

AUGUST, 1882.

The monthly evening meeting of the Society was held on Monday, August 7, Mr. C. H. Grant in the chair.

The Hon. Secretary (Mr. BARNARD) brought under notice the following returns, viz.:—

1. Number of visitors to Museum during July. On Sundays, 957 ; on week days, 960 ; total 1,917.
2. Do. to Gardens, do.; total 3,899.
3. Plants and seeds received at Gardens :—From Baron von Müeller, Melbourne, 18 packets seeds. From Mr. C. F. Creswell, Melbourne, 68 packets of seeds indigenous to Australia. From the Horticultural Society's Gardens, Victoria, 44 varieties of fruit scions. From Mr. J. Smith, Riddell's Creek, Victoria, 39 trees. From Messrs. Law, Somner, and Co., Melbourne, 38 varieties of Gladioli.
4. Seeds sent from Gardens. To Botanic Gardens, Calcutta, 36 packets. To do., Saharunpore, 36 do.
5. Books and periodicals received.
6. Presentations to Museum.

Meteorological Returns :—

1. Hobart, from Captain Shortt, Government Observer. Table for July.
2. Table of Rainfall at various stations in Tasmania, from do.
3. From the Marine Board. Tables from Goose Island for March, April, and May ; Kent's Group for do.; Bruny Island and Mount Nelson for July.

Time of leafing, flowering, and fruiting of a few standard plants in the Botanic Gardens during July, 1882 :—

- 14th. *Cytisus leucanthus* commencing to flower.
 18th. *Arbutus unedo* in flower.
 20th. *Eranthis hyemalis* commencing to flower.
 22nd. *Garrya elliptica* do.
 28th. Almond do.
 28th. Yellow Crocus do.
 30th. White Hyacinth do.
 31st. Snowdrop do.

Results of the Hobart observations :—

Barometer.—Mean for month, 29·664in.

Thermometer.—Mean, Max., 50·9deg.; Min., 38·9deg.; Dry Bulb, 44·5deg.; Wet Bulb, 41·7deg.

Humidity.—Dew Point, 38·1deg.; Humidity, 230 ; Elastic Force of Vapour, 785.

Condensation.—No. of days on which rain fell, 13 ; amount collected, 2·14in.

Clouds.—Mean daily amount, 5·25 (scale, 0·10).

Wind.—Prevailing direction, N.W. and S.W. Mean force, 2·3 (scale, 0·12).

Remarks.—Rain fell on 13 days ; the heaviest fall (5·25in.) was registered at 9 a.m. on the 4th. The highest temperature in the shade was 59deg. on the 2nd ; the lowest, 31deg., on the night of the 29th. There were nine days of strong winds and squally weather from the westward. Snow fell in Hobart on the night of the 13th, the ground and houses being covered in the morning. At 7 a.m. of the 26th another storm of snow, intermingled with rain, passed over the city, continuing all day and through the following night. Very cold weather, with heavy frosts at night continued until the 31st ; the minimum thermometer registering for the nights of Friday the 28th, and Saturday the 29th, at 9 a.m., 32·5 and 31deg. respectively. At Southport, under the thermometer shed the minimum temperature registered was 30deg. on the 28th, and 28deg. on the 29th. The lowest reading of the barometer was 28·964 at 9

a.m. on the 25th, and the highest 30·288in., at 9 a.m. on the 20th. This has been the coldest month experienced for many years, although the mean minimum temperature was higher than that for June. The falls of snow during June and July covered the city to a greater extent than has been previously observed. Mr. W. E. Shoobridge, of Bushy Park, New Norfolk, has kindly furnished the following record of the minimum temperature, at that place, for July, the instrument being under a thermometer shed, viz.—On the 29th, 29deg. ; on the 30th 26deg., the latter being the lowest register for the year.

