime, combines with it, forming insoluble carbonate of lime, while it liberates the combined sugar. This process is called the "carbonatation" of the juice. Defecation is effected in a batch of open, circular, round-bottomed pans, made of copper, into which the liquor, after being conveyed from the juice reservoir, into an upright iron boiler, called a "monte-jus" (literally mount juice), is then passed into the defecating pans, when milk of lime is poured into the warm juice, and well stirred into it.

"The defecating operator must always be a man of experience, as much must be left to his empirical judgment.

"The total cost for the defecating department of a 500-acre factory is given at £295.

"5. *The scums of Defecation.*—The scums formed during the process of defecation of the beetroot juice, being rich in saccharine matter, must be made to give up as much of their valuable contents as possible; and this is effected by collecting them into a special reservoir, and the action of powerful presses, followed by other minor processes.

"The "dead" scums constitute a valuable fertiliser, rich in nitrogen and lime, and are hoarded with care for sale to the farmers.

"The total cost of the "scum" department of a 500-acre factory would be £134.

"6. *Carbonatation.*—This process is the saturation of the defecated beetroot juice by means of carbonic acid gas, which may be effected in a simple, easy, and cheap manner by the combustion of charcoal. The combined defecated and scum juices are conveyed into carbonatation pans, and the carbonic acid is passed through the liquid. When the "foaming" has ceased, the carbonatated juice is run into large receivers, to settle, after which the juice is ready for the filters.

"The deposit formed during carbonatation is a valuable manure, which must not be lost or wasted.

"The total cost for the carbonatation department of a 500-acre factory is stated at £632.

"7. *Filtration and concentration of the juice.*—Is the next process after leaving the carbonatation pans, and usually takes place twice before crystalized sugar is produced. The first filtration is that of the carbonatated juice, the second is this juice after evaporation until it has become a thin "syrup." Evaporating pans were formerly simple contrivances, and consisted of open boilers; but these have now given way to the more perfect appliances known as the "triple-effect vacuum pans."

"The total cost of the filtering department is £595; and of the concentration and boiling department of a 500-acre factory is given at £2,300.

"8. *Bone-black, or animal charcoal.*—Is a very important item in the manufacture of beet sugar. The average quantity needed is 20 per cent. of the quantity of beets, by weight, worked up every 24 hours. A factory consuming 150,000lbs. of beetroot per diem, would thus need 30,000lbs. of bone-black. The residue from the bone-black washer is collected in cisterns, where it deposits itself as fine mud, and constitutes a highly valuable fertilizer.

"The cost of the bone-black department of a sugar factory, working 150,000lbs. of beets, every 24 hours, is estimated at £257.

"9. *Crystallization.*—The syrup boiled to a consistency of from 40 to 42deg. of Baume's areometer, is distributed into iron forms or crystallizers of a capacity of about 12 gallons each. These are left quiet for 18 or 20 hours in a room, the temperature of which is kept at 95deg. F.; and in from 5 to 8 days the sugar is "made." The contents of the forms are next emptied into "centrifugal turbines," revolving drums, the outer surface of which is covered with metallic tissue, through the meshes of which the syrups flow, by the action of the centrifugal force, while the crystals of sugar are retained within. These centrifugals are of various construction, but the velocity of their circumference must not be inferior to from 160 to 180 feet per second.

"In a very short space of time the sugar (first product) is ready to be scooped out from the inside of the centrifugals. Then follow other processes for securing the second and third qualities; the residue from the third sugar is molasses, and is collected into cisterns for the distiller's use.

"The cost of the crystallization department is £760.

"To the foregoing estimates must be added piping and cocks, £750; vats, £60; various tools, £200; packing and unpacking of machinery, £400; besides freight and other expenses on the whole apparatus, the total weight of which is estimated to be about 200 tons.

"*Water supply.*—Perhaps the most important consideration in the choice of a locality for a beetroot sugar establishment is an abundance of water, as will be seen from the following estimate of the quantity required per hour for the daily washing of 150,000 lbs. of beets; viz.:—

	lbs.
For the supply of the steam generator	3,000
Washing and pulping	6,000
Defecation	1,000
Milk of lime	100
Filtration	4,000
Bone-black washing	6,000
Concentration of juice	73,190
Boiling	19,900
	113,190

or 1882 cubic feet, which is equal to a delivery of 32·5 lbs. per second, or about half a cubic foot.

"*Labour and general estimates.*—With some few exceptions no skilled labour is required in new beetroot sugar works, as most of the operations are of a simple mechanical nature.

The only skilled hands really needed are an engineer, an hydraulic pump man, a defecator, a sugar boiler, and a bone-black burner.

"Based upon a campaign of 100 working days, the following is the general estimate given of the cost of labour for a factory upon the scale mentioned. The work is continuous day and night, being divided into two shifts; and the average daily rate of wages is taken at 4s., but a higher rate of pay is, of course, given to the skilled labour. The various processes, with the cost of each, are as under:—

	£
1. *Washing and pulping.*—Carriage and washing of the beets, 14 men, 2 shifts for 24 hours, 2,800 days' labour, at 4s.	560
Press Department, 28 men, 2 shifts per 24 hours, 5.600 days, at 4s.	1,120
Sack washing and darning, 8 women, 2 shifts, 1,600 days, at 4s.	320
2. *Defacation.*—8 men per 24 hours, 800 days' labour, at 4s.	160
3. *Scums.*—6 men per 24 hours, 600 days, at 4s.	140
4. *Carbonatation*—	
250 days, at 4s.	50
Monte-jus	40
Carbonic acid gas (preparation of)	40
5. *Filtration.*—3 men every 24 hours, at 4s..	60
6. *Concentration.*—Two men, every 24 hours	80
7. *Boiling.*—Two men, every 24 hours	80
8. *Crystallizations and Centrifugals*—1,500 days' labour, at 4s.	300
9. *Generation of Steam.*—Two shifts of 3 men, 600 days, at 4s.	120
10. *Breaking and Packing.*—Five men, at 4s. per day	100
11. *Men in the Yards, &c.*—Five men at 4s.	100
12. *Management*—	
One general superintendent and two overseers	800
Bookkeeper and clerk	320
13.—*Extras*—	
Carpenter, plumber, and smiths (3 months)	300
Extra pay to skilled labour	500
General cost of labour for one year's campaign	£5,190

"The quantity of coal consumed by such an establishment would average 600 tons, which, at 20s., would cost £600.

"The bone-black, 30,000lbs., would cost, for the first outlay, at 2½d. per lb., £312, but in succeeding years would only amount to replacing waste.

"The lime used would amount to 4,500 bushels, and cost about £280.

"The cost of 15,000,000lbs. of beet root to be worked up into sugar would be, at 12s. per ton, £4,500.

ANNUAL EXPENSES

"Summing up the above, the yearly expenses would be—

	£
Labour	5,190
Coal	600
Bone-black (waste)	100
Lime	280
Purchase of beet roots	4,500
Add 20 per cent. for incidentals	2,100
	£12,620
To which has to be added taxes, and insurance, computed at	400
Interest on capital invested	960
Making a grand total of	£13,980

FIRST COSTS.

"The first outlay for the establishment of machinery, buildings, &c., may be summed up as follows:—

Production of steam	925
Washing and pulping	1,967
Defecation	295
Scum	134
Sacks, trays, sack-washing	620
Carbonatation	632
Filtration	595
Evaporation of juice	2,300
Crystallization and turbines	760
Bone-black department	257
Pipes and cocks	750
Packing and unpacking	400
Tubs and tanks	60
Brickwork	500
Sundries and tools	400
Carriage of 200 tons of machinery, &c.	250
	£10,845

"Adding £2,000 for the erection of the works, and £312 for first cost of bone-black, we have the sum of £13,157 needed for the first establishment of a manufactory of sugar from beet roots for the produce grown on 500 acres of ground, and which ought to produce at least 1,200,000 lbs. of raw sugar.

"By the statistics for 1871, the quantity of sugar imported into Tasmania for that year, was 3,737 tons, (or 8,359,880lbs.) for a population of 101,785, giving an average consumption annually of 82lbs. for each person.

REALISATION.

"The products to be realised in the foregoing example of a sugar manufactory would be as follows:—

	£
Sugar from 15,000,000 lbs. beet at 8 per cent. of sugar, the sugar being sold at 24s. per cwt., 2½d. per lb., 600 tons	14,400
2,700,000 lbs. pulp, at ½d. per lb.	5,620
5,000 gallons molasses, at 1s. per gallon	250
Residues, as fertilizers	200
Total	£20,470
Deducting annual expenses and interest as above	13,980
Leaves net annual profit or 31·7 per cent.	£6,490

There is every reason to believe that, with careful management, the quantity of sugar obtained will range as high as 10 per cent. instead of 8 per cent., taken as the basis of the foregoing computations. In such a case, the net income would be £24,170, and the net annual profit £10,090, or 41·2 per cent.

"Such is a mere outline from the elaborate specifications and estimates given by Mr. Crookes in his admirable work; and so cogent are the facts and figures detailed, as to fully justify the conviction that a Beet-root Sugar Factory upon the scale of magnitude set out would prove to be a grand commercial success."

REPORT

OF THE

ROYAL SOCIETY

OF

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FOR THE YEAR

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1873.

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Westbrook, T.	Bellerive
Young, Russell	Hobart Town

MINUTES of the ANNUAL GENERAL MEETING of the ROYAL SOCIETY OF TASMANIA, held at the Museum, Macquarie-street, at 7 o'clock p.m., on the 28th January, 1873: Morton Allport, Esq., F.L.S., F.Z.S., C.M.A.I., &c., Vice-President, in the chair.

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

The Report for 1872 was then read.

It was moved by Mr. HOWELL, seconded by Mr. ABBOTT, jun., and carried—"That the Report be adopted, and printed for circulation amongst the Fellows."

Messrs. H. J. Buckland and Justin McC. Browne having been appointed scrutineers, the meeting proceeded to the election of four members of Council, in place of those retiring.

The result of the ballot was the election of the following gentlemen:—

THE VEN. ARCHDEACON DAVIES.
M. ALLPORT, ESQ.
J. W. AGNEW, ESQ.
THE RIGHT REV. BISHOP BROMBY.

The HON. SECRETARY having reported that Mr. F. Butler was desirous of retiring from the office of Auditor of Annual Accounts, it was resolved that Mr. John Macfarlane should be requested to act as auditor with Mr. Cook for the ensuing year.

Lieut. W. V. LEGGE, R.A., of Ceylon, was elected as a corresponding member of the Society.

Mr. Justin McC. BROWNE proposed a vote of thanks to the Honorary Secretary for the efficient manner in which the affairs of the Society had

been conducted during the year. Mr. J. BARNARD seconded. The vote having been accorded,

Dr. AGNEW expressed his gratification at receiving the thanks of the Fellows. On this occasion he had quite hoped to be able to say the Society was free from debt, but the unforeseen expenditure referred to in the report (the greater portion of which would not occur again) had deprived him of that pleasure. He might mention that we were about to make use, for the first time, of the large building we had recently become possessed of. A quantity of unclassified material would soon be removed into it from the large room upstairs, which would be a great boon to the Museum by affording greater space for the exhibition of specimens of the Tasmanian Fauna and Flora. To carry out these arrangements would, of course, be the duty of the Curator, Mr. Roblin, and he (Dr. Agnew) was glad to take this opportunity of expressing his sense of the great value to the Museum of the services of the Curator. Not only was Mr. Roblin well versed in all the duties peculiarly incidental to a Museum, but his accuracy in all the various accounts of the Society and the Public Gardens was well known to, and appreciated by, both the Monthly and Annual Auditors. He only regretted that the Society was not in a position to offer Mr. Roblin a salary at all commensurate with his deserts.

Mr. ALLPORT also bore testimony to the skill, courtesy, and devotion to his duties of the Curator.

The meeting terminated with a vote of thanks to the Chairman.

REPORT.

THE Session of 1872 was opened on the 12th March with a paper by F. Abbott, F.R.A.S., F.R.M.S., entitled "Notes on the results of Five Years' Meteorological Observations made at Hobart Town;" and the following papers were read at the various subsequent monthly meetings, which were held without intermission:—"Climate and Vital Statistics of Tasmania," by Dr. E. Swarbreck Hall;" "Tasmanian Pisciculture," by Judge Francis; "Political Economy," by E. C. Nowell; "Observations on changes which have taken place in the Nebula surrounding the Star η Argus," by F. Abbott, F.R.A.S., &c.; "On the existence of large animals, probably Seals, in the upland Lakes of Tasmania," by C. Gould, F.G.S.; "Account of an exploratory tour from Port Esperance to Adamson's Peak, and discovery of a supposed new species of Tree Fern," by J. R. Scott, M.H.A.; "Irregularity in the growth of the Salmon," by M. Allport, F.L.S., F.Z.S.; "Technology of a Beet Sugar Factory," by J. Barnard.

In addition to the above papers the following subjects have been under discussion:—"Mineralogical specimens from the neighbourhood of Oyster Cove (with correspondence)," "Development of Fœtal Marsupial," "Mineralogical specimens (Porphyries) from near Black Bluff Mountain, Middlesex Plains," "Manufacture of Iron from Tasmanian Ore," "A Tree Fern lately discovered on the North Coast of Tasmania," "Artificial hatching of Trout Ova," "The economic growth of Angora Wool," "The growth of Sugar Beet in the Colony," &c., &c.

