PAPERS AND PROCEEDINGS

OF

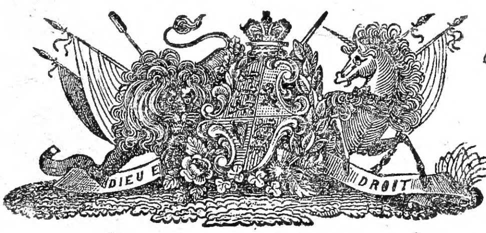
THE ROYAL SOCIETY

OF

VAN DIEMEN'S LAND.

VOL. III. PART I.

JANUARY 1855.



TASMANIA:

BY

WALCH AND SONS, AND HUXTABLE AND DEAKIN,
BOOKSELLERS, HOBART TOWN; AND BY OTHER
BOOKSELLERS.

1855.

Price—Four Shillings and Sixpence.

I.—*On the Heavy Fall of Rain in Hobart Town, on the 26th and 27th of February*, 1854, *with reference to the Sewerage, Drainage, &c., of the City. By* HIS EXCELLENCY SIR W. T. DENISON, F.R.S., *&c.* [*Read* 8*th March*, 1854.]

IN laying before the Royal Society of Van Diemen's Land the accompanying return of the amount of rain which fell on Sunday and Monday, the 26th and 27th February, I wish to draw attention to the bearing of the facts thus brought prominently under notice, upon the question of the Sewerage of the Town, to which allusion was made in a paper read by me at the meeting of the Society in November 1853.

In that paper I pointed out the necessity of proportioning the size of the sewer to the maximum amount of water which would have to pass through it, and I also drew attention to the fact, that the water would be discharged more rapidly into the main sewer from a surface properly drained than when it was left to find its own way through narrow, tortuous, and imperfect channels, and, therefore, that the more perfect the system of drainage, the larger must be the main outlet.

I own, however, that I never anticipated the probability of such a fall of rain as has lately taken place, amounting, as it appears, to $8\frac{3}{4}$ inches in thirty-four hours; and it is principally with a view of placing this fact upon record, for the guidance of those who may hereafter be called upon to carry out a system of drainage for the town, that I submit the following remarks, which may be considered as supplementary to those contained in my former paper, having a special reference to the drainage of Hobart Town.

It appears by the table submitted, which shows in the first page the rate at which the rain fell from 9 A.M. on the Sunday, to 8·50 P.M. on Monday, a period of thirty-four hours, that the total amount of the discharge was 8·68 inches.

On comparing this with the returns on the second page of the maximum amounts which have fallen in any day since 1842, when the records were first kept, we find that in November 1842, 4·05 inches fell in eighteen hours; that in November 1849, 4·0 inches fell in twenty-two hours, while on the present occasion, 6·25 inches fell in thirteen hours; so that while in November 1842, the average discharge was ·225 inches per hour, on Sunday, 26th February, 1854, the discharge was ·416 inches per hour, or not much less than double the former quantity.

It is evident that, in considering the size of the sewer required to discharge a given quantity of water, the absolute quantity is not of so much importance as the rate of delivery, and that a sewer which might be quite capable of discharging 8 inches of rain, if spread over forty-eight hours, would be altogether insufficient to pass the same in twenty-four hours.

If, then, we assume that the rate of ·416 of an inch per hour is the maximum amount which is likely to fall in the area, of which the Hobart Town rivulet is the outlet, we have next to approximate to this area, so as to get an expression for the quantity which will have to be passed through any given part of the rivulet during the same period.

I am not possessed of a survey detailed enough to enable me to give even a guess at the area, neither indeed would it be possible to deduce any very accurate conclusions from such a survey, for the quantity discharged into the creek at the different points would vary in proportion to the greater or less slope of the ground, and the solution of the problem would therefore be so complicated as to be practically useless.

It is, however, possible to arrive at an approximation to a mean area, in a much shorter, simpler, and, with relation to the subject under consideration, a much more accurate way, by ascertaining the quantity of water passing through the creek at a given spot during any period, say an hour; and assuming this to be the amount which fell during a similar period antecedent to that at which the experiment is made, it is obvious that in this manner some practical result could be arrived at, by which the area of drainage could be ascertained with every necessary degree of accuracy.

At present we are not in possession of any accurate observations by which the quantity of water passing down the creek, at any given period, can be estimated; under such circumstances the following approximation may be admitted rather as indicating the mode of arriving at the area, than as affording more than a guess at its dimensions.

Levels and sections of the rivulet were taken at two points, one above Wellington Bridge, and the other above the Bridge in Campbell-street; the depth of water in these sections was assumed from my recollection of its height at the points in question, on Monday, February 27th, about 11 A.M., when the obstructions at these bridges were cleared away: from the elements thus obtained, it would appear that the velocity of the current above the Wellington Bridge was 14·3 feet per second, and above the Campbell-street Bridge 9·6 feet per second, and the quantity of water discharged per hour at the former was 5559840 feet, while the quantity discharged at Campbell-street was 3248640 cubic feet during the same period. It is evident I have either overrated the depth above Wellington Bridge, or under-estimated that above the Campbell-street Bridge; but the mean of the two, or 4404240 feet, may be taken as the average discharge.

If then we assume that the rain falling upon the drainage took any given period, say four hours, to reach the Victoria Bridge, the quantity above determined would be the amount which fell on the area during one hour, say from seven to eight on Monday morning.

On reference to the Table, we find that from 6·50 to 7·50 it rained heavily,—that from 6·50 to 7·10 one-fourth of an inch of rain fell,—that from 7·10 to 7·50 another one-fourth of an inch; so that the total fall amounted to half an inch. If, then, we multiply the number of cubic feet per hour discharged by the rivulet by 24, we shall get the number of square feet contained in the area of drainage =105701760 =2426 acres.

As I said before, this can only be taken as a very rough approximation, for I have been obliged to assume, first, the average depth of the current at the points where the levels were taken, and again to guess at the time which the water takes to flow from the hills to the bridge. It must be evident that this latter element must be taken as a mean between the shortest and longest period for which the rain, falling in the vicinity of the bridge, would be discharged in a very short time; that falling on the mountain side would, of course, take much longer to reach the outlet, the steepness of the slope of the hill side would, by adding to the velocity of discharge, lessen this difference; but it is obviously impossible to attain to anything like certainty in such a question.