Rainfall in Tasmania, July, 1882 :—

- Low Heads, rain fell on 15 days, amount 3·99in.
- Southport, rain fell on 23 days, amount 4·12in.
- Falmouth, rain fell on 9 days, amount 1·21in.
- Oatlands, rain fell on 10 days, amount 1·10in.
- Mount Bischoff, rain fell on 27 days, amount 11·53in.
- Mount Nelson, rain fell on 10 days, amount 1·70in.
- Botanical Gardens, Hobart, rain fell on 13 days, amount 1·52in.
- Hobart, City, rain fell on 13 days, amount 2·14in.
- Circular Head, rain fell on 19 days, amount 5·82in.

J. SHORTT, Government Observer.

The presentations to the Museum were as follow :—

1. From Mr. G. Innes. A large specimen of Lignite, from Macquarie Harbour.
2. From Mr. D. Carsons. A Cardinal Finch, from Brazil.
3. From M. Murachi, of the Japanese warship *Tsukuba*. Three specimens of Japanese money, viz., 10 cents, paper ; 2 ditto, copper ; and 10 ditto, silver.

The Hon. W. A. B. Gellibrand exhibited samples of a Seedling Apple, originally grown at Cleveland, and subsequently worked on stocks at South Arm, which were greatly admired.

Mr. STEPHENS read the following "Notes on Minimum Temperature at Hobart during the month of July" :—

A question having arisen as to apparent discrepancies in the records of minimum temperature during the month of July in various parts of Hobart, a few remarks on the subject may not be without interest. On the nights of the 28th and 29th July two unusually severe frosts were experienced. Mr. Leventhorpe Hall reports to *The Mercury* that at 7·45 a.m. on the 29th his thermometer registered 23deg. (Fahr.), and on the following day at 7·30 a.m. 21deg. Comparing notes with the Rev. J. C. Whall, who had also been recording the temperature, he ascertained that the two observations for the night of the 29th July exactly tallied. About the same time it was stated that the minimum results registered by the instruments under the charge of Commander Shortt, R.N., the Government Observer, were 32·5deg. and 31deg. respectively for the two nights in question. A considerable variation may occur at any time in the readings of different instruments, which are not periodically tested by the same standard. Commander Shortt informs me that of two minimum thermometers which have been in use elsewhere in the colony, and which he has compared with the standard, one is 3deg. 5min., and the other 5deg. out. This possible discrepancy must always be taken into account in comparing observations ; but in the present instance the difference is mainly caused by registrations of temperature under widely different conditions of exposure. Mr. Hall's instrument is an ordinary mercurial thermometer, placed outside his house, and unprotected above, but sheltered from the sun. It reads nearly 3deg. lower than the Museum thermometer, and if corrected to that extent, and placed "on grass," the result for the night in question would probably have been much the same as was actually recorded. Mr. Whall's is a self-registering instrument, of the type known as *Six's Thermometer*. It

is placed about 18in. from the ground, without protection above or around it, and the general conditions of exposure are nearly equal to those under which the temperature "on grass" is usually ascertained. On the other hand, there is no thermometer in use at the Barracks at present for recording the temperature "on grass," nor is there any place available for the purpose. The maximum and minimum thermometers are intended to record the temperature of the air under definite conditions of protection, and are kept, as nearly as present circumstances allow, under the conditions prescribed for all the meteorological stations in the inter-colonial system. They are new instruments by Negretti and Zambra, and as they were obtained from Mr. Ellery, it is superfluous to say that they supply a better standard than is obtainable elsewhere in the colony. Their position, pending the completion of the instrument shed, is of course not satisfactory, and they will probably register both a higher and lower temperature when placed under it than they do now; but it must be remembered that the temperature of the air, as taken at a meteorological station, is a very different thing from the temperature "on grass." My own observations have necessarily been so irregular that they are of little value; but I believe that the lowest temperature yet noted in the colony was registered by a thermometer which I placed on the top of Mount Wellington several years ago, and which gave 16deg. as the minimum temperature for two consecutive winters. The minimum "on grass" in Hobart during the same period was 24deg.; but, for the present exceptional season, a record of 21deg., as the minimum temperature, is probably not far from the mark. But no meteorological statistics can be satisfactorily registered at Hobart until the station is properly equipped, and favourable conditions of observation permanently and effectually secured. Since writing the above I find that Mr. Shoobridge records as the minimum temperature of the air at New Norfolk, on the night of the 28th July, 29deg.; and on the following night 26deg.; a result which, if I may judge from experience of the winter temperature at the two places, agrees pretty closely with that obtained at the temporary station in the Barracks.