The Meteorological Observations have been

carried on as hitherto at the various stations, and abstracts of the results of five years' registers for Hobart Town have been incorporated with the 25 years' abstract already published, affording, in a condensed form, a meteorological record extending over thirty consecutive years. These latter have, by the permission of Government, been printed at the Government Printing Office, and copies have been forwarded to various Governments, Institutes, Hospitals, Libraries, and individuals of scientific repute throughout the world.

The Society is much indebted to Dr. E. Swarbreck Hall for his very elaborate and valuable paper on "The Climate and Vital Statistics of Tasmania," which is printed with the Meteorological Abstract.

We have, as usual, received many valuable donations of books from learned Societies. In this respect America has been, so far, our largest contributor that the Council, in recognition of such liberality, have determined to set apart a special case in the Library for the exhibition of books from that country.

COUNCIL.

"No vacancy has occurred during the year. The required list according to Rule XXXII., as amended at the general meeting of 1868, has been exhibited in the Library for the last fortnight.

FINANCE.

The total income from all sources was as follows:—Government Grant to Museum, £200; ditto to the Gardens, £400; subscription, £123; from Marine Board, £20; deducted from salary of Curator on account of repairs to his residence, £10; sale of Plants, &c., at Gardens, £66 4s.; special donation to Garden Funds, £1. This

with £30 12s. in the hands of the Superintendent of the Gardens for payment of wages, £30, which will certainly be realised from the amount of subscriptions in arrear, and £6 in the hands of the Collector, will give a total of £886 16s. The expenditure and liabilities as per balance sheet, amount to £901 17s. 6d. leaving a balance to debit of £15 1s. 6d.

It is much to be regretted that some of the Members are dilatory in paying their subscriptions. Reminders have been regularly sent when payments were due, and had these in all cases been responded to, we should at present have been quite clear of debt.

GARDENS.

The portion of the sea wall referred to in last year's Report has been completed, and a continuation of it is now in process of construction.

During the year the line of the Main Railway has been laid out through the lower part of the gardens, and it is probable the work will be carried out to completion without delay. It is not anticipated, however, that any inconvenience will accrue from the work, as the contractors are most desirous of meeting the views of the Society in taking such measures and adopting such precautions as will ensure the safety of visitors.

Very little progress has been made with the new entrance, but this work will be resumed forthwith.

The expenses for the gardens have, to the detriment of the funds of the Society, exceeded the income by about £13. This unusual outlay has been incurred in part by repairing damages done by the floods, and partly by laying on water. The latter work has long been a great desideratum

for the comfort of visitors, and will also be to some extent reproductive.

New plants, in greater variety than usual, have been introduced, many being of considerable interest. To Dr. J. D. Hooker, of the Royal Gardens, Kew, we are indebted for a very liberal donation (about 600 packets) of seeds, many of which have not hitherto been under cultivation here.

The number of visitors has been estimated at 24,666.

MUSEUM.

As will be seen by the list of presentations many objects of interest have been added to the collection. The majority of these have been placed in their appropriate sections, some (chiefly skeletons) are in course of preparation, and others (shells, specimens in spirits, &c.) have been placed in store until proper cases, glass jars, &c., can be procured for their reception and display.

Among the donations to the Museum worthy of special note may be mentioned two complete skeletons of the Dugong *(Halicore dugong)* presented, and very liberally forwarded to Hobart Town free of all charge, by Captain H. O'Reilly, of Brisbane, Queensland.

To H. S. Lewes, Esq., of Geelong, the Society is also indebted for a fine collection of weapons of the Australian Aborigines, procured in various parts of Victoria and New South Wales, especially for this Museum.

R. Gatenby, Esq., of Macquarie River, has presented (and forwarded free of cost) several specimens of our Mammals, Reptiles, &c. Many of these have been added to our collection, and others as a means of effecting exchanges with other Museums, have been of special value. The Native

Tigers (*Thylacinus cynocephalus*) have been particularly useful in this respect, special requests for this animal having been received from Adelaide, and Christchurch, New Zealand.

Correspondence with Dr. Haast, of Christchurch, New Zealand has been entered into for the purpose of enlisting his interest for our acquisition of some perfect skeletons of the Moa.

Specimens of iron ore from various parts of the Colony have been received, and have excited much attention.

The number of Visitors to the Museum was 14,956, being an increase of nearly 4,000 on that of any previous year.

STATEMENT of the Funds of the ROYAL SOCIETY OF TASMANIA for the Year 1872.

RECEIPTS.

Annual subscriptions from 74 members	111	0	0			
Arrears of ditto	12	0	0			
Amount received from Marine Board for completing Meteorological Returns from Lighthouses, as per agreement	20	0	0			
Total Royal Society				143	0	0
MUSEUM.—Grant-in-aid from Treasury	200	0	0			
Amount deducted from Curator's salary on account of repairs to residence	10	0	0			
Total Museum				210	0	0
BOTANIC GARDENS.—Grant-in-aid from Treasury ..	400	0	0			
Proceeds of sale of plants, &c.	66	4	0			
Special subscription to funds	1	0	0			
Total Botanic Gardens				467	4	0
Jan. 16th.—Balance overdrawn at Commercial Bank ..				65	13	6
				£885	17	6

NOTE.—*Dr.*—To overdrawn balance at bank	65	13	6			
Wheatley and Co., London, to 31st December (not received), estimated at	16	0	0			
Total liability				81	13	6
Cr.—By cash in hands of Superintendent of Gardens	30	12	0			
Ditto in hands of Collector	6	0	0			
Subscriptions due	30	0	0			
Total assets				66	12	0
Balance to debit				£15	1	6

EXPENDITURE.

Jan. 18th.—Balance overdrawn at Commercial Bank as per statement for 1871						37 1 4
Interest on overdrawn account as per Bank Book ..						3 18 4
ROYAL SOCIETY,—Meteorological instruments				2	10	6
Printing and advertising				38	7	6
Postage, parcels, &c.				6	1	7
Collector's commission on subscriptions, £123 at 5 per cent...				6	3	0
Messenger for delivering Proceedings to Members ...				1	0	0
Sundries				2	1	6
Clerical assistance for completing Meteorological Tables from Marine Board				20	0	0
Library—Books and Stationery				54	14	4
Total Royal Society						130 18 5
MUSEUM.—Salary of Curator				125	0	0
Wages of Attendant				51	10	0
Insurance				6	7	6
Purchase and preparation of specimens				6	8	0
Water rate				3	2	8
Fuel and light				3	11	4
Sundries				2	0	10
Camphor, spirits of wine, &c.				6	6	9
Ironmongery				6	6	10
Freight and carriage of specimens				3	2	0
Fittings, repairs, &c.				20	0	9
Total Museum						233 16 8
BOTANIC GARDENS.—Salary of Superintendent				150	0	0
Wages of labourers				244	4	0
Tools and repair of ditto				5	8	11
Freight and carriage of plants				11	9	0
Stationery and stamps				1	8	5
Forage				14	17	4
Ironmongery				13	15	9
Repair of buildings				15	1	2
Seeds				0	8	0
Sundries				22	9	4
Water rate				1	0	10
Total Botanic Gardens						480 2 9
						£885 17 6

27th January, 1873.

Audited and found correct { HENRY COOK / FRANCIS BUTLER } Auditors.

BOOKS PURCHASED & PRESENTED DURING 1872.

[*Presentations marked thus* *]

Arts, Journal of Society of, Vol. 19, Nos. 989 to 992 ; Vol. 20, Nos. 993 to 1,039.
Arts, Transactions of Society of, Vol. 19.
Athenæum, Current numbers.
*Acclimatisation Society, Victoria, Reports of 1871-2. From the Society.
*Animals, large, on the existence of, in the upland Lakes of Tasmania. By C. Gould, F.G.S. From the Author.
*Builder, The, Current numbers. From Dr. Agnew.
*Beet Sugar Factory, The Technology of. By J. Barnard, Esq. From the Author.
*Catalogue of Plants, Huber, 1872.
*——— of Books, 3, Quaritch.
*——— of Parliamentary Library, Tasmania.
*——— of Agricultural Exhibition, New South Wales.
Conchologia Iconica. Parts 290, 295.
*Census of Victoria. Parts 1 and 2. From the Registrar-General, Victoria.
*Currents and surface temperature of North Atlantic Ocean, 1872. From the Meteorological Office, Board of Trade, London.
*Coast Survey, United States, Report of, 1868. From U.S. Government.
*Climate and Vital Statistics of Tasmania. By Dr. E. S. Hall. From the Author.
*Discursos sobre su inauguracion, Observatorio Astronomico Argentino. From Professor B. A. Gould.
*Echinodermata of New Zealand. By F. W. Hutton, F.G.S., C.M.Z.S. From the Author.
Florist and Pomologist, Nos. 47 to 58 (Nov. 1871 to October 1872.)
Fishes of New Zealand. By F. W. Hatton, F.G.S., &c. From Dr. J. Hector, F.R.S.
Gardeners' Chronicle, The, current numbers.
*Intelligencer, Literary, Walch's Monthly Numbers. From Messrs. Walch & Sons.
Journal of Science and Art, Silliman's American, Vol. 2, Nos. 11 and 12 ; Vol. 3, Nos. 13 to 18 ; Vol. 4, Nos. 19 to 21.
Journal, Quarterly of Science, current numbers.
Journal of Agricultural Society of New South Wales, current numbers.
*Journey to Musardu, Appendix. By B. Anderson, New York. From the Author.
Magazine, Country Gentleman's, Vol. 7, Nos. 40 to 46 ; Vol. 8, Nos. 47 to 52.
*Medical and Surgical Pamphlets (30) by Dr. Amussat, Paris. From the Author.
*Meteorological and Magnetical Observations, made at Batavia, 1870. From the Government of Netherlands, India.
*Meteorological Reports, Quarterly, 1870. From Meteorological Office, Board of Trade, London.
*Meteorological Observations, made at Radcliffe Observatory, Oxford, 1871, Results of. From F. Abbott, Esq.
*Meteorological Returns for New Zealand, 1870. From the Government.
——— Sydney, 1872, monthly. From the Government Observer.
*——— Melbourne. From R. J. L. Ellery, Esq. 1872, monthly.
*——— Monthly, for Hobart Town. From F. Abbott, Esq., F.R.M.S.

*Meteorological Returns, Monthly, for Swansea. From Dr. Story.
*——————————, Ditto, for Port Arthur. From A. H. Boyd, Esq.
*——————————, Ditto, for Westbury. From F. Belstead, Esq.
*——————————, Ditto, Tamar Heads. From R. Henry, Esq.
*———————— Observations, Results of 30 years', for Hobart Town. By F. Abbott, F.R.M.S.
Nature, Current Numbers.
Natural History, Annals and Magazine of, Vol. 8, Nos. 47-8 ; Vol. 9, Nos, 49 to 55 ; Vol. 10, Nos. 56 to 58.
*Nebula surrounding η Argus, Notes on changes in. By F. Abbott, F.R.A.S., &c.
*Observations, Astronomical and Meteorological, made at United States Naval Observatory, Washington, 1871. From the United States Government.
*Proceedings of American Philosophical Society, Vol. 2, Nos. 83, 84, 85. From the Society.
*———————— of Essex Institute, Salem, Massachusetts, Vol. 6, pt. 2, 1871 ; and Bulletin, Vol. 2, Nos. 1 to 12. From the Institute.
*———————— of Geological and Polytechnic Society of West Riding of Yorkshire, 1870. From the Society.
*———————— of Royal Society (London), Vol. 20, Nos. 130 to 136.
*Patents, Abstracts of, Victoria, Parts 1 and 2, 1871 ; Indexes, 1870. From W. H. Archer, Esq.
*Pisciculture, Tasmanian. By Judge Francis. From the Author.
*Political Economy. By E. C. Nowell. From the Author.
*Report, 2nd Annual of Board of Indian Commissioners. From United States Government.
*———— of Geological Survey of Indiana, 1869. From U. S. Government.
*————, Smithsonian for 1869, 1870. From the Smithsonian Institution, Washington.
*————, of Department of Agriculture, Washington, 1869-70. From the Department.
*———— on the Water of the State of Maine. From U. S. Government.
*———— of Commissioners of Fisheries, State of Maine. From Ditto.
*————, Annual of Philosophical and Literary Society, Leeds.
*———— of Mining Surveyors and Registrars of Victoria. From Victorian Government.
*———— of Colonial Museum, Wellington, N. Zealand, for 1870. From J. Hector, Esq., M.D., F.R.S.
*———— of British Association, 1870. From the Association.
*———— of American Patent Office, 1868, vols. 1, 2, 3, 4. From the U. S. Commissioner of Patents.
*————Report of Board of Public Education, 1870. From the Board of Education, Philadelphia, U. S. A.
*————Annual of Museum of Comparative Zoology, Harvard College, Cambridge, U. S. America. From Director of the Museum.
*Statistics of New Zealand, 1870-71. From J. B. Bennett, Esq., Registrar-General, New Zealand.
*———— of Victoria, 1870. From W. H. Archer, Esq., Registrar-General.
*———— of Tasmania for 1871. From E. C. Nowell, Esq., Government Statistician.
*Society, Royal Astronomical.—Monthly Notices of vols. 28 to 31 inclusive. Index to first 29 volumes.
———————————— Vols. 35 to 38, inclusive ; and Part 1, vol. 39. General Index to first 38 vols. From the Society.