It would be very desirable to institute a series of experiments during the course of next winter for determining the area of discharge more accurately; the experiments would require but very little preparation or attention: it would be desirable to clear the bed of the creek at two points above Wellington Bridge and the Campbell-street Bridge, at, say 100 feet apart, so as to give the water a fair run over the bottom, to determine accurately the section of the creek at these two points, and the difference of level or fall of the bed between them; a scale of feet and inches being then marked plainly on the sides of the creek at those points, any ordinary observer could note down, from hour to hour, the rise or fall of the water, and thus obtain the necessary data for obtaining not only the quantity of water passing, but, when taken in connection with the observations of the rain guage, of forming a very fair approximation to the length of time which the water takes to reach the point of observation.

When a sufficient number of experiments have been made to justify the assumption of the average of the results as a mean to be depended upon, it may become a matter of consideration whether steps might not be taken to intercept a large portion of the water which is forced through the rivulet in winter, and to retain it for the use of the inhabitants during the dry summer months.

A scheme of this kind, if carried out with judgment and boldness, would not only relieve the lower parts of the town from the risk of being flooded, but would afford an ample supply of water, available at all times for the extinction of fires, or for the more ordinary purposes of domestic economy. This, however, is a matter for future consideration, and I will not enlarge upon it at present. I propose to take steps to record the observations to which I have alluded above, and shall submit the results to the Society when they have been determined.

II.—*On the Best Method of Relaxing the Dried Skins of Birds and other Animals. By* WILLIAM SWAINSON, *Esq.*, F.R.S., L.S., *&c.* [*Read 8th February*, 1854.]

OBSERVING in the Museum of the Royal Society of Tasmania a valuable and not an inconsiderable collection of bird skins from different countries, which will require, eventually, to be mounted or set up in their natural attitudes, I think it very desirable to lay before the Society the method of relaxing such skins, as pursued by the best animal preservers in Europe, and the efficiency of which I have repeatedly proved.

Let a common box be made of any seasoned wood, about three-quarters of an inch thick, with the cover or lid made to lift off and on, but without hinges. The size is not material, but that which is most generally convenient may be about two and a half feet long by one and a half feet broad in the clear. This will be sufficiently large to contain the skins of nearly all the birds under the size of a goose or eagle; and for those which are larger other methods, which I will subsequently allude to, should be used. Let the sides and bottom have an internal lining of plaster of Paris, at least two inches in thickness; the lid also should have a similar coating, leaving only a margin all round for receiving the edges of the box itself. When this internal coating of plaster becomes dry, it is hard, but perfectly porous.

When it is required to relax the skins of any birds, (three, four, or five at once), let a sufficient quantity of hot water be poured into the box to saturate the whole of the plaster, not only on the bottom, but that which lines the sides and the lid: this must be done effectually, and more water added so long as it is absorbed by the plaster, after which, if any water remains at the bottom, it should be poured out, that none of the feathers of the birds to be relaxed may become wet. The specimens are then to be laid in the bottom, and the lid immediately put over, so that the steam arising from the plaster does not escape, or the external air enter, to counteract its effects.

The time necessary for the proper softening of a bird's skin depends very much on circumstances, arising either from its size or the mode in which the skin has been originally prepared; generally speaking, however, twenty-four hours will be sufficient for birds not larger than a thrush, if the skin has only been washed with common arsenical soap. But it sometimes happens that the natives of India, not being acquainted with any other composition, use one of their own, which, being chiefly composed of spices, not only injuriously contracts the skin, but hardens it considerably.

In such cases the operator should cut the original sewing where the orifice for extracting the body and soft parts has been made, take out the original stuffing and insert a fresh one, composed of any soft substance, saturated (but not dripping) with warm water: this additional process will be found necessary with many species of the *anatidæ* or duck family, whose skins are much thicker than those of the generality of birds; but if, after being again replaced in the box, and left for another twenty-four hours, the skin is not found to be sufficiently pliable, it may be rendered much more so by applying the thumb-nail, moistened with saliva, and working it sufficiently long to produce the necessary degree of softness.

Great care, however, should be observed in not distending the skin beyond its apparent natural size, particularly that of the neck, for however much the skin can be enlarged by this process, it can never be contracted, and an undue length of neck is the general fault of all preserved specimens, whether mounted or otherwise.

Birds of a size too large for being relaxed in a box of the dimensions above specified may be enveloped in two or three folds of damp cloths, from which the warm water has been well wrungo ut, the inside being also stuffed, as already directed. Wetted cotton or tow should likewise be inserted in the orbits or hollow of the eyes, and should the bill not be closed, an additional piece of wet tow, inserted in the mouth, would much facilitate the object to be attained.

Skins of quadrupeds are much more difficult to be relaxed than those of birds.

In these the whole of the original stuffing should be taken out, well saturated with warm water, and the animal enveloped in wet cloths, over which another, quite dry, will prevent, in a great degree, the evaporation of the steam.

When it is considered how much more attractive an Ornithological collection, well mounted, becomes to ordinary observers, I cannot deem these few remarks to be unworthy the attention of our Society, as they may ultimately be found very useful, when a fit and proper building is erected for the display of our many specimens now remaining in skins, and which number is continually augmenting by the liberality of our members, and other well-wishers to Zoological Science.

III.—*Observations on Tasmanian Statistics for the Decennial Period* 1844 *to* 1853, (*compiled from Official Sources, and published by Authority*). *By* JAMES BARNARD, *Esq.* [*Read* 11*th October,* 1854.]

SINCE the date of the last published statistics of this colony in 1849, upwards of four years ago, the changes that have taken place in the fortunes of Australasia, by the magnificent gold discoveries in New South Wales and Victoria, and slightly shared in by Tasmania, have invested the authentic records of the progress made by even the smallest and weakest of the group with an interest, not only in the eyes of those locally concerned, but in the estimation of the whole civilized world.

Secondary as she may be in point of size, and comparatively insignificant as she certainly is in extent of population, yet it may be affirmed that, of all the colonies planted in this hemisphere, Tasmania more fully displays the verisimilitude which would justify the appellation of the Britain of the South. The parallel is close and striking. In insular position,—bold and picturesque scenery,—sheltered harbours,—climate and soil adapted to agriculture,—forests of splendid timber, scarcely, if at all, inferior to the English oak,—ship-building,—whale fisheries,—an unlimited supply of the best quality of coal for steam, gas, and domestic manufactures, besides immense beds of iron ore, limestone, freestone, &c.,—all these, with other advantages superadded of free institutions and universal education, combined with mental energy and industry of character, comprise the elements of national wealth and prosperity, which cannot fail in their ultimate development to acquire a renown for commercial and manufacturing and moral greatness, and for the cultivation of the arts of peace, second only to her English prototype.