On the conclusion of the reading of the paper, Mr. GRANT observed that Commander Shortt must have chosen an unfortunate position for his thermometer, the day temperature throughout the whole of the 30th July having certainly been below the freezing point, as proved by the frozen condition of the ground, and the forming of ice on tubs placed 4ft. above it, where sheltered from the direct solar rays. Such temperature, therefore, would probably have been much lower during the preceding night, and was proved to be so by the observations of Messrs. Hall and Whall. He understood that Captain Shortt's thermometer was placed under a deep verandah, and a worse place than an ordinary verandah could scarcely be selected for observing the air temperature. The usual position for this instrument is at the back of a light screen of trellis work or louver painted white, and with a top covering which protects it from the direct sunlight, but allows the free circulation of the air around, and it should be at such a distance from every other object as not to receive heat therefrom. Under a verandah the temperature of the partially stagnant air, increased by the heat radiation of all surrounding objects, especially of the house, would alone be obtained, and doubtless differ many degrees from the true air temperature correctly taken. In a long course of practical experiments and observations he had not found much difference in the minimum readings were the thermometer placed only 9in., or several feet above the ground, whether covered or uncovered, if the roof were simply a shade; but there was a considerable difference on a clear night between the readings of an instrument placed on the grass, or not more than 3in. above it, of a wet bulb, and of a dry bulb thermometer; the wet bulb reading showing an intermediate temperature between the other two. He did not think that in Hobart the extreme difference would

much exceed $4\frac{1}{2}$ deg., because there is rarely an entire absence of cloud, which checks the radiation and evaporation, but in some of the high table lands of India, the Deccan especially, where the air is of less density and the skies perfectly clear, the difference between an air and grass thermometer sometimes exceeds 10deg. The readings from a Six's Thermometer could not be so fully relied upon as the simple form, as, although very convenient for reference, their liability to derangement made them almost a toy. There was little trouble with spirit thermometers, if attention were paid them to see that the spirit was all connected with that in the bulb, but it must not be expected that any two thermometers will read exactly together throughout the scale, even though all were divided on the glass, from very carefully ascertained points, and from comparison with undoubted standards, as were the best instruments. Still, the registered maxima and minima of all good thermometers, placed in similar positions, should coincide.

Mr. STEPHENS thought that Mr. Grant had somewhat misunderstood his remarks, and described the conditions under which the temperature of the air would be registered, when the arrangements are completed, by thermometers placed close under a double roof, and 4ft. or 5ft. from the ground. Of course the temperature registered by thermometers freely exposed would depend on whether they were placed close to the ground or at a considerable distance above it. The thermometers at the Barracks appeared to have been put in the verandah because there was no other covered place available for them.

Mr. R. M. JOHNSTON said he agreed with the remarks made by Mr. Stephens. He was aware that arrangements for reading the temperature were not yet made, and it was therefore not fair to say that Commander Shortt's readings were incorrect, for he was necessarily more conversant with meteorology than the gentlemen who had published the records of their thermometers. Commander Shortt had, moreover, followed the system laid down for taking such records, whereas the other records mentioned had all been taken at different times and under different conditions. He considered that Commander Shortt, as far as his present arrangements would allow, had taken his records under precisely the same conditions as were adopted in every part of the world, and that the other gentlemen were necessarily incorrect, having conformed to no rules whatever in placing their instruments. He hoped that in a short time Commander Shortt would be able to take records under all conditions, and then his readings would compare with the thermometers of others.