*Society, Royal Geographical, Proceedings of, Vol. 15, Nos. 1 and 5; Vol. 16, Nos. 1 and 2.
*————————, Journal of, Vol. 40. From the Society.
*———, Linnean, Journal of, Vol. 11, No. 56; Vol. 13, Nos. 65. 66, Botany.
*————————, Vol. 11, Nos. 51 to 54. Zoology.
*————————, Proceedings of, Session 1871-2.
*———, Geological, Quarterly Journal of, Vol. 27, Nos. 106-108; Vol. 28, No. 109.
*————————, List of, November 1st, 1871.
*———, Zoological, Proceedings of, Parts 1, 2, 3, 1870; Part 1, 1871. From the Society.
———, Ray, The, Volume for 1869.
*Smithsonian Contributions to Knowledge, Vol. 17. From the Smithsonian Institution.
*Salmon, Irregularity in the growth of. From the Author, M. Allport, Esq., F.Z.S., F.L.S., C.M.A.J., &c.
*Transactions of Connecticut Academy of Arts and Sciences. Vol. 1, Part 2; Vol. 2, Part 1. From the Academy.
———————— New Zealand Institute, 1871. From Dr. J. Hector, F.R.S.
———————— Institution of Engineers and Shipbuilders in Scotland. Vol. 15, 1871-2. From the Institution.
*Tour from Port Esperance to Adamson's Peak, Account of. By the Hon. J. R. Scott, Esq., M.L.C.

PRESENTATIONS TO MUSEUM DURING 1872, WITH NAMES OF DONORS.

Allen, Mr. P., Hobart Town.—An Almond Tumbler Pigeon.
Allport, Master C.—An Irish Farthing, 1806.
Atkinson, Rev. H. D., Three Hut Point.—Porphyry from Trial Bay. Carboniferous Limestone from Arch Head. Iron Ore from Three Hut Point. Two Echini from deep water.
Aldred, Mr.—Specimen of a curious Fungus from Watchorn's Hill.
Abbott, Mr. F., jun.—A Blue Mountain Parrot *(Trichoglossus multicolor).*
Burgess, Miss, Hobart Town.—Tanned Skin of a very large Bengal Tiger *(Felis tigris).*
Blythe, Mr. J. B., Honeywood.—Skin of Black Snake *(Hoplocephalus curtus).* Specimen of *Antechinus swainsonii* and young.
Barnard, J., Esq., Hobart Town.—Six specimens of auriferous Conglomerate from Rouse's Paddock Diggings, Mudgee, N. S. Wales. Two Species of Sandstone, with Dendrites from ditto. Gum of an indigenous Forest Tree of N. S. Wales.
Bidencope, Mr. J.—6 samples of Tin Ore from New England, N. S. Wales, 2 specimens of Stanniferous Quartz from ditto. 2 Topazes from ditto. 1 specimen Hartley Shale. Rock specimen from Blue Mountains, N. S. Wales. 1 specimen Iron Ore from the Leven, Tasmania.
Bayley, Captain, New Town.—An Albino Pheasant, from New Zealand.
Bromfield, Mr., Hobart Town.—A Beaver Rat *(Hydromys chrysogaster.)*
Butler, F., Esq., Director of Public Works.—A block of Red Granite from Gabo Island.
Chichester, C. M. S., Esq., Private Secretary.—Specimen of *Voluta elliotti* from Western Australia.

Clinch, J., Capt.—A Bow, 19 large and 27 small poisoned Arrows, a Neck Ornament, and Head-dress of a New Guinea Chief.

Cearns, Mr., Hobart Town.—A fac-simile of the letter, addressed to Lord Monteagle, which occasioned the discovery of the Gunpowder Plot.

Degraves, C., Esq.—Sample of Tin Ore, and Tin smelted from the same. From Queensland.

Dry, Lady.—Specimen of the Superb Fruit Pigeon *(Lamprotreron superbus)* shot at Quamby after a heavy northern gale.

Davies, Mr., Hobart Town.—A brass weight 5dwts. 6grs. (Weight of Guinea of 1772.)

Elwell, Mr., Hobart Town.—Piece of Copper Ore, partially smelted in a blast furnace, probably from Adelaide.

Everett, Mr. G., Cape Barren Island.—Large abnormal growth of Horse's Hoof, from Preservation Island, Bass' Straits.

Emmett, Mr. Sketton, Circular Head.—A young Tree Fern *(Cyathea affinis.)*

Fisher, Captain, brig "Wild Wave."—A Boa *(Python sp.)* found alive in the cabin of the vessel nine days after leaving Sourabaya, Java, supposed to have been taken on board in a bag of clothes belonging to a passenger.

Giblin, Mrs. T.—Two operculæ of a species of Turbo, from Fiji.

Gatenby, R., Esq., Macquarie River.—A small "Tiger" snake *(Hoplocephalus curtus.)* A "Grass" snake, probably a very young specimen of H. curtus. 48 eggs taken out of a black snake. Eggs of so-called "Iguana" *(Cyclodus nigroluteus.)* 2 Rock Lizards. 1 Lizard. 1 Gecko from Ballarat. Ascaris sp. from Kangaroo. Deformed Kitten. Centipedes, Scorpions, &c., &c. A Native Devil *(Sarcophilus ursinus.)* 2 Native Tigers *(Thylacinus cynocephalus.)*

Graves, J. W., Esq., Hobart Town.—A Freshwater Crayfish *(Astacus sp.)* from Gordon River. Cast of face of Timmy, a Tasmanian Aborigine. Cast representing an interview between G. A. Robinson and a party of Tasmanian Aborigines. Photographic Copy of Portrait of G. A. Robertson, Protector of the Aborigines.

Gellibrand, W. A. B., Esq.—Gravid uterus of Forester Kangaroo Rat. *(Bettongia cuniculus.)* Ditto of Wallaby *(Halmaturus billardieri.)*

Groom, Mr., Hobart Town.—A Bronze Portuguese Coin 1814.

Hood, Master E.—3 Eggs (probably of a species of Petrel) from Bird Island.

Hull, Master.—Nest of White Eye *(Zosterops dorsalis.)*

Hebblewhite, Mrs.—Portrait of Leichardt, framed and glazed.

Hedberg, Mr. O. H.—Atlas of Sperm Whale.

Huston, Dr., New Norfolk.—2 Paradise Ducks *(Casarca varigata)* of New Zealand.

Hodgson, W., Esq., M.H.A.—Specimen of Native Bread *(Mylitta australis)* from Sorell.

Hissey, Mr. W.—A Cape Barren Goose *(Cereopsis novæ hollandiæ.)*

Just, T. C., Esq., Launceston.—A small bar of malleable iron manufactured from Tasmanian Ore.

Kreskel, Mr. J. G.—A Brazilian Silver Coin *(Mille rei.)*

Legrand, Mr. W.—Sponge from Recherche Bay. A specimen of rare Irish Slug *(Geomalcus maculosus.)*

Littlechild, Mr. H., Lindisferne.—4 Spine-tailed Swifts *(Chætura caudacuta.)*

Lucas, Mr. R. J.—Specimen of Fish *(Cheironectes politus.)*

Luckman, Mr., Sorell.—2 Shoveller Ducks *(Spatula rhynchotis.)*

Lewes, H.S., Esq., Geelong.—A collection of Weapons, &c., of Aborigines of Australia. 2 Stone Tomahawks. Basket made by women. One Shield. 4 Waddies. 4 Clubs, and one Boomerang.

Legge, Lieut. W. V., R.A., Ceylon.—2 Nests of Weaver Bird, and a collection of Ceylon Reptiles.

Montgomerie, Mr., Hobart Town.—A prize Belgian Canary.

Maclanachan, Hon. J., Esq.—A Green Leck Parrakeet *(Polytelis barrabandi)* from New South Wales. A Hen Pheasant *(Phasianus colchicus.)*

Meredith, J., Esq., Swansea.—A Musk Duck *(Biziura lobata.)*

Manion, Mr. P.—Copper Pyrites from Adelaide.

Maning, Mr. A. H.—A Butterfly Gurnard.

McArthur, Captain G.—Lower Jaw of square-headed Grampus, ditto of Cestracion, 24 Land Shells *(Bulimus sp.)* from Howes Island.

Nichols, Mr. F. E., Gould's Country.—Two Pieces of Chain cut with a pocket knife from solid wood.

Owen, Mr. H.—A Japanese Coin.

O'Reilly, Captain, Brisbane.—2 Skeletons of the Dugong *(Halicore dugong.)*

Peacock, Mr. W., Sorell.—A Pelican *(Pelecanus conspicillatus.)*

Paul, Mr. G.—A mass of drift conglomerate from near Bridgewater.

Page, J., Esq., Lemon Springs.—Specimen of Native Bread *(Mylitta australis.)* The skin of a very large domestic cat.

Pearce, Master H., New Town. A Tippet Grebe *(Podiceps australis.)*

Roblin, Mr. T., Curator of Museum.—Echini and Haliotis from East Coast of Tasmania.

Ross, T. R. J., Esq., Huon.—A plumed bronze wing Pigeon *(Ocyphaps lophotes)* from Australia. Two Indian Boas *(Python tigris)* from Ceylon.

Robinson, Mrs., Cascades.—Tin Ore from N. S. Wales.

Rayner, Mr., River Styx.—A Hawk with curiously coloured plumage.

Simpson, Mr.—Sample of Flax grown at the Huon.

Solomon, Mr. N. C. F., ship "Eugenie."—Five Danish Coins. A fossil Eclimus from Denmark. A Flint Arrow Head from ditto.

Seidelin, Mr. Conrad.—251 Silver and Copper Danish Coins. A Bronze Medal of Peter the Great of Russia.

Stuart, Mr. R. W., Table Cape.—11 Specimens of Garnets from that locality.

Salier, F. J., Esq.—A War Canoe, with Paddles, &c., from the Solomons Island Group, South Pacific. A "Frigate" or "Man of War" Bird.

Sale, Mr. H.—A Brazilian Copper Coin.

Scott, Jas., Esq., M.H.A.—16 Stone Implements of Tasmanian Aborigines, from Mount Morriston.

Sprent, Mr. C., Table Cape.—12 Mineralogical Specimens from the neighbourhood of Mt. Bischoff.

Stokell, Mrs. W., Hobart Town.—A piece of "Tapa" cloth from South Seas.

Stephens, T., Esq., M.A.—Specimen of Bituminous Shale from Piper's River, Tasmania.

Taylor, Mr. G., Valleyfield.—A White Hawk *(Leucospiza novæ hollandiæ.)*

Thorne, Mr. S.—An Egret *(Herodias alba.)*

Thorne, Mr., Hobart Town.—A Brazilian Parakeet.

Williams, Captain, "Kestrel."—Shells from the East Coast of Tasmania. A Bittern *(Botaurus australis.)* Skin of Avocet.

Williamson, Mr., Hobart Town.—Sandstone Boulder from Anderson's Quarry.

Whitehead, J., Esq., M.H.A.—An Egret *(Herodias alba.)*
Watson, Mr. J., Muddy Plains.—Two White-eyed Ducks *(Nyroca australis.)*
Wickborg, Mr.—Skin of a Toucan from Brazil.
Wilson, G., Esq.—Tin Sand from the Ovens, Victoria.
Willett, Mrs., New Town.—A young Viper and a small Snake from Cape of Good Hope.

PLANTS AND SEEDS RECEIVED AT THE ROYAL SOCIETY'S GARDENS DURING THE YEAR 1872.

Principally from Foreign Parts.

January.—From Mons. J. Linden, Brussels.—Two cases containing 71 Plants, 46 alive, 25 dead.
March 1st.—From Mr. F. Salier.—One case of Plants from Lord Howe's Island.
April.—From the Royal Gardens.—Kew Seeds of Cedrus atlantica.
April 15th.—From Dr. Schomburgh, Botanic Gardens, Adelaide.—35 species Bulbs.
May 10th.—From Mr. C. Hollinsdale.—60 packets imported Seeds.
May 18th.—From the Melbourne Botanic Gardens.—Two cases containing 100 Plants of utility for distribution.
June 3rd.—From Ch. Huber, France.—Seeds of Pterocarya caucasica.
July 6th.—From the Melbourne Botanic Gardens.—50 Plants Eucalyptus rostrata.
July 6th.—From W. G. Brumming, St. Kilda.—30 Plants, 30 varieties Gladioli.
August 2nd.—From the Melbourne Botanic Gardens.—31 Plants, principally Eucalypti.
August 2nd.—From Mr. J Bailey.—32 Imported Plants of Ilex, &c.
August 23rd.—From Mr. William Bull.—New Plant, Merchant, London; 141 packets seeds.
August 28th.—From Jean Kerschaffett, Ghent, Belgium.—200 Plants, all dead from salt water.
September 28th.—From the Royal Gardens, Kew.—511 packets of Seeds.
October 2nd.—From Ch. Huber, France.—Nine varieties Chinese Primrose.
August 19th.—From the Royal Gardens, Kew.—19 species Aconitum Seeds.
November 4th.—From C. Gould, Esq.—Four Plants Aralia bidwilli; Cuttings of Bougainvillœa species.
November 23rd.—From the Royal Gardens, Kew.—60 packets seeds.
November 23rd.—From Mr. C. F. Cresswell.—100 named Hyacinths (Imported.)
December 9th.—From Mr. C. Hollinsdale.—28 varieties of Bulbs.
December 24th.—From Mons. Verschaffett.—160 varieties Dutch Bulbs.
December 27th.—From D. Manning, Sydney.—Seeding Norfolk Island Pine.
December 28th.—From the Chamber of Agriculture, Smithsonian Institute.—36 packets Vegetable Seeds.