The object of the present paper is to tread closely in the footsteps of those which have been previously submitted on the same subject; and to present an analysis of the statistical returns for the decennial period referred to, with especial reference to the modifying effects of the Gold-fields upon the condition and interests of Tasmania.

Table 1 exhibits the population of Tasmania, exclusive of the military and their families, as ascertained by census taken on 31st December, 1841, and 1847, and March, 1851. The population is also shown on the 31st December of each of the three years ending 1853,—which has been calculated by adding to the census last taken the births and arrivals, and deducting therefrom the deaths and departures, for the intervening periods respectively.

The aggregate population, then, at the last authentic registration in March, 1851, was 69,187, of whom 34,070 or 49·2 per cent. were adult males, 15,996 or 23·1 per cent. adult females, and 19,121 or 27·6 per cent. children. This census, it must be borne in mind, was taken about two months prior to the rise of the gold discoveries in the sister colonies; and the disturbing effects produced upon the population, and upon the ratio of the sexes, will be seen by a comparison of the figures in the subsequent returns. Thus the arrivals in 1851 were in all 6076, and the births 1840; while the departures were 6613, and the deaths 993, making the total number of souls in the colony at the end of that year 69,497, in the several proportions of 46·3 per cent. men, 23·8 per cent. women, and 29·9 per cent. children. During 1852 the births were 2114, and the arrivals 15,203;

while the deaths were 1452, and the departures 21,917,—making the total 63,445, in the respective proportions of 39·2 men, 25·5 women, and 35·2 children, being a deficiency of 6052, or nearly 9 per cent. of the whole, upon the year. During 1853 the births were 2,233, and the arrivals 14,977, while the deaths were 2017, and the departures 12,684,—making the total 65,954, or 4 per cent. increase upon the year preceding, but still a decrease of 5 per cent. as compared with 1851; the proportion of adult males being 39·3 per cent., adult females 24·7, and of children 36 per cent.

The disastrous effect upon our labour market in diminishing the adult male population of this colony, thus depriving it of its thews and sinews, is strikingly apparent from the figures in this table; for, while there is a steady progressive increase in the per-centage of women and children, there appears a positive decrease in the number of men of 23 per cent. at the end of 1853 as compared with the census of 1851. The disturbing influence this must have exercised upon the social and domestic condition of the Colony, and the check upon its industrial prosperity and advancement, is too plain to need remark. It is most satisfactory, however, to notice the considerable increase in the number of children, constituting as they do the germ of a future people.

Of the aggregate population the convicts constituted, in 1851, 28·8 per cent.; in 1852, 30 per cent.; and in 1853, 25·3 per cent.; and the proportion of the males to females was, upon the average, as 3 to 1.

The stain upon the Tasmanian escutcheon of being a penal settlement having, happily, been effaced by Her Majesty's Order in Council, the existence of a servile class in the community is fast diminishing, and must, in the very nature of things, cease altogether within a comparatively short time.

Table 2 shows the number and distribution of the convicts in the colony, and spreads over a period of ten years. In 1844, the total number which arrived in the colony amounted to 4966; in 1850 it was 2910; and in 1853, when transportation had finally ceased, 1480. In 1851, the total of both sexes was 20,069; in 1852 it was 19,105; and in 1853 it had gradually declined to 16,745, with the prospect, as before remarked, of a rapid diminution annually in the numbers of this class until its total extinction. The proportion of males to females is, upon the average, as 3 to 1. The total number of convicts is divided into those who maintain themselves, averaging 77 per cent., and those who are maintained by the Government, 23 per cent. With regard to the former of these two divisions, considering them in the light of quasi free, mingling as they do in the general community, no further notice need be taken of them here; and as to the latter division, or those maintained by the Government, 24 per cent. are under probation, 62 per cent. under sentence, 13 per cent. in hospital or invalids; and the number of males to females coincides with the general proportion of 3 to 1.*

Tables 3, 4, and 5 show the total number of births, deaths, and marriages in the colony which have been registered

* By a Council paper it appears that on the 1st of August, 1854, there were 13,456 convicts of all classes of both sexes; of whom 10,174, or 75·6 per cent. were earning their own livelihood, and 3282, or 24·3 per cent. were maintained by Government. Of the whole number it was estimated that 10,000 would be released from their convict condition by the 1st of April, 1856; and that on that date 3500 would remain, of whom it is probable that one-half would be maintaining themselves.—The expenditure for this service for 1854–5 was estimated at £205,385; and for the year ending 31st March, 1856, at £132,553,—making a diminution of £72,832 in the expenditure for that year.

during the last ten years. Of the births, the proportion to population upon the average of the three years 1851 to 1853 is as 1 to 30,—the average population being 66,298, and the average births 2142; and the excess of males over females upon the average of the ten years is 4 per cent. The number born in 1853 was 1194 males and 1039 females, or a total of 2233.

Of the deaths, the increased mortality of the last two years from the scourge of epidemics is painfully evident from their increased proportion to population; the ratio being in 1851 as 1 in 62, in 1852 as 1 in 43, and in 1853 as 1 in 32. The males who died in 1853 were 1138, and the females 879, making a total of 2017 deaths, nearly equalling the births it will be seen, and being in the ratio of 3·3 per cent. to population. It must also be noted that the deaths of convicts are not registered in the several registry offices.

Of the marriages, the number solemnized in 1851 was 993; in 1852 the number had increased to 1213, or an addition of 22 per cent.; in 1853 they had further increased upon a diminished population to 1479, or 21 per cent. upon the preceding year,—one effect of the gold fields with which the experience of all present may be familiar, as being caused in great measure by the numerous lucky diggers upon their return from Victoria selecting brides to share their good fortune. Again, of the marriages performed in 1853, 57·8 per cent. were celebrated according to the rites of the Church of England, 7·6 per cent. the Church of Scotland, 21 per cent. the Church of Rome, 3·9 per cent. the Wesleyans, 5·3 per cent. the Independents, 3·4 per cent. the Baptists. The Jews record 2 weddings, and the Deputy Registrars 5.