Mr. H. J. BUCKLAND understood that Commander Shortt's thermometer was placed against the wall of his house, and thought that would to some extent affect the reading; it would draw heat from the interior of the house and surrounding objects. He doubted if readings in other parts of the world were taken under such conditions, as if so, it would be impossible to arrive at the true climate of a country. If by this means the temperature of what was admitted to be a bitterly cold night was only shown as 32deg., and by other instruments without cover it was said to be 20deg., it was surely impossible to arrive at a correct temperature of the locality.

Mr. JOHNSTON explained that the reason for using a cover was to exclude the direct influence of sunlight, and everything was eliminated that could, in the least degree, influence the temperature, and therefore scientific men have advised that there should be some standard of eliminating all disturbing influences, and Commander Shortt, as far as he could, had adopted these principles, and if all these conditions were taken into consideration, there would not be such a great discrepancy in the readings as now appeared.

Mr. RIDDOCH thought Commander Shortt's readings deceptive in stating the temperature of the atmosphere. He had seen where

Commander Shortt's instruments were placed, and did not think they could ever give the normal state of the air. The verandah had a roof, and was enclosed on both sides. The instruments were against a weatherboard wall, and sheltered from the west and south-west; and altogether a more sheltered place could hardly be found, and the lowest temperature could not possibly be obtained.

Mr. JOHNSTON then read an elaborate and valuable paper, entitled 'General and Critical Observations on the Fishes of Tasmania, with a Classified Catalogue of all the known species.' The time was too limited to admit of more than the first two divisions of the subject being read, and the remainder, including the classified catalogue, was deferred until the next monthly meeting. Discussion on the portion read was also deferred until a future occasion, in order to admit of its being printed and circulated.

The usual vote of thanks was accorded to the contributors to the Museum, and also to the authors of the papers read.

SEPTEMBER, 1882.

The monthly meeting of the Society was held on Monday, the 11th September; Mr. T. Stephens, V.P., in the chair.

The following gentlemen, who had previously been nominated by the Council, were balloted for, and declared duly elected as honorary Members of the Society, viz.:—Baron Ferd. von Müller, K.C.M.G., M.D., F.R.S., Government Botanist of Victoria; and the Rev. J. E. Tenison-Woods, F.L.S., F.G.S., F.R.G.S., etc., etc.

The Hon. Secretary (Mr. BARNARD) laid before the meeting the following returns for the month of August:—

1. Number of visitors to Museum—On Sundays, 1,012; on week days, 666; total, 1,678.
2. Do. to Gardens—Total, 4,192.
3. Plants received at Gardens:—From Messrs. Shepherd and Co., Sydney, 16 plants. From Messrs. Vilmorin and Co., Paris, a general collection of flower and shrub seeds. From Mr. W. R. Guilfoyle, Director of Botanic Gardens, Melbourne, seeds of *Pinus Australis* (the Georgia Pitch pine). From Professor McOwen, Cape Town Botanic Gardens, sods of *Disa grandiflora*, a magnificent Orchid from the Table Mountain, in good condition.
4. Books and periodicals received.
5. Presentations to Museum.

Meteorological Returns.

1. Hobart, from Captain Shortt. Table of observations for August. Registers of rainfall at various stations through the colony.
2. From the Marine Board. Monthly tables from Mount Nelson for August; Swan Island for May; Goose Island for June and July; and King's Island from February to July inclusive.

Time of leafing, flowering, etc., of a few standard plants in the Botanic Gardens during August:—

- 20th. *Sambucus niger* commencing to break.
- 24th. Horsechestnuts do.
- 28th. Gooseberries do.
- 28th. Elm commencing to flower.
- 29th. Poplar commencing to break.
- 30th. Apricots commencing to flower.

Results of the Hobart observations:—

Barometer.—Mean for month, 29'836in.