PLANTS AND SEEDS SENT FROM THE ROYAL SOCIETY'S GARDENS DURING THE YEAR 1872,

Principally to Foreign Parts.

March 1st.—To the Botanic Gardens, Adelaide.—2 cases containing 66 Plants.
March 5th.—To Mr. McGinn, Botanic Gardens, Cape Town.—25 packets Seeds.
March 5th,—To Mr. Wilson, St. George's Park, Port Elizabeth, South Africa.—25 packets of Seeds.
March 25th.—To the Royal Gardens, Kew.—60 packets of Seeds.
May 31st.—To Mons. J. Verschaffett, Ghent, Belgium.—6 Tree Ferns, 6 and 8 feet.
June 18th.—To the Royal Gardens, Kew.—100 packets of Seeds.
July 24th.—To the Melbourne Botanic Gardens.—30 packets of Seeds.
July 24th.—To Mr. G. Brunning, Nurseryman, St. Kilda, near Melbourne.—32 Plants, 50 packets of Seeds.
October 2nd.—To D. Manning, Sydney.—24 Plants.
December 2nd.—Per "Ethel," to Mons. Jean Verschaffet, Ghent, Belgium.—3 Tree Ferns, each about 12 feet in length.

PLANTS SUPPLIED FOR THE DECORATION OF PUBLIC PLACES, DURING 1872.

May 7th.—H.M. Gaol, Campbell-street.—68 Plants.
May 22nd.—The Longford Church Grounds.—70 Plants.
May 22nd.—The High School Grounds, Hobart Town.—64 Plants.
May 22nd.—Campbell Town Church Grounds.—83 Plants.
May 22nd.—Jew's Synagogue, Hobart Town.—64 Plants.
May 30th.—Church of England Grounds, Broadmarsh.—84 Plants.
May 31st.—Church of England Grounds, Avoca.—55 Plants.
June 6th.—The Public Offices, Launceston.—21 Plants.
June 10th.—Public School, Bagdad.—60 Plants.
July 6th.—Hobart Town City Council for Castray Esplanade.—17 Elms.
July 16th.—For Town Hall Grounds.—100 Plants.
July 30th.—The Cemetery Grounds, New Town.—286 Plants.

F. ABBOTT, Jun.

LIST OF PLANTS INTRODUCED INTO THE ROYAL SOCIETY'S GARDENS DURING 1872.

Acer Tataricum
Alnus macrophylla
Amaranthus atropurpureus
Amelanchier montana
Ampelopsis japonica
Anona cherimolia de loxa
Antigonon leptopus
Arabis aremosa
Arbutus andrachne
Betula lutea
Bontelona curtipendula
Brahia egregia
Calodendron capense
Campanula altiidiifolia
,, medium roseum
Carica gracilis
Centaurea candidissima
Ceroxylon niveum
Chamœrops stauracantha
,, tomentosa
Chamœdorea Ernest Augusti
Chrysophyllum carinito
Cinnamomeum cericeum
Citrus limoton
Clivia miniata
Cocos australis
,, flexuosa
,, wallisi
,, yurumaguas
Coreopsis aristosa
Cotoneaster acuminata
,, boxlearia
,, granatensis
,, rotundifolia
,, vulgaris
Cratœgus fructo lutea
,, oxycantha flava
,, ,, lutescens
Cupressus Lawsoniana argenta
,, ,, erecta
,, ,, gracilis
Cyclobothria pendula
Cyperus cylindrostachys
Datura gigantea
Delphinium nudicaule
,, regninii
Deutzia crenulata variegata
Ebenus criticus
Echeveria secunda
Erigeron glabellum
Eschscholtzia rosea
Eucalyptus alpina
,, behryana
,, corymbosa
Eucalyptus colossea
,, elliptica
,, eugenoides
,, gonyocalyx
,, gunni
,, hemiphleia
,, lencoxylon
,, madrorhyncha
,, megacarpa
,, nutans
,, pilularis
,, polyanthem
,, punctata
,, resinifera
,, siderophleia
,, stricta
Fagus nigra
Gaillardia admiration
,, loisellii
Galasine azurea
Genista radiata
Glaziova insignis
Hæmanthus insignis
Hedera canariensis maculata
,, helix marmorata
Hyacinthus candicans
Iberis linifolia
Ilex hodginsi
,, laurifolia
,, myrtifolia
,, scottica
,, shepherdii
Jubaea torallis
Juglans granatensis
Kyllingia triceps
Lachenalia rosea
,, superba
Lantana sellowii
Lecythis ollaria
Lilium thompsonianum
,, thunbergianum
Livistonia rotundifolia
Lupinus mutabilis
,, subcarnosus
,, venustus
Lychnis lagascoi
Lycium arnosum
,, chinense
Machirerium firmum
Mahortica speciosa
Martinezia lindeniana
Mathiola tricuspidata
Morenia lindeni
Myosotis dissitiflora

Narcissus monophyllus
Nerine corusca
Nigella hispanica atropurpurea
Orbigna dubia
Oxalis andrieuxii
,, articulata
,, bipunctata
,, deppei
,, filifolia
,, flava
,, grandiflora
,, ,, alba
,, ,, rosea
,, lactiflora
,, lasiopetala
,, monophylla
,, multiflora
,, obtusa
,, pentaphylla
,, rosacea
,, rubella
,, rutilans
,, tetraphylla
Pectis angustifolia
Persia frigida
Phœnix tenuis
Pinus tongiana
Piper fucudosuro
Pittosporum ralphii
Platystemon californicum
Plumbago rosea
Populus angulata
,, betulæfolia
,, græca
,, macrophylla
Prunus candicans
,, orientalis
,, padus
,, semperflorens
Pterocarya caucasica
Pyrus aurantiaca
,, baccata macrocarpa
,, communis nivalis
,, hyemalis
,, pinnatifida
Quercus serrata
Rhapis flabelliformis variegata
Rhopala granatensis
Rosa arvensis andersoni
,, barkeri
,, cinamonica
,, hailstoni
,, lucida
,, microphylla
,, mollissima
,, rubiginosa latifolia
,, ,, major
,, spinosissima
Rosa spinosissima astiflora
,, ,, pusila
,, ,, rubra
,, ,, variegata
,, ,, vulgaris
Sabal princeps
Salix alba
,, americana pendula
,, conifera
,, lambertiana
,, napoleana
,, rosmarinifolia
,, russelliana
Salvia camphorata
,, pischeri
,, russelliana
Sedum maximoniczii
Senecio centropappus
Spirœa chamædrifolia
,, cratægifolia
,, grandiflora
,, indica
,, nutans rhamnifolia
,, salicifolia paniculata
,, tomentosa
,, vacciniæfolio
Spondias pleiogyne
Swainsonia splendens
Syringa emodi
,, vallettiana
,, virginalis
Theophrasta imperialis
Thermopsis fabacea
Thuja orientalis sieboldtii
,, ,, elegantissima
Tilia grandiflora
,, pubescens
Triconema rosea
Tripsacum monastachym
Vitis hypoglanca
Weigela lavallii
Zea Cuzco

ROSES.

Abbé Girandiere
Alphonse Fontaine
Berthe Baron
Christine Neilson
Climbing Victor Verdier
Grand Duchesse Marie
General de la Martiniere
Louis Van Houtte
Madame Alice Dereau
Madame Decour
,, Eugenie Verdier
,, Hippolyte Jamin

Madame Tauffle
,, William Paul
Marquis de Castellane
Paul Neron
Princess Christian

FUCHSIAS.

Angelena Braemt
Angelic
Avalanche
Blanchette
Catherine Parr
Gazelle
Herald
Inimitable
Jolly
Lady Dumbello
Lustre
Model
Purple Prince
Tower of London
Vainquer de Puebla
Warrior Queen
White Eagle

DOUBLE GERANIUM.

Andrew Henderson
Camelliæflora
Consul
Crown Prince
Memmon
Pink Perfection
Victor Lemoin
Ville de Nancy

ZONAL GERANIUM.

Dr. Meuret
Lavinia

Hyacinths, 100 named varieties
Tulips, 30 named varieties
Crocus, 12 named varieties
Gladiolus, 30 named variecies

F. Abbott, Jun.

PRINTED AT THE "MERCURY" STEAM PRESS OFFICE.

METEOROLOGY.

MARCH, 1872.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In	°	°	°	°			
1	30·211	30·176	79	58	114·0	57·0	SE	1·04	
2	30·065	29·904	90	56	127·0	52·5	W SE S	1·04	
3	30·211	30·119	82	55	70·5	55·5	SE	·52	
4	30·270	30·129	86	56	118·0	52·5	NW SE	·78	
5	30·206	30·154	86	54	123·5	52·5	NW SW SE	1·04	
6	30·198	30·123	93	55	124·0	58·5	NW N	1·04	
7	29·997	29·840	96	64	126·5	62·5	NW	1·56	
8	30·007	29·913	90	59	95·0	59·0	SE	·58	0·05
9	30·115	30.087	85	47	100·0	43·0	NW SE	1·04	
10	30·124	30·117	81	45	95·0	41·5	NW SE	1·56	0·03
11	30·255	30·189	75	40	108·0	35·5	NW SE	1·04	
12	30·184	30·002	73	49	91·5	43·5	NW	·78	0·11
13	29·915	29·899	69	57	71·0	55·5	NW NE	·26	0·30
14	29·940	29·909	71	60	93·0	59·0	NW NE	·52	0·02
15	29·865	29·728	77	57	97·0	54·0	NW NE	·78	
16	29·701	29·687	73	56	73·0	53·0	NW NE	·26	0·45
17	29·874	29·815	72	58	107·0	55·5	S SE E	·78	0·03
18	30·130	29·982	72	50	100·0	48·5	NW S SE	·78	
19	30·275	30·227	69	54	75·5	52·0	NW S E	0·	
20	30·229	30·097	69	47	99·0	44·5	NW NE	·78	
21	30·092	30·003	77	49	112·0	42·0	NW SE	·52	
22	29·974	29·914	74	52	94·0	48·0	NW SE	1·30	
23	29·915	29·829	80	57	109·0	54·5	NW S SE	·78	
24	29·879	29·832	76	50	108·0	46·5	NW SE S	·78	0·27
25	29·786	29·737	72	54	96·0	47·0	S SE	3·12	0·06
26	29·704	29·574	66	55	72·5	52·0	NW SE S	3·12	0·35
27	29·625	29·620	63	54	63·0	47·5	SE	1·04	0·08
28	30·029	29·834	64	50	99·0	48·0	SE SW	1·04	0·07
29	30·311	30·300	65	41	103·0	37·0	NW SE	1·04	
30	30·319	30·250	72	44	102·0	40·0	NW E SE	·26	
31	30·125	29·985	72	44	106·5	41·0	NW SE	1·04	
Monthly mean 30·018			63·68		99·15	49·65	Total Force	32·76	2·27

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

The direction of the wind is registered from currents moving at a height of 102 feet and the force according to Lind's Wind Gauge. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

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

The 25 years' standard tables are used for obtaining the difference from the average.

Barometer mean, 30·018in., being 1·163in. above the average.
Temperature mean, 63·68°, being 3·92° above the ditto.
Solar intensity mean, 99·15°, being 10·04° below the ditto.
Dew point mean, 53·08°, being 3·86° above the ditto.
Humidity of air mean, ·71, being the same per cent.
Elastic force of vapor mean, ·418, being ·052 per cent. above the ditto.
Total amount of rain, 2·27in., being 0·60in. above the ditto.
Increase of spontaneous evaporation on rainfall, 58in.
Mean amount of ozone, 7·32, being 0·31 of chromatic scale above the ditto.
Electricity comparatively feeble through the month.
Thunder, lightning, and rain on the 13th.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, during the month.

15th.—Coe's Golden Drop Plum ripe.
20th.—Seckle Pear commencing to ripen.
21st.—Tips of Elm turning yellow.
25th.—Leaves of Horse Chestnut turning brown.
28th.—Ash leaves commencing to fall.
30th.—Oak ditto ditto.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE HOBART TOWN REGISTRATION DISTRICT DURING THE MONTH OF MARCH, 1872.

By E. Swarbreck Hall.

The most marked phenomena in the weather this month were the high but tolerably steady atmospheric pressure; the warm mean, but very variable daily-range, of temperature; great elastic force of vapour; heavy rain-fall; small aerial movement; cloudy skies; pure air; and unusually defective electricity indications. The death rate total was above the average, but principally in children under one year old, and persons above 60 years old.

Atmospheric pressure mean, 30·018, was +·141 above the 30 years' mean for March. Minimum, 29·574, was registered on the 27th; maximum, 30·319, on the 30th, being a range in three days of ·745 of an inch. Within this period 10 deaths occurred, while in twice that number of days previously there were only 3 deaths. The greatest movement of the barometer in any 24 hours, from 1 p.m. to 1 p.m., was a rise of +·386 of an inch on the 29th. On eight other days there were movements exceeding one-fifth of an inch.