Tables 6 and 7 show the extent of emigration to and from Van Diemen's Land, exclusive of the troops, together with the total expense incurred by the Government for immigration during the last two years. No return is given of the number of immigrants prior to 1851 : indeed, for years past it must have been too insignificant for record ; but in that year 4348 arrivals are noted, 12,852 in 1852, and 16,808 in 1853. But of these large numbers the real immigration was but a fraction, comprising those only who were introduced at the public expense ; viz., 418 or 9·6 per cent. in 1851 ; 220 or 1·7 per cent. in 1852 ; 1831 or 10·9 per cent. in 1853.

The expenditure on account of immigration for the three years has been, for the Department, including cost of office, lodging, salaries, gratuities, &c., £4475, remittances to England £39,765, making a total of £44,240.

The departures from the colony are recorded from the year 1847, averaging about 4000 a year down to 1850, of whom about 1500 annually were persons who had been convicts. In 1851 the number had risen to 7463, in 1852, 21,920, and in 1853, 12,684 ; and of these the proportion who had been convicts were, in 1851, 2713, or 36·3 per cent. ; in 1852, 7357 or 33·5 per cent.; and in 1853, 3096 or 23·6 per cent.

Perhaps it will explain the movement of the population since the gold discoveries more clearly by stating that 34,008 persons arrived in the colony during the three years 1851 to 1853 ; and that 42,067 quitted it during the same period,—showing a decrease in the number of inhabitants of 8059, or 10·1 per cent., as compared with the census of March, 1851.

Table 8 exhibits the value of the imports and exports for the ten years ending with 1853. Prior to the opening of the gold fields, the commerce of the colony was slowly but steadily advancing ; but that grand discovery imparted an extraordinary activity to its trade, and stimulus to its agriculture, which, notwithstanding the great drain upon its labour market, has contributed largely to the general prosperity of Tasmania.

In 1851 the value of the imports was £641,609; in 1852 it was £860,488, or an increase of 34·1 per cent.; and in 1853 it reached the enormous amount of £2,273,397, being 164 per cent. increase upon the preceding year. The ratio of imports to population was, respectively, £9 4*s.* 7½*d.* per head in 1851; £13 11*s.* 3*d.* in 1852; and £34 9*s.* 4½*d.* in 1853,—exceeding, perhaps, that of any other British colony, Victoria alone excepted.

The corresponding exports for the three years cited were £665,790 in 1851; £1,509,883 in 1852; and £1,756,316 in 1853; the ratio of exports to population being respectively £9 10*s.* per head in 1851, £23 15*s.* 10*d.* per head in 1852, and £26 10*s.* 3*d.* per head in 1853.

Taking the average of the imports for the last three years, and doing the same with the exports, and dividing by the average population for the same period, it gives £18 19*s.* 9*d.* per head as the imports, and £19 15*s.* 4*d.* per head as the exports, of the entire population, during the three years that the gold-fields have been in operation. The balance of trade, upon the calculation of the same period of three years, was £156,505 in favour of the colony,—clearly denoting, under the feverish and exciting circumstances of the times, the particularly healthy state of our commercial relations.

Table 9 is a return of the shipping employed in the whale fisheries for the same decennial period; and, as might be predicated, apart from the uncertainty ever attending this precarious branch of commerce, fully exemplifies the injurious effects of the gold mania upon the ordinary pursuits of industry. In 1850 there were 40 colonial and 9 foreign vessels, having a tonnage of 12,503 engaged in whaling; in 1851 the number was 26 colonial, and 14 foreign, of 11,225 tons; in 1852, the colonial vessels were 18, and the foreign 18, of 10,299 tons; and in 1853 the former were reduced to 7, and the latter to 2, with a tonnage of 2607 only,—brought down to the lowest ebb known in the history of the fishery since its first establishment.

It would thus seem that whaling has suffered more than almost any other branch of industry; a result indeed which might be naturally expected, seeing that the same enterprising disposition which would lead a man to cast his fortune upon the chance of acquisitions from the depths of the ocean, would be likely to induce him to be one of the very first to join in the rush to the gold-fields even upon a similar uncertainty of acquiring wealth from the bowels of the earth.

Table 10 shows the total value of the timber imported and exported during the same decennial period. The growth of the timber trade is remarkable, as being almost the sole branch of colonial industry which has thriven amidst the general declension; and which must be ascribed to the extraordinary stimulus communicated to the pursuit by the golden prices realized in Melbourne for sawn stuff, yielding extremely handsome returns even after paying the most exorbitant wages to the sawyers.

In 1844 the value of timber exported was £3577; in 1847 it had reached £15,414; in 1850, £55,869; in 1851, £32,726; in 1852, £89,507; while in 1853 it rose to nearly half a million sterling.

In 1851, during the first year of the gold discoveries, it will be noticed that the timber trade suffered in common with other branches of our staple industry, and the export was actually lower than it had been for the two preceding years. In 1852, when a large amount of capital had been actually realized at the gold-fields, and become available in Melbourne for investment,—and when population was pouring into that city from all parts of the world, and the necessity for accommodation, and even shelter from the inclemency of the weather, had become urgent,—then the demand for timber grew from day to day, and prices rose out of all proportion. Hence the value of the export of timber from Tasmania in 1852 became triple that of 1851, and in 1853 more than five-fold what it had been in 1852; luring back to our Tasmanian forests many of the adventurers, who found that the gold-fields, after all, were less profitable, and much more precarious, than the rewards offered to the steady application of labour in this department of industry.

The imports of timber also, consisting of cedar from New South Wales, pine from New Zealand, but chiefly of deals from America and the north of Europe, take a sudden spring from £1341 in 1852 to £24,057 in 1853; an increase sufficiently explained by the high prices which, as has been already stated, stimulated our own timber trade to such excessive production.

Tables 11 and 12 are returns of the quantity and value of grain and flour imported and exported during the same period of ten years. The steadiness of the imports of these prime necessaries of life was at once affected by the general rush to the gold-fields, and the consequent check to the cultivation of the land. In 1850 the total value of these imports was £1860; in 1851 it had increased to £4402, or 136 per cent.; in 1852 to £14,294, or 224 per cent.; and in 1853 to £75,627, or 429 per cent. The timely supply of American flour balanced, in some measure, our own additional exports of breadstuffs, and helped to feed our own population. The exact quantity of each description of grain imported cannot be stated with precision, as the indefinite term "package" is much used in this return without the means of attaching to it its precise weight or measure.

The return of the export of grain and potatoes strikingly shows the highly remunerative character of this branch of our commerce, and the active stimulus that the golden market of Victoria imparted to agricultural industry: for while there has been an actual decrease in the quantity exported as compared with preceding years, with the exception of potatoes, which has doubled, the value of these exports has nearly trebled. In 1849, when there was shipped 296,236 bushels of wheat, 112,164 bushels of oats, 4172 tons of flour, and 3003 tons of potatoes, the total value was £114,635; but in 1853, when there was shipped only 20,673 bushels of wheat, 144,028 bushels of oats, 4801 tons of flour, and 6783 tons of potatoes, the value was £315,153, or 200 per cent. increase.

Agriculture, it will thus be seen, like every other branch of industry, has shared in the general stimulus imparted; but, from the circumstance of farm labourers, as might be expected, having been attracted to the gold-diggings, the produce has been diminished, and the exports reduced, in 1853, to one-seventh of what they were in 1851, and to a little more than a tenth of what they were in 1850—potatoes only excepted. The value of our exports of breadstuffs being, on the contrary, in 1853 three times what they were in 1850, depends chiefly upon the enormous rise in price—which, doubtless, would have ruled higher still but for supplies from America and Europe in even larger quantities than the market required,—insomuch that it not only indirectly acted there in lowering our prices, but directly in being re-exported and sold in our own market.

During the three years of the gold-fields, the average export annually of our chief agricultural products has been 87,342 bushels of wheat, 146,838 bushels of oats, 4751 tons of flour, and 4096 tons of potatoes; and the average value of these exports has been £251,532. Comparing the average of these years with the exports of 1849, it is worthy of note that the value has increased 119 per cent., while the decrease in the quantity of wheat exported has been upwards of 200,000 bushels. There has been an increase, however, of 25,000 bushels of oats, 579 tons of flour, and 1093 tons of potatoes.

Table 13 states the quantity and value of butter and cheese imported and exported for the last ten years; and shows that the trade in these products of the dairy has shared in the general colonial prosperity. In 1851 the value of these imports was £1761; in 1852, £5269; and in 1853, upwards of £17,000. The corresponding exports were, respectively, £4324 in 1851; £7251 in 1852; and £19,548 in 1853. No comparison can be made of the relative quantities, from the indefinite term "package" being for the most part adopted. It may be, and is most likely, as in the case of grain, that the increased value of these exports is due to the greatly enhanced price of the articles.

Table 14 states the number of the various descriptions of live stock that have been imported and exported during the past ten years; and its examination shows that the gold-diggings have produced effects in this instance which have tended to neutralize each other. On the one hand, there have been realized by the colonists since 1851 very high prices for their stock, especially for horses sent to Victoria, many of which have fetched immense sums; while, on the other, the cattle and sheep imported have been considerably enhanced in cost to the consumers from the great scarcity of meat.

Our exports during the last three years consisted of 320 head of cattle, 4107 horses, and 11,217 sheep, of the declared value of £100,590; and the imports for the corresponding period were respectively 16,308 head of cattle, 61 horses, and 152,023 sheep, valued at £153,687.

Of the imports, the value in 1851 was £22,385, or 27 per cent. increase upon 1850; in 1852, £49,754, or 122 per cent. increase; and in 1853, £81,548, or 63 per cent. increase; and of the exports, the value in 1851 was £19,064, or 173 per cent. increase upon 1850; in 1852, £53,127, or 178 per cent. increase; and in 1853, £28,399, or 26 per cent. decrease upon the previous year.

Table 15 shows the value of the hides, skins, and leather, manufactured and unmanufactured, which were imported and exported during the last ten years, and calls for no special remark. Upon the average of the last three years, the value of the imports, and of the exports, in this department of commerce was about £10,000 respectively, thus balancing each other.

Table 16 shows the quantity and value of wool and oil exported from the colony from 1844 to 1853. As to the former of these staples, wool, it is cheering to know that the scarcity of labour arising from its withdrawal to the gold-fields has had no effect in diminishing the quantity produced; and also that a much higher value is given to the exports of the last three years from the rise of price in the English market. As to the latter of these staples, oil, the diminished quantity of this most important product of colonial industry has been already adverted to: but in this case also the advance in value upon the smaller yield in some measure compensates for the deficient supply. Of the wool, the quantity exported in 1853 was 19,524 bales, of the declared value of £326,096, and of the oil, the quantity was 339 tons only, valued at £30,106.

Table 17 sets out the quantity and value of the gold dust exported, or rather re-exported, from Tasmania; it having been mostly brought hither from Victoria by the successful diggers from this colony, The returns are, of course, for the years 1851 to 1853,—and are as under:—

	OUNCES.	VALUE.
1851	7,636	£24,717
1852	145,420	£472,615
1853	59,054	£217,538

The total quantity exported for the three years is 212,110 ounces; and its declared value £714,870, or at the rate of £3 *7s.* 4¾*d.* ℔ ounce.

Tables 18 to 21 relate to the shipping interests of Tasmania independently of the whale fishery. The stimulus to commerce from the gold-fields is seen at once by the increased amount of shipping which has since visited our ports. In 1850 the number of vessels inwards was 674, being an increase of 4 per cent. over 1849; in 1851 the number was 782, or 16 per cent. increase; and in 1853 there were 1024 vessels, or 29 per cent. increase. The tonnage in 1850 was 104,017, and in 1853, 192,420; its progressive increase having been, 1851, 15·5 per cent.; 1852, 12·7 per cent.; and 1853, 42 per cent. Upon the average of the three years, the proportion of shipping annually from Great Britain was 49 vessels, 21,726 tons; from the British Colonies 771 vessels, 115,465 tons; from the United States 18 vessels, 7061 tons; and from foreign states 18 vessels, 5096 tons.

In 1852 the comparatively small increase of vessels, at a time when the stimulus to colonial trade was so powerfully felt through the operations of the gold-fields, is obviously due to the fact, that many of the vessels which would have come hither were attracted to Victoria; but in 1853 a re-action had taken place to a certain extent, and the trade to Victoria had been overdone, and exporters had found out that consignments, which had ceased to yield profitable returns in Melbourne, might still meet with an advantageous market in Tasmania,—and hence the comparatively large increase in 1853. It would also appear, from the increase in tonnage as compared with the number of vessels employed, that they must have been of a larger calibre than had previously visited our ports.