Wind-force, 32·76 lbs., was −21·89 below the average. Gentle sea-breezes from the *south-east* preponderated both in frequency and force. The wind from any quarter only attained the force of 2·60 lbs. pressure to the square foot, twice, on the 25th and 27th, one a *south* the other a *south-east* wind. *Calms* were 24, being −4·22 below the average. *Temperature* mean, 63·68 degrees, was +3·76 above the 30 years' average for March, and was as hot as the mean for February. The maximum, 96 degrees, was noted on the 7th, and the minimum, 40 degrees, in the night of the 11th, being a range in five days of 56 degrees. On these five days there were 13 deaths, but the effects of this rapid and extensive variation in temperature, with rain and cold winds, extended to the 13th inclusive, there being altogether within this period of the month 22 out of the total deaths of the month. The *wet bulb thermometer* mean, 57·99 degrees, was +4·04 above the average.

Daily-range of temperature mean, 23·61 degrees, was +3·77 above the average. Only March, 1856, had a higher mean, *i.e.*, 23·80. The greatest range in any 24 hours was registered on the 9th, being 38 degrees.

Solar-intensity mean, 99·15 degrees, was −4·35 below the average. There was, however, so great an excess in the cloud mean that the sun's rays when unintercepted were really unusually hot. The maximum was 126·5 degrees on the 7th.

Terrestrial-radiation mean, 49·65 degrees, was +1·72 degrees above the average. Of course this is usually the case with an excess of cloudy nights. The lowest record was 35·5in the night of the 11th.

Elastic-force of vapour mean, 418, was +61 above the 30 years' mean. March, 1856, only had a higher mean, *i.e.*, 450. The range was from maximum 598 at noon on the 5th, to minimum 215 at 7 a.m. on the 11th.

Humidity mean, 71, was exactly the March mean of the 30 years.

Rain fell to the aggregate amount of 2·27 inches, which is +·67 of an inch above the average. There were 12 days on which rainfell, being +3 above the average. On the 8th, 13th, 16th, 24th, 26th, enough fell to flush drains, sewers, &c.

Spontaneous evaporation exceeded rain-fall very slightly, being only 2·85 inches. This is a very small amount of evaporation for March, but of course in this month the small wind-force and the excess of cloudy weather account for it.

Cloud mean, 6·16, was +·74 above the average.

Ozone mean, 7·32, was +·21 above the average. *Saturation*,, 10 was recorded five times. The prevalence of sea-breezes and the great rain-fall maintained high aerial purity.

Electricity was in a very unusual state this month. There were only 5 *positives* with tension from 4 to 5·5; *negatives* were 36, with tension only from 1 to 4. There were 21 *nils*. *Thunder* and *lightning* occurred with rain in the afternoon of the 13th.

The *deaths* were 58, being $+3^{14}/_{15}$ above the average for March of the previous 15 years. 1858 and 1864 alone exceeded the present month, having

respectively 66 and 73 deaths each. The smallest number in any month was 42 in 1869. Under one year old there were 16 deaths, several only a few hours or days old ; from 1 to 2 there were 3 ; from 2 to 3 the deaths were two ; from 3 to 4 one ; from 4 to 5 none ; from 5 to 10 one ; from 10 to 15 none ; from 15 to 20 two ; from 20 to 60 there were 13 ; at 60 and all ages above, the oldest being 92, there were 20. In the *Zymotic class of diseases* there were 14 deaths ; of these 11 were from *bowel complaints*, nearly all young infants. One, a girl of 18, registered *Common Continued Fever*, but with suspicion that sunstroke was the exciting cause. A young wife, aged 22, died from *Typhoid Fever*, and her only child, aged 11 months, died the day after, registered *Diarrhœa*, most probably typhoid also. In the previous month a woman, aged 21, died close to the above, registered *Enteritis*, but very likely the result of the typhoid poison. Intelligent neighbours report six cases with three deaths from this cause in a group of houses in Warwick-street, between Argyle and Campbell-streets. The drainage there is very bad, and at the back and on one side of these houses the soil in two paddocks is a swamp from sewage. From time to time deaths occur from this preventible disease in Hobarton, warning us to put our sewage in order, ere this disease becomes the terrible scourge that it is in the home country. If not thoroughly disinfected, the dijecta from typhoid patients become carriers of the disease to others in various ways of the most repulsive nature. The 14th death in the zymotic class was from *Thrush* in an infant. In the 2nd, or *Constitutional class* of disease, there were 12 deaths, 6 of them from *Consumption*. Two of these were natives of Tasmania, 2 Irish, one being a visitor from Victoria, 1 English, 1 a sailor, a native of the South Sea Island of Tanna. Diseases in the 3rd class, *Local Diseases*, need not all be commented on, but those of the *Brain and Nervous System* caused 10 deaths ; the *Heartand Organs of Circulation* 3 ; the *Lungs and Organs of Respiration* 3 ; *Organs of Digestion* only 1 ; *Urinary Organs* 3. Of the remaining classes it will suffice to state that *Old Age* caused 7 deaths ; *Atrophy and Debility* 3 ; *Premature Births*, &c., 2 ; *Accident* only 1. No *Inquests* were held this month. In the *Hospital* there were 8 deaths, five of them belonging to other " Registration Districts." At the *Brickfields Male Asylum for Invalids* there were 3 deaths, aged respectively 64, 66, 71. At the *Cascades Invalid Asylum* two men, aged 61 and 65, and one woman, aged 68, died.

APRIL, 1872.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	29·842	29·752	69	44	97·0	41·5	NW SE W	2·86	
2	29·974	29·940	66	48	100·0	45·0	SW SE E	1·04	
3	30·062	30·019	71	44	105·0	38·5	W SE S	·52	
4	29·852	29·699	73	49	98·0	44·5	NW SE	·78	
5	29·663	29·627	70	51	68·0	50·0	NW	·78	0·03
6	29·580	29·547	70	52	86·5	50·0	NW	1·30	
7	29·921	29·832	67	49	100·0	47·0	NE SW NW	·52	
8	29·769	29·704	68	49	85·0	47·5	NW	5·99	0·07
9	29·921	29·904	65	48	97·0	43·5	SW NE S	2·60	
10	30·021	29·998	69	43	99·0	39·5	W NW	·52	
11	30·241	30·182	65	46	92·0	42·0	NW W SW	·52	
12	30·302	30·103	72	38	100·0	33·5	NW	1·04	
13	29·929	29·829	70	49	94·5	44·0	N NW SW	5·72	0·50
14	30·108	30·065	67	40	60·5	36·0	SW NW SE	·78	
15	30·192	29·976	65	45	84·0	40·5	NW SE NW	·78	
16	30·135	30·010	74	44	103·0	41·0	SW E SE	·78	
17	30·182	30·135	72	50	101·0	46·0	NW E SE	1·30	
18	30·194	30·157	70	45	100·0	41·5	NW E SE	1·04	
19	30·174	30·049	76	45	103·5	42·0	NW NE SE	1·04	
20	29·937	29·918	71	47	98·0	43·0	NW	3·12	0·70
21	30·010	29·900	69	43	71·5	40·0	W SW S	10·94	0·23
22	30·003	29·974	65	46	90·0	39·5	SW S	7·80	0·23
23	30·087	30·052	64	49	22·0	47·0	SW	0·	0·03
24	29·945	29·776	61	46	68·0	43·0	NW SE	0·	0·16
25	29·818	29·752	60	53	97·0	49·5	S SE	·52	
26	30·075	30·029	64	53	88·0	52·0	SE	0·	
27	30·198	30·179	70	44	97·0	40·5	NW SE	0·	
28	30·242	30·224	67	45	81·0	40·0	NW NE SE	0·	
29	30·255	30·085	70	41	93·5	37·0	NW SE	·52	0·06
30	29·950	29·776	65	44	70·0	38·5	W NW	·26	
Monthly mean 29·981			56·42		90·07	42·78	Tota force	53·07	2·01

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Barometer mean, 29·981in., being 0·090in above the average.
Temperature mean, 56·42°, being 1·39° above the average.
Solar intensity mean, 90·07,° being 00·74 below the average.
Dew point mean, 48·2,° being 1·09° above the average.
Humidity of air mean, ·75, being ·01 per cent. below the do.
Elastic force of vapour mean, ·338, being ·013 per cent. below the ditto.
Total amount of rain, 2·01in , being 0·23in. above the ditto.
Increase of spontaneous evaporation on rainfall, 0·24in.
Mean amount of ozone, 7·41, being 0·42 of chromatic scale above ditto.
A feeble amount of electricity all through the month. Thunder on the 4th. Large fall of snow on Mount Wellington on the 21st. Aurora on the 29th.

Leafing, Flowering, and Fruiting of a few standard plants in the Royal Society's Gardens during the month.

18th. Coes late red plum commencing to ripen.
14th. Chinese Chrysanthemums commencing to flower.
16th. Elm leaves commencing to fall.
26th. Black Ash ditto ditto.
26th. Black Mulberry ditto ditto.
30th. Seeds of Hornbeam ripe.

FRANCIS ABBOTT.

V.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE HOBART TOWN REGISTRATION DISTRICT DURING THE MONTH OF APRIL, 1872.

By Dr. E. Swarbreck Hall.

The only meteorological phenomena of this month adverse to health were excessively high daily-range of temperature and high elastic-force of vapour. On the other hand, wind-force, temperature, rainfall, ærial purity, were all propitious to health and life, and consequently the deaths in the month were one-sixth less than the average of the previous 15 years' Aprils.

Atmospheric-pressure mean, 29·981, was only +·069 above the 30 years average for April. The maximum was 30·302 on the 12th, the minimum 29·547 on the 6th, the extreme range of the barometer being therefore only ·755 of an inch. The greatest movement in any 24 hours was a fall of—·395 of an inch on the 13th. On eight other days the movements exceeded one-fifth of an inch.

Wind-force total, 53·07 lbs., was, +6·13 lbs., above the April average. From the four healthiest points of the compass, S.E., S., S.W., W., the winds, both in frequency and force, greatly predominated over the other less favourable points. The strongest winds had a pressure of 5·21 lbs. to the square foot, and were recorded three times. Calms were registered at 32 out of the 90 observations, being +2 above the average.

Temperature-mean, 56·42°, was +1·09 above the average. The maximum was 76 on the 19th, the minimum 38 on the 12th. The *wet-bulb Thermometer* had the mean of 51·91°, being +0·82 above the average.

Daily-range of temperature, 21·83°, was +4·47 above the average. In only two years out of the 30, in 1857 and 1858, was the daily-range higher. Its effects were scarcely appreciable on deaths from diseases of the organs of circulation and respiration, but the deaths from apoplexy and paralysis were unusually nnmerous. The greatest range on any day was 34 degrees on the 12th; the high day maximum of that day being 72 degrees, and the low night minimum 38 degrees.

Solar-intensity mean 90·07 degrees, was — 1·67 below the average, the cloudy days being above the average. The maximum was 105 degrees on the 16th. Only two Aprils in the last 18 years have had a lower maximum.

Terrestrial-radiation mean, 42·78 degrees, was – ·91 below the average. The minimum was 33·5 degrees in the night of the 12th.

Elastic-force of vapour mean, 338, was × 9 above the average. The range was from 226 on the 12th to 485 on the 24th.

Humidity mean, 75, was — 1 below the average.

Rain-fall was 2·01 inches, being × ·24 of an inch above the average. It fell on 9 days, being — 1·70 less than the average. On two days, however, the rain was very heavy, *i.e.*, half an inch on the 13th and nearly three-quarters of an inch on the 20th, and nearly one-quarter of an inch on each of the two following days, so that as far as rain-fall can cleanse our drains, sewers, and city rivulet, they had this desirable advantage. *Snow* fell abundantly on Mount Wellington on the 21st and 22nd, but was not visible during the rest of the month.

Spontaneous evaporation amounted to 226 inches.

Cloud mean, 6·59, was × ·85 above the average.

Ozone had the mean of 7·41, which is × ·35 above the average. Only twice before in the previous 15 years has there been more ozone in April. Saturation (10) was recorded 7 times.

Electricity.—There were 15 "positive" records with tension 2 to 5. The "negatives" were 26, with tension from 1 to 4. "Nils" were registered 16 times out of the 60 observations.

Thunder was heard on the evening of the 4th. An *Aurora* was seen on the evening of the 29th.

The *Deaths* were 35 in number, being — $6^{10}/_{15}$ less than the average of the previous 15 years. Under one year old there were 6 deaths; from 1 to 5 there was only 1; from 5 to 10 also 1; from 10 to 15 there were 2; from 15 to 20 none; from 20 to 60 there were 14; at 60 and all ages above there were 11; the oldest being 79 years old. In the *Zymotic* class of diseases, there were 4 deaths, all from Diarrhœa. One of these, a child aged 7 months,

died in the group of houses where the deaths from typhoid fever occurred, referred to last month. Altogether the deaths in this group of houses during the three months (estimating the population at 150 persons) has been about six times more than the average for the whole city. In the *Constitutional class* of diseases there were 8 deaths. *Cancer* 3 ; Tabes Mesenterica 1 ; *Consumption* 4. Of the latter, two boys, aged 11 and 13 respectively, were natives of Tasmania. In the *Local class* of diseases The 1st order, the *Brain and Nervous System*, had 7 deaths ; 6 of them from *Apoplexy*, 1 from *Paralysis*. In the 2nd order, the *Heart and Organs of Circulation*, there was only one death. In the 3rd order, the *Lungs and Organs of Respiration*, there were 3 deaths. In the 4th order, *Stomach and Organs of Digestion*, there were 3 deaths. From *old age* there were 6 deaths, which with a child 5 weeks old from *malformation*, and one from *suffocation* (overlaid), and another *found drowned*, makes up the total deaths for April. There were 3 *Inquests*. In the *Hospital* there were only 4 deaths ; two of them from other Registration-Districts. At the *Cascades Invalid Asylum* two men died, aged 69 and 77, and two women, aged 62 and 69. At the *Brickfields Male Invalid Asylum* 5 died, aged 49, 50, 57, 67, 75. One of these, however, had been removed from the public Hospital only five days before, and should therefore have been a Hospital death. In March, too, one of the deaths at the Brickfields was a man nearly moribund sent there instead of to the Hospital. He died a few days after admission. This practice was condemned long ago, and it was under stood that the dying should not be sent to an establishment which has not proper hospital requisites.