Of the vessels outwards the total number in 1850 was 702, and the tonnage 104,848; and in 1853, 999 vessels and 188,279 tons: the progressive rates of increase being 1851, 12 per cent.; 1852, 5 per cent.; and 1853, 21 per cent.: the increase of tonnage being respectively 13 per cent. in 1851, 14 per cent. in 1852, and 38 per cent. in 1853. Upon the average of the three years, the proportion of shipping annually to Great Britain was 31 vessels, 8749 tons; to British Colonies 804 vessels, 124,239 tons; to the United States 20 vessels, 5964 tons; and to foreign states 25 vessels, 8801 tons. Of the whole tonnage inwards the proportion from Great Britain is 15·8 per cent., from British Colonies 81 per cent., from the United States 1·2 per cent., and from foreign states 1·7 per cent.; and of the whole tonnage outwards the proportion to Great Britain is 4·7 per cent., to British Colonies 88·3 per cent., to the United States 0·5 per cent., and to foreign states 6·3 per cent.

Ship-building was rapidly advancing in importance as an industrial pursuit at the time of the gold discoveries, from which it received a severe check that it has not yet recovered from; but, like other branches of trade, it appears to have reached the lowest point of depression, brought about by the disturbing influence of the gold-fields, and will now, no doubt, take a fresh start fostered by the accumulation of capital. It may be as interesting to trace its progressive rise as to notice the gradual decline since 1850. In 1844 the tonnage of shipping built was 350; in 1845 there was an increase of 50 per cent.; in 1846, of 80 per cent.; in 1847, of 70 per cent.; in 1848, of 46 per cent; in 1849, of 22 per cent.; and in 1850, of 10 per cent. In 1851 there had been a decrease in the number of vessels built of 57 per cent., in 1852 of 35 per cent., and in 1853 of 1½ per cent. The vessels registered, on the contrary, have increased in number, showing that such addition to our colonial marine must have been made by purchase in other ports; and such we know to have been the case. In 1850 there were 78 vessels registered; in 1851, 99; in 1853, 107, with an average of 11,500 tons.

The fact of there being two Patent Slips in course of construction at the present moment,—involving a considerable outlay of capital,—would seem to indicate the confidence that the advantages which the Port of Hobart Town presents as a station for building and repairing vessels will be likely to attract hither a still increasing amount of shipping.

The steam marine of the colony has also received an impetus; for in 1850 there were only two steam vessels employed on our rivers, of 139 tons and 52 horse power in all. In 1853 the number was 5, of 1221 tons and 357 horse power; and of these the three additional steamers are built of iron. It is gratifying to know that enterprise is planning and accomplishing much in this valuable department of our inter-colonial and coasting trade; and also that the colony possesses so largely within herself the means of supplying suitable coal for the prosecution of such useful undertakings.

It is well known that, in addition to those registered at our ports, there were other steam vessels trading regularly with this colony, besides occasional visitants.

Table 22 shows the amount of revenue derived from the sale and leasing of crown lands for the same decennial period; and the results presented for the years subsequent to the opening of the gold-fields afford conclusive proof of the soundness of the prosperity enjoyed by the colony. In 1850 the total land revenue was £28,444; in 1851 it had increased 8 per cent.; in 1852, 37 per cent.; and in 1853 it reached £90,690, or 113 per cent. increase upon the year preceding.

In 1850 the proportion of receipts from the sale of waste lands was 16 per cent.; in 1851, 21 per cent.; in 1852, 15 per cent.; and in 1853, 55 per cent.

Table 23 is a return of the number of mortgages effected upon property, and of the sum total, for each of the last ten years respectively. Dividing the whole into two quinquennial periods, and comparing them together, the mortgages were fewer in number by 23 per cent., and less in amount by 29 per cent., during the last five years than during the five preceding.

Tables 24 and 25 represent the monetary condition of the colony, as shown in the extent of its metallic currency, and in the operations of the several banks as disclosed by their returns of assets and liabilities, for the ten years 1844 to 1853. Irrefragable evidence, if any were wanting, is hence presented of the acquisition of wealth by the colony since the opening of the gold-fields; and also of the sound basis upon which its four large banking establishments are conducted,—so amply justifying the confidence reposed in them.

The whole amount of coin in the banks and military chest in 1850 was £239,417, being an increase of 13 per cent. upon

1849. In 1851 the increase was too trifling to deserve notice. In 1852 the amount had increased to £621,419, or 160 per cent. upon 1850. In 1853 it had still further increased to £1,375,352, or more than double the sum in 1852. By way of contrast it may be stated that in 1844 there was scarcely more than one-tenth of the amount of specie in circulation.

The bills of exchange in the banks in 1853 represented rather more than one million sterling, being 34·6 per cent. increase upon 1852, and showing a legitimate expansion of business as compared with the increasing commerce of the colony; the increase of 1852 upon 1851 having been only 1·4 per cent.

The paper currency of the banks will show a corresponding enlargement called for by the growing necessity for meeting the demands of commerce. In 1850 the total issue of the banks was £61,777; in 1851, £99,120 or 60 per cent.; in 1852, £202,688 or 104 per cent.; and in 1853 the issue increased to £246,532 or 21·6 per cent. upon that of the preceding year.

The aggregate deposits in the banks in 1850 were £368,680; in 1851 they increased to £503,330 or 36·5 per cent.; in 1852 they had more than doubled, amounting to £1,026,020; and in 1853 had reached £1,876,112, or 82 8 per cent. increase upon the year preceding.

It will, perhaps, exhibit in a more clear and striking light the degree of prosperity attained by the colony from its proximity to the gold-fields, to state that the bank deposits for 1853, divided by the total population, would give £28 8*s*. 10*d*. for each soul in the colony. This simple fact would dispel every doubt, if any such existed, of the sound and healthy character of the prosperity enjoyed by the colony,—unparalleled, perhaps, in the history of any British Colony in the world, Victoria not excepted.

To complete the analysis of these bank returns, it remains to say that the total liabilities of all the banks amounted in 1853 to £2,122,644, and the assets to £2,396,109, or an excess of assets of 11·4 per cent.

Tables 26 and 27 show the relative amounts of the general revenue and expenditure of the colony for the last ten years; and, as might be anticipated, the annual returns since 1850 exhibit the influence of the gold discoveries. The revenue in 1850 was £135,429; in 1851 the increase was 3·1 per cent.; in 1852, 29 per cent.; and in 1853 it reached £257,872 or 42·4 per cent. upon that of the preceding year. The expenditure has also necessarily increased, though not in the same proportion. For the years 1850 to 1852, it as much as possible agreed with the amount of revenue; but in 1853 the public expenditure was £191,443, leaving a surplus of revenue of £66,429, or 26 per cent. These statements are exclusive of the land revenue, which has already been referred to.