MAY, 1872.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of month.	Bar. 37 feet abv. sea level corrected & reduced. Highest.	Bar. 37 feet abv. sea level corrected & reduced. Lowest.	Self-Registering Thermometers. Highest in shade.	Self-Registering Thermometers. Lowest in shade.	Self-Registering Thermometers. Highest in sun.	Self-Registering Thermometers. Lowest on grass.	Wind. Direction from three daily registers.	Wind. Force in lbs. per square foot.	Rain in Inches.
	In.	In.	°	°	°	°			
1	29·638	29·591	64	46	66·5	43·5	SE NW SW	.26	0·20
2	29·822	29·803	64	37	87·0	33·0	NW SW	1·30	
3	29·976	29·892	66	32	91·0	30·0	SW NE SW	·52	
4	30·154	30·072	63	34	90·0	29·5	NW E	·78	0·02
5	30·181	30·134	62	38	83·5	33·0	NW	·78	0·09
6	30·328	30·260	63	40	87·5	35·0	NW SW W	·52	
7	30·421	30·326	68	34	92·0	30·5	SE NW	·26	
8	30·322	30·147	62	35	85·5	30·0	NW	1·56	
9	30·000	29·922	59	45	63·0	41·0	NW	·26	
10	29·992	29·729	57	47	79·0	43·5	NW SW	·26	0·24
11	29·642	29·533	68	47	91·0	42·5	NW N	·78	0·03
12	29·443	29·320	68	46	87·5	40·0	NW	·52	
13	21·721	29·593	65	45	93·5	42·0	NE NW E	·78	
14	29·893	29·834	59	46	79·0	42·0	NW NE SE	·52	0·02
15	29·603	29·431	57	44	68·0	42·0	NW	·78	
16	29·554	29·525	64	40	87·0	36·5	NW N NW	1·04	0·10
17	29 722	29·688	63	48	88·5	43·0	NW E SE	·52	
18	29·730	29·723	61	50	62·0	44·0	SE	5·72	0·45
19	29·402	29·302	54	48	60·0	43·0	SW S	7·80	0·42
20	29·606	29·312	51	39	53·0	34·3	NW NE SW	3·38	0·19
21	30·045	30·019	63	43	89·0	33·5	NW	1·30	
22	30·095	30·079	66	48	66·0	33·0	NW	3·64	0·12
23	30·040	29·727	65	48	89·0	46·5	NW	3·12	0·44
24	30·069	30·012	67	37	81·0	31·5	NW	1·30	
25	30·085	30·033	55	45	54·0	42·0	NW N	1·30	0·01
26	29·837	29·735	70	49	91·0	44·5	N NW	1·30	0·30
27	30·290	30·002	66	45	88·0	42 5	SE SW	1·30	
28	30·380	30·341	60	33	80·5	29·0	NW	·78	0·01
29	30·377	30·301	59	34	76·0	29·5	NW	1·04	
30	30·198	30·142	58	36	75·5	31·0	NW	·78	
31	30·093	30·002	57	36	80·0	32·0	NW	1·04	
Mean Monthly 29·905			51·19		79·50	37·21	Total Force		2·64

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Barometer mean, 29·905in.. being 0·058in. above the average.
Temperature mean, 51·19°, being 0·91° above the average.
Solar intensity mean, 79·50° being 2·37° below the ditto
Dew point mean, 42·8°, being 0'68° below the ditto.
Humidity of air mean, ·78, being ·02 per cent. above the ditto.
Elastic force of vapour mean, ·294, being ·008 per cent. below the ditto.
Total amount of rain, 2·64in., being 0·83in. above the ditto.
Increase of rain fall on spontaneous evaporation, 1·25in.
Mean amount of ozone, 7·05, being 0·25 of chromatic scale above ditto.
Electricity active on the 4th, 6th, 7th, 8th, 13th, 14th, 21st, 24th, 26th, 27th, and 31st.
Mount Wellington covered with snow on the 20th, with a fresh additional fall on the 21st.
Auroras on the 27th and 28th.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

21st—Coronilla glauca commencing to flower.
25th—Photinea serrulata ditto
27th—Diosma alba ditto.
30th—Spiræa prunifloia ditto.
31st—Ailanthus leaves all shed.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE HOBART TOWN REGISTRATION DISTRICT DURING THE MONTH OF MAY, 1872.

By E. Swarbreck Hall.

The total deaths this month exceeded that of any May in the previous 15 years. Great fluctuations in atmospheric pressure, and very great daily variations of temperature, seem to have been the principal agents in causing the high death rate in previously diseased and debilitated persons. Deaths from zymotic and acute inflammatory affections were very small, and of young persons below 20 years old the deaths were at a minimum.

Atmospheric pressure mean, 29·905, only exceeded the 30 years' average for May by +·094 of an inch. The maximum, 30·421, occurred on the 7th; the minimum, 29·302, on the 17th, being an extreme range in the month of 1·119 inches. But the daily fluctuations were very great, the highest recorded being a rise of ×·565 on the 21st, and on 13 other days there were movements of the barometer above one-fifth of an inch. In all respects atmospheric pressure differed much from what it was in May, 1871.

Wind force.—Total 45·24lbs., was + 12·25 above the average, and nearly three times as much as May, 1871, had. Out of the 93 observations 60 were from the *North-west*, with nearly one-half of the total force. *South-west* came next, both in frequency and force, being 12 of the former, 10·66lbs. of the latter. The strongest winds had only 2·60lbs. pressure to the square foot, and were registered 7 times. *Calms* were registered at 20 of the observations, being 22·80 below the May average. Constant moderate winds prevailing principally from the quarter least favourable to health was therefore the wind character of the month.

Temperature mean 51.19 degrees was only +0·57 above the 30 years' average, and —1·29 less than in May, 1871. The maximum high-day temperature by the self-registering thermometer was 70 degrees on the 26th, and the mean of all the maxima was 62·06. The minimum of the low-night temperature was 32 degrees (freezing point) in the night of the 3rd. The mean of all the minima was 41·77 degrees. The Wet-Bulb Thermometer mean of the self-registering thermometers was 46·77 degrees.

Daily Range of Temperature had the mean of 20·29 degrees, being +4·94 above the 30 years' average. Only May, 1857, exceeded this, being 22·40. May, 1871, had only 16·32. The greatest range in any 24 hours was 34 degrees registered both on the 3rd and 7th.

Solar Intensity mean was 79·50 degrees, being 2·66 less than the average. The maximum was 93 degrees on the 5th and 13th.

Terrestrial Radiation mean 37·21 degrees, was —2·77 below the average. The minimum was 29 degrees in the night of the 28th. In 6 other nights it was below freezing point. In May, 1871, this thermometer never fell below freezing point, the minimum being 43 degrees.

Elastic force of vapour mean 294, was —10 below the average.

Humidity mean 78, was —2 below the average, notwithstanding the excess in rain-fall.

Rain-fall total was 2.64 inches, being +·87 above the average. It was recorded on 15 days, which is + 2·25 above the average. *Snow* appeared on Mount Wellington on the 19th, and never disappeared during the rest of the month, but received some additions.

Spontaneous Evaporation amounted to 1·39 inches only.

Cloud mean, 6·58, was + 1·08 above the average.

Ozone mean, 7·05, was + 20 more than the average. Saturation (10) was recorded 8 times out of the 26 observations.

Electricity. There were 15 positive with tension from 3 to 6; negatives 31 with tension from 1 to 4, and 16 nils. No *lightning* seen or *thunder* heard. *Aurora-Australis* visible on the nights of the 28th and 29th.

The *Deaths* were 51 in number, being + 11 1-15 above the May average of the previous 15 years, one more than May, 1857, had, and 18 more than in May, 1871. The third week had the most deaths, 16; the first week the fewest, 6; the second and fourth weeks each 13; the last 3 days 3; on 3 days there were no deaths; on the 16th, 17th, 25th, there were four deaths each day. The

five days 15th to 19th inclusive had the greatest number (15) of consecutive deaths. Under one year old there were only 4 deaths, two of them accidentally suffocated in bed with their mothers, and respectively aged 6 weeks and two months; another only 14 days old died of "convulsions and general debility." The fourth, 5 weeks old, is supposed to have died from "some disease of the bowels." Between 1 and 5 years old, there was one death; none in the next quinquenium; one between 10 and 15; two between 15 and 20. Altogether there was only one more death this month under 20 years old than in May last year. At 20 to 60 years old there were 28 deaths, being an unusually large proportion of the total deaths, 1871 having only had 10 deaths. At 60 and all ages above, the oldest being 87, there were 15 deaths, being one less than May, 1871, had. In the *Zymotic* class of diseases there was one death, a man aged 40, registered "Dysentery." In the *Constitutional* class there were altogether 10 deaths, 6 of them from *Consumption*, of whom 3 were born in Tasmania. In one of these, however, I have reason to doubt the accuracy of the Diagnosis. One of the others was a gentleman lately from England, the other 2 born in Ireland. In the *Local* class of diseases, always the most numerous, the total deaths were 27 : of these 11 were of the *Brain*, &c., mostly sudden deaths, from apoplexy and paralysis ; 6 were from diseases of the Heart, &c., only 4 from Lung, &c., affections ; 4 from organs of Digestion &c. ; 2 from Kidneys, &c. In the *Developmental* class there were 6 deaths, two of young women a few days after childbirth; 4 only from old age. In the *Violent and Accidental* class, there were 7 deaths. In *Hospital* there died 9, two of them received from other Registration Districts, other 2 sailors. There were 7 *Inquests*, inclusive of 4 of the deaths in Hospital. At the *Brickfields Invalid Asylum* for men, there died 3, aged 48, 58, 74. At the *Cascades Invalid Asylum* for both sexes, there died 2 men aged 40 and 76, two women aged 55 and 61.

JUNE, 1872.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·072	29·925	53	36	82·5	33·5	NW	·78	
2	30·061	29·882	60	40	82·0	36·0	NW	·78	0·02
3	29·959	29·750	59	40	59·5	34·0	NW	·26	1·29
4	29·459	29·336	56	37	55·0	47·0	SW	15·63	3·46
5	20·934	29·837	64	44	87·0	40·0	SW NE	1·30	
6	30·048	29·977	62	42	72·5	30·0	W S SE	·26	0·02
7	30·182	30·158	60	32	79·0	28·0	NW	·52	
8	30·161	30·037	60	44	70·0	33·5	NW SW	·78	0·06
9	30·305	30·194	57	40	75·0	36·0	SW W SE	1·04	
10	30·372	30 251	60	33	85·5	27·0	SW E SW	·52	
11	30·074	29·932	65	35	90·0	32·0	NW SW	1·30	0·06
12	29·876	29·803	54	43	64·0	39·0	S SW NW	0·	0·05
13	29·850	29·762	50	41	58·0	38·0	NW SE	·52	0·16
14	29·965	29·950	60	40	87·5	38·5	NW	·52	
15	29·874	29·756	59	37	62·0	29·0	NW NE	·52	0·12
16	29·708	29·656	54	43	67·5	37·0	NW SW SE	·52	
17	29·910	29·828	58	35	78·0	28·0	NW	·78	0·07
18	29·614	29·554	51	39	57·5	32·5	NW	.26	0·46
19	29·504	29·409	54	42	60·0	41·0	NW	·52	0·05
20	29·341	29.327	64	40	87·0	34·5	NW	1·04	0·01
21	29·403	29·310	68	44	86·5	36·5	NW	·52	
22	29·246	29·178	60	43	67·0	36·0	NW	·52	0·09
23	29·255	29·045	58	44	79·5	41·0	NW	1·04	
24	29·365	29·139	55	41	57·5	32·0	NW	1·04	0·06
25	29·488	29·454	63	44	84·0	41·0	NW	·78	0·03
26	29·801	29·609	59	43	65·0	38·5	SW W	1·04	
27	29·877	29·606	56	39	76·0	29·0	NW	·52	0·31
28	29·663	29·456	68	46	87·5	42·0	SW SE	·78	
29	29·706	29·596	62	38	68·0	33·0	NW	·52	0·01
30	29·338	29·309	63	42	85·5	36·0	NW	1·30	
Mean Monthly 29·712			48.36		73·70	35·32	Total Force	35·91	6·33

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Barometer mean, 29·712in.. being 0·179in. below the average.
Temperature mean, 48·36°, being 1·27° above the average.
Solar intensity mean, 73·70° being 1·79° below the ditto
Dew point mean, 41·7°, being 0·01° below the ditto.
Humidity of air mean, ·81, being ·02 per cent. above the ditto.
Elastic force of vapour mean, ·274, being ·005 per cent. below the ditto.
Total amount of rain, 6·33in., being 4·53in. above the ditto.
Increase of rain fall on spontaneous evaporation, 2·98in. ditto.
Mean amount of ozone, 6·89, being 0·28 of chromatic scale above ditto.
A very feeble amount of atmospheric electricity all through the month; out of 90 records there were 53 nils.
Aurora on the 10th and 27th.
Snow never absent from Mount Wellington with frequent fresh deposits.
Lightning on the 30th.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

18th—Osage Orange leaves commencing to fall.
20th—Common Privet leaves shedding.
28th—Calycanthus præcox in full flower.
30th—Black Mulberry leaves all shed.

FRANCIS ABBOTT.

JULY, 1872.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	29·102	29·080	57	42	62·0	36·0	SW NW	·26	0·20
2	29·790	29·672	59	41	81·5	39·0	SW	·52	
3	29·800	29·780	60	46	68·0	42·5	NW	1·04	0·20
4	29·892	29·723	58	48	79·5	40·5	SE W SW	3·12	0·02
5	30·271	30·219	63	51	80·5	34·0	NW E	·26	
6	30·332	30·279	58	47	75·0	27·0	NW	·52	
7	30·282	30·249	56	34	78·5	29·5	NW	·78	
8	30·127	30·054	65	39	88·0	31·0	NW	·26	
9	30·092	29·986	60	34	77·5	26·0	NW	·52	
10	29·728	29·600	55	37	58·5	30·5	NW SW	0·	0·90
11	29·459	29·441	55	44	73·0	40·0	NW	·26	
12	29·638	29·609	66	41	85·5	35·5	SW NW	·52	
13	29·541	29·504	62	40	78·0	35·0	NW SW	·26	0·38
14	30·042	29·964	58	43	84·0	39·5	SE	·78	
15	30·184	30·142	66	39	87·0	39·5	S W SW	·26	
16	30·409	30·364	56	47	67·5	44·0	SW SE SW	·52	0·97
17	30·410	30·281	56	42	78·5	39·0	NE W SE	·26	
18	30·066	29·925	52	41	63·0	36·5	NW	·52	
19	29·966	29·818	58	40	78·0	36·0	NW	·26	
20	29·865	29·831	60	34	81·0	30·0	NW SW	·26	0·02
21	29·866	29·842	57	40	77·0	32·5	NW SE	·52	0·03
22	29·942	29·903	56	40	82·0	30·0	NW SE	·52	0·02
23	29·874	29·701	53	35	79·0	28·0	W NW	0·	0·02
24	29·462	29·299	62	42	83·0	40·0	NW	1·04	0·12
25	29·298	29.282	58	43	75·0	39·0	NW	8·33	0·01
26	29·328	29.293	58	40	85·0	33·5	NW	·78	0·05
27	29·636	24·487	55	40	68·5	35·5	SW	·52	0·03
28	29·948	29·889	54	44	72·0	32·0	SW NE SW	·52	
29	30·016	29·984	64	40	90·5	32·5	W NW SW	·52	
30	30·032	29·992	60	37	87·0	29·0	NW NE W	0·	
31	29·912	29·847	62	34	87·5	28·5	NW	·52	
Monthly mean 29·842			48·0		77·80	34·56	Total force	24·71	2·17

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Barometer mean, 29·842in., being 0·025in. below the average.
Temperature mean, 48·0°, being 1·93° above the ditto.
Solar intensity mean, 77·80°, being 1·72° above the ditto.
Dew point mean, 39·6°, being 0·43° below the ditto.
Humidity of air mean, ·79, being ·03 per cent. below the ditto.
Elastic force of vapor mean, ·263, being ·005 per cent. below the ditto.
Total amount of rain, 2·17in., being 0·07in. above the ditto.
Increase of rainfall on spontaneous evaporation, 0·42in.
Mean amount of ozone, 7·10, the same as 30 years standing.
Electricity active on the 5th, 6th, 7th, 14th, 15th, 18th, 19th, 20th, 24th, 26th, 28th, 29th, 30th, and 31st.
Aurora on the 8th and 9th.
Snow never absent from Mount Wellington with frequent fresh deposits

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, during the month.

14th.—Garrya elliptica commencing to flower.
20th.—Arbutus unedo ditto ditto.
29th.—Morus alba commencing to break into leaf.
30th.—Almond in full flower.
31st.—Common yellow Crocus in flower.

FRANCIS ABBOTT.

AUGUST, 1872.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In	°	°	°	°			
1	29·661	29·496	58	44	79·5	38·0	NW	3·12	0·27
2	29·803	29·754	60	39	85·0	34·0	NW NE	7·80	0·29
3	29·516	29·486	57	44	80·5	39·0	NW	5·72	0·40
4	29·770	29·640	57	40	85·0	36·0	SE SW	5·20	
5	29·964	29·900	56	33	82·0	25·5	NW	·26	0·07
6	29·580	29.472	58	37	79·0	29·0	NW	1·30	0·06
7	29·676	29·601	53	36	72·0	33·0	N NWW	1·04	0·04
8	29·874	29·837	63	38	83·5	34·5	NW W	·78	0·02
9	29·728	29·709	57	35	85·0	29·0	NE SE	2·86	0·40
10	30·011	29·877	49	38	75·5	31·0	SW	7·80	0·15
11	30·261	30·127	57	36	77·0	32·5	NW SW	·78	0·01
12	30·286	30·269	64	38	90·0	30·5	W SE	·52	
13	30·329	30·283	65	35	87·0	28·0	SE NW	·78	
14	30·312	30·244	59	33	79·0	26·0	NW	·52	
15	30·222	30·126	66	47	91·0	29·5	NW W	·78	
16	30·216	30·169	63	40	92·0	32·0	NW NE	·26	
17	30·199	30·141	66	38	86·5	34·5	NW	·78	
18	29·972	29·679	62	42	83·5	32·5	NW	3·12	0·02
19	29·970	29·816	59	39	79·0	35·0	NW SW	1·56	
20	29·969	29·925	55	42	57·0	34·0	SE NW	3·12	
21	30·239	30·210	81	43	91·5	33·5	NW SW	1·04	0·01
22	30·290	20·228	67	44	97·0	32·0	NW SE	0·	0·03
23	29·889	29·837	64	44	90·0	38·0	NW SE	3·12	0·40
24	30·011	29·959	63	41	91·5	39·5	NW SE	·26	
25	29·844	29·676	62	40	88·0	37·0	NW	1·04	
26	29·467	29·428	64	40	89·0	33·0	NW SE	·78	0·40
27	29·930	29·766	61	40	84·5	34·5	SW	7·80	0·03
28	30·066	30·054	61	40	87·0	35·5	NW SE	1·30	
29	30·102	30 062	64	33	90·0	26·0	NW SE	1·04	
30	30·054	29·887	61	36	78·0	28·5	NW SE NE	·52	0·23
31	29·654	29·577	77	44	72·0	40·0	NW	·52	
Monthly mean 29·924			49·66		83·53	43·95	Total Force	61·16	2·88

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Barometer mean, 29·924in., being 0·104in. above the average.
Temperature mean, 49·66°, being 1·19° above the average.
Solar intensity mean, 83·53,° being 0·71 above the average.
Dew point mean, 38·60,° being 2·20° below the average.
Humidity of air mean, ·72, being ·07 per cent. below the do.
Elastic force of vapour mean, ·252, being ·017 per cent. below the ditto.
Total amount of rain, 2·88in , being 1·16in. above the ditto.
Increase of rainfall on spontaneous evaporation, 0·83in.
Mean amount of ozone, 8·70, being 114 of chromatic scale above ditto.
Electricity active on the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 9th, 12th, 13th, 14th, 15th, 17th, 21st, 22nd, 25th, 28th, and 29th.
Aurora on the 4th. Snow never absent from Mount Wellington, with frequent fresh deposits.

Leafing, Flowering, and Fruiting of a few standard plants in the Royal Society's Gardens during the month.

14th—Sambucus niger (elder) commencing to break.
18th—Gooseberries ditto
24th—Horsechestnut ditto
25th—Elm commencing to flower.
27th—Poplar commencing to break.
31st—Apricots commencing to flower.

FRANCIS ABBOTT.

SEPTEMBER, 1872.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	29·709	29·663	62	55	87·0	36·0	NW	3·64	0·03
2	29·730	29·644	70	50	95·5	47·0	NW W	10·94	0·03
3	29·848	29·752	69	47	95·5	40·0	NW	13·02	
4	29·842	29·705	75	49	104·0	46·0	NW	1·04	0·03
5	29·680	29·620	71	45	96·5	43·0	NW	7·81	0·17
6	30·195	29·911	67	42	81·0	36·0	SW	10·41	
7	30·153	30·074	62	37	83·5	29·5	NW	10·41	0·01
8	30·095	30·037	68	48	95·5	44·0	NW	1·56	
9	30·122	30.046	80	50	106·0	47·5	NW	1·30	
10	29·987	29·837	80	48	95·0	41·0	NW	2·86	0·51
11	29·684	29·651	73	53	76·0	53·5	NW	10·94	0·55
12	30·199	29·980	69	40	77·5	37·5	NW SW	·52	0·01
13	30·469	30·441	66	44	92·0	32·0	NWSE	1·04	
14	30·478	30·409	64	34	92·5	30·5	NW E SE	·78	
15	30 391	30·241	65	39	90·0	30·0	NW NE SE	1·04	
16	30·194	30·093	69	39	95·0	30·5	NW SE	1·30	
17	30·043	29·861	71	41	97·0	33·0	NW	3·38	
18	29·890	29·783	79	50	107·0	42·5	NW	·78	
19	29·700	29·591	77	47	107·0	40·5	NE NW	10·42	
20	29·815	29·695	72	46	98·5	42·5	NW	7·80	0·43
21	29·974	29·791	69	37	102·0	33·5	NW E SE	·52	0·02
22	30·145	30·106	64	43	77·0	37·0	SW SE	1·56	
23	30·169	30·115	65	41	95·0	31·0	NW SE	1·30	
24	30·161	30·060	67	43	99·5	31·5	NW SE	1·04	0·07
25	30·081	29·963	69	47	104·0	33·5	NW SE NW	1·62	
26	30·187	30·048	64	46	89·0	40·0	SW SE	3·64	
27	30·242	30·121	66	37	95·5	31·0	NW SE	·52	
28	30·076	29·863	68	44	99·0	35·0	NW SE	·78	
29	29·742	29·740	52	48	59·5	44·0	SW	5·72	0·67
30	29·811	29·779	63	38	95·0	32·0	SW SE NW	1·30	
Monthly mean. 29·287			55·70		92·78	37·68	Total Force ..	118·73	2·53

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Barometer mean, 29·287in., being 0·486in. below the average.
Temperature mean, 55·70°, being 4·58° above the ditto.
Solar intensity mean, 92·78°, being 3·32 ditto
Dew point mean, 41·3°, being 0.94° below the ditto.
Humidity of air mean, ·64, being ·12 per cent. below ditto.
Elastic force of vapour mean, ·280, being the same as ditto.
Total amount of rain, 2·53in., being 0·33in. above ditto.
Increase of spontaneous evaporation on rain-fall, 1·22 in.
Mean amount of ozone, 8·70, being 0·78, of chromatic scale above ditto.
Electricity active on the 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, and 30th, with 44 positive, and 12 negative, the remainder nil.
An aurora on the 3rd. Snow never absent from Mount Wellington, with frequent fresh deposits.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, during the month.

12th—Ash commencing to break into leaf.
17th—Grape vines ditto.
19th—Oak ditto.
20th—Mountain Peony commencing to flower.
24th—Horsechestnut commencing to flower.
28th—Robinia pseudo-acacia commencing to leaf.

FRANCIS ABBOTT.

OCTOBER, 1872.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	29·750	29·737	60	46	84·0	42·5	NW W	0·	0·06
2	29·672	29·626	71	43	103·0	37·5	NE SW	·78	0·31
3	29·967	29·892	65	47	76·5	44·0	NE SE	·52	0·26
4	30·178	30·114	62	37	90·0	33·0	NW E SE	1·04	0·14
5	30·209	30·180	63	42	91·0	38·5	SW SE	·78	
6	30·309	30·113	64	50	80·5	37·5	NW NE	1·04	
7	29·942	29·860	68	47	95·0	45·0	NW	1·04	0·03
8	29·906	29·874	64	53	60·0	49·5	SW	0·	0·39
9	29·932	29·912	60	50	60·0	44·0	SE	·78	0·10
10	29·840	29·719	70	46	104·0	42·0	NW NE	·78	
11	29·756	29·544	67	47	69·5	39·5	NW W	·52	0·36
12	29·719	29·671	70	48	104·5	39·5	NW SE	1·04	0·01
13	29·685	29·397	68	48	80·0	44·0	NW	·78	0·07
14	29·330	29·277	64	46	92·0	40·0	NW W NW	13·42	0·10
15	29·570	29·404	61	43	93·0	36·0	NW W	13·42	
16	29·926	29·801	58	39	90·5	34·5	NW W NW	·78	0·03
17	30·002	29·968	67	43	98·0	36·5	NW W	5·46	0·04
18	30·053	30·026	69	50	94·0	46·0	NW SW	1·04	0·02
19	30·149	30·114	68	50	105·0	44·0	NW	3·12	
20	30·236	30·053	79	45	111·0	43·0	NW	3·64	
21	29·713	29·633	86	50	117·0	47·5	NW SE	6·25	0·34
22	29·522	29·417	78	49	99·5	45·5	NW W NW	8·07	0·24
23	30·003	29·865	74	40	97·0	39·0	NW SE	1·04	
24	29·724	29·585	70	45	86·0	41·0	E SW	7·81	
25	29·963	29·845	67	48	99·5	42·0	NW SW	5·99	
26	30·087	30·006	73	47	109·5	41·0	NW NE SE	3·12	
27	29·934	29·833	69	49	77·0	44·0	NW SE	1·04	
28	29·591	29·280	79	46	112·0	41·5	NW	5·73	
29	29·751	29·253	75	50	99·0	46·0	NW S SW	15·63	0·10
30	30·096	30·053	71	39	108·0	34·0	NW W	3·38	
31	30·191	30·105	69	46	110·0	38·0	NW SE	1·56	
Monthly mean 29·837			58·0		93·42	41·10	Total force	106·78	2·60

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Barometer mean, 29·837in., being ·059in above the average.
Temperature mean, 58·0°, being 3·71° above the average.
Solar intensity mean, 93·42°, being 3·70° below the average.
Dew point mean, 46·6°, being 2·04° below the average.
Humidity of air mean, ·69, being ·04 per cent. below the ditto.
Elastic force of air mean, ·323, being ·020 per cent. above the ditto.
Total amount of rain, 2·60in , being 0·54in. above the ditto.
Increase of rainfall on spontaneous evaporation, 0·10in.
Mean amount of ozone, 8·1, being 0·19 of chromatic scale above ditto.
Electricity active on the 5th, 15th, 16th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 29th, 30th, and 31st.
Thunderstorm on the 10th and 21st.
Aurora on the 15th.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, during the month.