Table 28 presents the statistics of the Post Office of the colony for the past ten years, of which the return for 1853 possesses more than usual interest, as showing the effect upon the revenue of the new postal arrangements, which have been assimilated with those of the mother country by reducing the postage, and making prepayment compulsory. The result seems to have amply justified the expectations entertained of its success. As compared with 1852, the number of post offices have increased from 53 to 62, the persons employed from 86 to 93; the miles of post roads travelled over from 647 to 662; the letters sent from Hobart Town from 203,305 to 220,473, or 8·4 per cent.; the letters received from 157,611 to 189,847, or 24·5 per cent.; the newspapers forwarded from 189,961 to 222,940, or 12 per cent; and the newspapers received from 68,121 to 102,497, or 50 per cent. increase.

As respects the working of the two-penny post, or rather penny post in 1853, the increase of letters has been considerable. Independently of the franked letters, the numbers passing through the post offices in 1851 were 12,125; in 1852 they numbered 15,815, or 30 per cent. increase; while in 1853, by the penny post, they amounted to 26,293, or 60 per cent. increase upon the preceding year.

The receipts in 1852 were £8303, and the expenditure £7361, or a deficiency of 11·3 per cent.; in 1853 the receipts were £9880, and the expenditure £11,091, or a deficiency only of 12·2 per cent.,—notwithstanding the sacrifice of revenue from the abolition of postage on all the inland letters, and the great additional cost of conveying the mails. At the same time, it may be questioned whether some portion of this improvement may not be due to the general expansion of trade rather than to the modification of the postal arrangements.

Tables 29 and 30 are returns by the Registrar of the Supreme Court of the number of civil cases tried and disposed of, and of convictions under its criminal jurisdiction, for the ten years 1844 to 1853; and it must afford unalloyed satisfaction to perceive a reduction to the extent of about one-half in both branches of the business of the Court for the last five years as compared with the former similar period. From 1844 to 1848 the number of actions tried and assessed was 188: from 1849 to 1853 the number was only 86. The number of convictions for felonies and misdemeanors for the first of these terms was 1087: for the last, 559. Something of this, of course, is due to the diminished population of the last three years; but much more to the prosperity of the colony generally, and the withdrawal of the inducements to crime against property from the abundance of employment at high, not to say exorbitant, rates of wages.

Table 31 is the Sheriff's return of the executions which have taken place for a similar period, and is not quite so favourable; the number of criminals executed for the first five years being 61, and for the last 47, or a reduction of 22·9 per cent. If crimes against property have diminished, crimes of violence it is to be feared have increased, attributable to the very prosperity itself enjoyed by the colony from the excesses and lawlessness produced by extravagant wages, leading to drunken broils and the letting loose of the brutal passions of the ignorant and turbulent.

Table 32 is a return from the Principal Medical Officer of the number of Lunatics in confinement at the New Norfolk Asylum and the Salt Water River Station for the years 1844 to 1853. The results of the medical treatment adopted are exhibited in the several columns of "discharged cured," "discharged improved," "died," and remaining supposed incurable. The return stretches over a period of nine years only, omitting 1844. Adding each column together, and taking the mean, it gives an average of 208 patients kept in confinement, and 60 as the average number admitted annually. Of the total, the discharged cured are 12·4 per cent.; the discharged improved, 1·4 per cent.; and the deaths 8·6 per cent. annually upon the average of the nine years. Again, of the whole number, the average is 66 per cent. of convicts; and of these the proportion is as 2 males to 1 female. Of the free, in like manner, the average proportion of males is 62·4 per cent. In a note it is added, that on the 31st December, 1853, there was a grand total of

250, of whom it is said that 215 are supposed to be incurable, viz. 150 males and 65 females. Compared with the population, it gives 0·38 per cent., or as one lunatic to every 263 persons.

Tables 33 to 37 are four important returns from the Chief Police Magistrate, bearing upon the industrial resources of the colony in respect to its agriculture, its trade, and manufactures.

The number of acres in crop, the nature of the crop, and the produce, are given in the first of these tables; and an examination of its figures fully confirms the preceding remarks as to the falling off in production caused by the abstraction of labour to the gold-fields. In 1850 the total number of acres in cultivation was 168,820; in 1851 there were 151,846, or a decrease of 10 per cent.; in 1852, 123,983¾ or 18 per cent. decrease; and in 1853, 116,446¾ or a further decrease of 6 per cent.

Further analysis, and comparison of the year 1850 with 1853, will show the extent and nature of this decline of agriculture caused by the dearth of labour. In 1850 the acres of wheat in cultivation were 64,650: in 1853 there were only 44,123, or 31·7 per cent. decrease,—diminishing the supply of wheat by more than a quarter of a million of bushels, and about 4000 tons of hay. In 1850, 43,180 acres of barley were in cultivation; in 1853, there were 11,782, or 10·6 per cent. less. In 1850, 35,243 acres of oats: in 1853, 31,052, or 11·8 per cent. less. The yield of this year is set down at about half a million of bushels of oats, and nearly 20,000 tons of hay. The crop of peas have declined one half, from 981 acres to 405; and of beans remain nearly the same, from 95 acres to 90¼. In 1850 there were 6646 acres of potatoes in crop: in 1853, 5530 acres, or 16·7 per cent. less,—the yield being 16,990 tons. Turnips show a decrease of about one half; being 3643 acres, and yielding 16,088 tons in 1853. Of carrots, 153 acres and a yield of 943 tons are returned for 1853; and of mangel wurzel, 53½ acres of 311 tons. Of tares, 371 acres are returned as in crop, producing 1972 bushels and 209 tons of hay. In 1850 there were 39,971 acres laid down in English grasses, but the produce is not stated: in 1853 the number of acres was only 19,241, more than one half less, the produce being 11,122 tons and 6834 bushels of seed.

The annual returns of live stock for the last ten years are given in the next table, by which it appears that on 31st December, 1853, Tasmania possessed 15,455 horses, 91,803 head of cattle, 1,942,550 sheep, 1805 goats, 28,082 pigs, and 12 asses.

The average cost of provisions at Hobart Town on the 31st December of each year is next detailed; and shows a considerable progressive rise in the prices of all the common necessaries of life since the discovery of the gold-fields, reaching in some instances to fully 500 per cent. It will at once be evident that this augmentation of price has been occasioned partly by the greater abundance of money in circulation in these colonies, partly by the increased demands in the markets of the neighbouring colonies to supply the means of subsistence to the crowds of adventurers flocking in and from all quarters to the gold-fields, and partly by the diminished production of our industrial population.