10th.—Carpinus betulus commencing to leaf.
20th.—Ailanthus glandulosa ditto.
23rd.—Common Lime ditto.
24th.—Morus nigra ditto.
26th.—Common Elm seeds commencing to fall.
30th.—Melia azederach commencing to leaf.

FRANCIS ABBOTT.

NOVEMBER, 1872.

Private Observatory, Hobart Town.

Day of month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·195	30·167	69	49	106·0	36·0	NW SE	1·04	0·07
2	30·230	30·206	65	50	108·0	49·5	E SE	1·04	
3	30·243	30·028	75	50	112·5	42·5	NW NE	1·30	
4	30·101	30·093	85	60	119·0	48·0	NW	·78	0·01
5	30·118	30·053	78	60	110·5	50·0	SE	·52	0·01
6	29·985	29·842	84	65	119·0	51·5	NW NE SE	1·56	
7	29·757	29·639	79	60	112·0	53·5	NW SE	·52	0·17
8	29·534	29·451	73	60	80·5	55·0	NW SW NE	·26	0·30
9	29·709	29·619	75	55	118·0	51·0	NW SE	·78	0·04
10	29·824	29·677	72	62	105·5	50·0	SE	·78	0·03
11	29·768	29·585	66	53	102·0	47·0	NW SW S	10·41	0·02
12	30·184	30·150	63	42	95·0	37·0	SW SE	1·60	
13	30·209	30·180	69	44	106·5	37·0	NW W SE	3·38	0·04
14	30·194	29·989	75	50	109·0	47·5	NW SE	1·56	
15	29·886	29·750	86	50	125·0	46·0	NW W	5·72	0·16
16	30·107	30·022	80	46	85·0	40·0	SE SW SE	3·12	0·10
17	30·317	30·250	75	40	119·5	36·0	SE	1·56	
18	30·102	29·889	76	42	114·0	37·0	NW	·78	
19	29·807	29·737	72	58	76·0	52·0	NW E SE	·26	0·02
20	30·027	29·997	70	52	111 0	38·5	SE	3·64	
21	30·127	30·106	67	54	94·0	50·0	SE	1·30	0·07
22	30·126	29·935	68	54	78·0	48·0	NW SE	·26	
23	29·915	29·894	70	57	99·0	55·0	NE SE	·26	0·87
24	30·013	29·988	67	56	78·0	54 0	SE	5·46	0·03
25	30·066	30·055	64	53	78·0	52·0	SE	1·56	0·07
26	29·996	29·789	76	54	104·0	52·0	NE NW NE	·78	
27	29·607	29·438	78	59	111 5	55·0	NW SE	·52	0·45
28	29·428	29·412	75	57	116·0	55·0	SE SW	1·30	0·02
29	29·699	29·627	70	51	110·0	47·5	NW	5·72	
30	29·943	29·922	71	49	114·0	46·0	NW	3·64	
Monthly mean 29·93			62·58		103·30	47·30	Total Force	62·41	2·85

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Barometer mean, 29·93in., being 0·130in. below the average
Temperature mean, 62·58°, being 4·91 above the ditto.
Solar intensity mean, 103·30°, being 4·61° below the ditto.
Dew point mean, 52·7°, being 6·21° above the ditto.
Humidity of air mean, ·71, being ·01 per cent. below the ditto.
Elastic force of vapor mean, ·399, being ·073 per cent. below the ditto.
Total amount of rain, 2·85in., being 0·07in. above the ditto.
Increase of rainfall on spontaneous evaporation, 1·07in.
Mean amount of ozone, 8·5, being 1·00 on chromatic scale above ditto.
Electricity active on the 1st, 3rd, 11th, 12th, 13th, 15th, 17th, 18th, 29th, and 30th.
Aurora on the 3rd and 17th. Heavy thunder, lightning, and rain on the 25th.

Leafing, Flowering, and Fruiting of a few standard plants in the Royal Society's Gardens during the month.

14th.—First Strawberry gathered.
20th.—Ditto Cherry ditto.
20th.—Black Mulberry in blossom.
26th.—First ripe Raspberry gathered.
29th.—Bougainvillea spectabilis in flower.

FRANCIS ABBOTT.

DECEMBER, 1872.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced. Highest.	Bar. 37 feet abv. sea level corrected & reduced. Lowest.	Self-Registering Thermometers. Highest in shade.	Self-Registering Thermometers. Lowest in shade.	Self-Registering Thermometers. Highest in sun.	Self-Registering Thermometers. Lowest on grass.	Wind. Direction from three daily registers.	Wind. Force in lbs. per square foot.	Rain in inches
	In.	In.	°	°	°	°			
1	29·960	29·826	67	53	104·0	49·0	NW SW W	7·80	
2	30·087	30·068	65	46	107·0	40·0	NW SW SE	1·30	
3	30·172	30·099	68	47	106·0	42·5	NE SE	1·04	
4	30·099	29·923	77	46	116·5	38·0	NW NE NW	1·04	
5	29·933	29·875	82	53	120·0	48·0	NW SE	1·30	
6	29·882	29·649	89	58	126·0	50·5	NW	1·30	0·01
7	29·681	29·646	84	60	116·0	60·0	NW SE	1·30	
8	29·695	29·505	78	55	112·5	47·0	NW	13·54	0·05
9	29·730	29·630	72	47	109·5	42·0	NW SW	6·25	0·08
10	29·997	29·834	69	47	110·0	44·5	NW SE	3·64	
11	29·233	29·210	70	43	108·0	37·0	NW SE	1·30	
12	30·114	29·942	69	51	79·5	45·0	NW NE	1·04	0·05
13	29·707	29·615	83	56	123·5	52·5	SE	1·30	
14	29·711	29·674	73	53	116·0	49·0	NW SE	1·04	0·03
15	30·459	29·343	74	57	114·0	55·0	NW SE	·78	
16	29·545	29·464	73	53	114·0	45·0	NW SE	1·30	1·0
17	29·389	29·018	70	47	91·0	44·0	NW	1·04	0·28
18	29·235	21·173	69	48	114·0	44·5	NW	1·56	0·31
19	29·428	29·376	68	48	114·0	45·0	NW	3·64	0·20
20	29·557	29·532	72	52	118·0	44·5	NW SE	1·04	0·02
21	29·593	29·590	68	50	86·5	45·0	SE	1·56	0·12
22	29·865	29·749	67	49	106·0	46·0	SW SE	1·04	
23	29·701	29·639	64	49	107·0	42·0	NW SE	1·56	0·12
24	29·580	29·549	70	49	114·0	48·0	NW	1·56	0·02
25	29·401	29·362	71	54	105·0	51·0	NW	5·72	0·08
26	29·702	29·585	68	47	107·0	45·5	NW	20·84	0·01
27	29·707	29·664	75	51	81·5	46·0	NW	7·80	
28	29·824	29·591	73	50	105·0	42·5	NE NW	2·86	
29	29·531	29·504	72	50	108·0	48·0	NW	5·40	
30	29·867	29·829	71	49	115·0	40·5	NW NE	1·30	
31	29·918	29·825	82	50	120·0	45·0	NW SE	1·56	
Monthly mean 29·807			64·0		108·90	45·90	Total Force	103·80	2·35

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Barometer mean, 29·807in., being 0·059in. above the average.
Temperature mean, 64·0°, being 2·81° above the average.
Solar intensity mean, 108·90°, being 4·12° above the ditto.
Dew point mean, 49·4°, being 0·49° above the ditto.
Humidity of air mean, ·60, being ·07 per cent. below the ditto.
Elastic force of vapour mean, ·357, being ·004 per cent. below the ditto.
Total amount of rain, 2·35in., being 0·54in. above the ditto.
Increase of spontaneous evaporation on rainfall.
Mean amount of ozone, 7·7, being ·04 of chromatic scale below ditto.
Electricity active on the 1st, 2nd, 4th, 8th, 9th, 10th, 21st, 24th, 25th, 26th, 27th, 29th, 30th, and 31st.
Thunder and lightning on the 5th and 15th, heavy.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

10th.—First bunch of Red Currants ripe.
12th.—Common Privet commencing to flower.
15th.—First bunch Black Currants ripe.
20th.—Melia Azederach commencing to flower.
24th.—Doyenne d'Ete Pear ripe.
28th.—Juneating Apple ripe.

FRANCIS ABBOTT.

JANUARY, 1873.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lb. per square foot.	
	In.	In.	°	°	°	°			
1	29·614	29·504	73	53	110·0	48·0	NW W	11·20	0·07
2	29·834	29·777	69	48	97·5	42·5	NW SE	3·64	
3	29·959	29·876	74	49	112·0	45·0	W NW SE	3·64	
4	30·092	30·033	77	46	114·0	40·0	NW SE	1·04	
5	30·051	29·803	78	51	114·5	49·0	NE SE	·78	0·07
6	29·937	29·802	75	57	103.5	57·0	SE S SE	1·30	
7	30·291	30·184	70	48	93·0	44·0	SW SE	3·64	
8	30·216	30.194	65	47	101·0	44·0	SE	1·04	
9	30·199	30·173	66	51	110·0	48·0	SE	1·56	
10	30·178	30·127	70	45	112·0	47·0	NE SE	·78	
11	30·174	30·150	70	51	89·5	46·5	SE	·52	
12	30·026	29·860	66	52	76·0	50·0	SW SE	·78	
13	29·876	29·766	62	49	105·0	49·0	S SE	3·64	0·10
14	30·092	30·019	76	43	110·5	38·0	NW E NW	1·56	
15	30·037	29·916	77	44	116·0	39·0	SE	·78	
16	30·097	29·998	72	55	107·0	49·5	SE	1·04	
17	30·312	30·214	80	46	117.0	42·0	NW SE	1·04	
18	30·151	30·056	86	50	122·5	45·5	NW SE	3·38	
19	29·933	29·879	85	53	113·0	48·0	NW SE	1·56	
20	29·757	29·620	87	54	124·0	49·0	NW SE	1·30	0·32
21	29·530	29·509	78	55	105·0	55·0	SW SE	·78	0·97
22	29·892	29·826	71	57	115·0	49·5	SE	1·30	
23	30·031	30·009	78	59	118·0	46·0	NW SE	1·04	
24	29·961	29·914	78	52	118.0	49·0	NW SE	1·04	
25	30·348	30·274	70	54	104·0	50·0	SE	1·56	
26	30·392	30·344	72	48	110·5	44·0	NW SE	1·30	
27	30·344	30·231	74	56	110·5	55·0	NW E SE	·78	
28	30·168	29·970	83	52	124·0	49·0	NW SE	1·30	
29	29·962	29·773	82	60	112·0	52·0	NW E SE	·52	
30	29·677	29·5: 3	85	59	119·0	60·0	NW	1·56	0·16
31	29·955	29·832	80	48	111·0	45·0	NW SE SW	5·72	0·01
Monthly mean 29·992.			64·55		109·4	47·6	Total Force ...	61·38	1·70

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

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

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

The 25 years' standard tables are used for obtaining the difference from the average.

Barometer mean, 29·992in., being 0·248in. above the average.
Temperature mean, 64·55°, being 1·86° above the ditto.
Solar intensity mean, 109·4°, being 1·38 above the ditto
Dew point mean, 51·2°, being 0.79° above the ditto.
Humidity of air mean, ·64, being ·03 per cent. below ditto.
Elastic force of vapour mean, ·391, being ·018 per cent. above the ditto.
Total amount of rain, 1·70in., being 0·23in. below the ditto.
Increase of spontaneous evaporation on rain-fall, 2·66 in.
Mean amount of ozone, 7·7, being 0·77, of chromatic scale above ditto.
Electricity active on the 1st, 2nd, 3rd, 7th, 8th, 9th, 10th, 14th, 15th, 16th, 20th, 25th, and 31st.
Thunder and lightning on the 5th, and ditto with rain on the 21st; aurora on the 20th.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, during the month.

10th—First ripe apricot gathered (Royal).
14th—Veronica Angustifolia in full flower
,, —Jargonelle pear gathered.
16th—Grevillea robusta in full flower.
20th—Mulberries commencing to ripen.

FRANCIS ABBOTT.

The End.