The average rate of wages paid to certain classes of mechanics and labourers is tabulated in the next return; and a glance at the columns of the last two years afford ample corroborative proof, if any were required, of the great disturbance of the labour market. In 1853, the wages of bricklayers, carpenters and masons have fully trebled,—

15*s*. a day was the current wages in the towns, the rate being a trifle less in the interior; and the same proportion holds good with painters, plumbers, plasterers, and quarry-men, whose wages varied from 16*s*. to 10*s*. daily. Of course rations are not included. Excessive as these rates seem, they are after all not so very unreasonable when compared with the greatly enhanced cost of provisions and fuel and rent, and indeed of every article of consumption; and it may be affirmed that a mechanic with a family was much better off with his ordinary wages in the cheap times.

The next and last return of this series details the several manufactures and trades in operation in Tasmania annually for the last ten years. The enumeration comprises sixty distinct pursuits; and is valuable as showing the direction which colonial enterprise is taking in opening fresh channels of industry. Some remarkable fluctuations appear by a comparison of the returns, which would almost seem to contradict common experience as to the scarcity of certain classes of mechanics. For instance, in 1853 the number of blacksmiths, bricklayers, cabinet-makers, carpenters, engineers, shipwrights, shoemakers, and tailors in the colony appears to have been much greater than in 1850.

Table 38, giving a return of the diseases treated in Her Majesty's Colonial Hospitals, as it represents rather the results of a single institution than the state of health and disease of the colony at large, needs no particular notice.

Table 39 describes the number of houses in Tasmania, as ascertained by census taken in 1842, 1848, and 1851 respectively. In the first of these returns the total number was 7629, built in about equal proportions of stone or brick and wood: in 1848 they had increased to 10,187 or 33·5 per cent.; and in March 1851 the number was 11,844 or 16·2 per cent. increase. The population had increased respectively 18·4 per cent. for the first of these periods, and 1·8 per cent. only for the last; showing the diffusion of more house accommodation among the community in proportion to its numbers, and a consequent augmentation to the sum of social and domestic comfort. The houses uninhabited in 1842 were 333 or 4·3 per cent.; in 1848, 668 or 6·5 per cent.; and in 1851, 599 or 5 per cent. This was two months before the gold discoveries; the first effect of which was to create the belief that there would be a general desertion of houses from the selling off of house and home by people of every grade rushing to the diggings. House property, in fact, at the onset was greatly depreciated, and sold—and that with difficulty—at almost a nominal price. In a short time, however, there came an unlooked-for reaction. The streets of Hobart Town and Launceston by the end of the year began to swarm with lucky diggers and numerous visitors,—the former bent upon enjoying the fruits of their success with their families and friends, and the latter to take up their abode more or less permanently, attracted by our superior climate, and our more quiet and better protected towns. The demand for dwellings at once exceeded the supply, and soon there was not a house to be got without almost a scramble,—rents rising 300 or 400 per cent.

Table 40 is a classification of the inhabitants of Tasmania as regards their profession of religion, as ascertained by the census taken in the years 1842, 1847, and 1851 respectively; every person whose religion was not stated in the census paper being returned as belonging to the Church of England. By comparing and analyzing the returns for the three periods, we obtain the following results :—

	1842. per cent.	1847. per cent.	1851. per cent.
Church of England........	73·1	69·3	65·6
,, ,, Scotland........	7·9	7·	6·5
,, ,, Rome............	9·4	15·4	18·1
Wesleyans	4·7	3·9	5·4
Other Denominations	4·	3·4	3·4
Jews..............................	0·6	0·7	0·6

In 1842 there were returned 31 individuals as Mahomedans and Pagans, 29 in 1847, and 21 in the census of March 1851.

Table 41 shows the distinction between the married and single inhabitants of the colony at the three several dates noted, of December 1841 and 1847, and March 1851. The proportion of the married people at the first of these periods was 27·9 per cent., at the second 27·4 per cent., and at the third 28·3 per cent.

Table 42 distributing the gentlemen in the commission of the peace, 246 in number, into groups corresponding with their respective avocations, requires no comment.

Table 43 is a return of the quantity of crown land sold, and of the amounts realized by the sales, for the last ten years; and affords ample confirmatory proofs of the wealth accumulated from the gold-fields, and of its partial investment in the lands of the colony. Of the country lots 1544 acres were sold in 1850, yielding £2496: in 1851 the quantity was 2956 acres, or 91 per cent. increase; and the sum paid for it was £3106, or 24·4 per cent. increase. The average price in 1850 was 32*s.* 3¾*d.*; and in 1851, 21*s.* 4*d.* In 1852 the quantity sold was 5363 acres, or 81·5 per cent. increase, yielding £7353, or 136·3 per cent. increase; the average rate being 27*s.* 5*d.* In 1853 the quantity rose to 35,550 acres, producing £36,132, or fivefold that of the year preceding; the average price being 20*s.* 3¾*d.* per acre.—

Of the town and suburban allotments, the quantity sold in 1849 was 241 acres, producing at the average of £5 4*s.* 1¼*d.* per acre £1256. In 1850 the quantity had fallen considerably below the average of preceding years. In 1851 the quantity was 529 acres, realizing at £5 19*s.* 1¼*d.* per acre £3154 ; in 1852, 700 acres, at the highest average of £7 16*s.* 3¾*d.*, £5472; and in 1853 the smaller quantity of 287 acres produced, at the average price of £39 10*s.* 6½*d.* per acre, £11,344. This higher average of price may be ascribed also to the fact already referred to, of so many adventurers having returned from the gold-fields with money in their pockets, and anxious to secure for themselves and their families a settled residence in the towns, as well as to the fact of the lots offered being more favourably situated, and therefore, under ordinary circumstances, of greater value. It will also be observed that the country lots have not advanced in proportion ; and much of the land exposed for sale is probably such as, under the circumstances of ordinary times, would have brought even less than the average price.

Table 44, the last of the series, is a synopsis of the meteorological observations kept at the Royal Observatory in the Queen's Domain for the last ten years. The mean pressure of the atmosphere, corrected down to the standard temperature of 32° Fahrenheit, is tabulated in the first column for each year ; and the mean for the whole decennial period is 29·7614. Of far greater importance to the comfort and health, as well as to the material interests of the inhabitants, is the mean temperature, given in the next column, which ranges from a minimum of 51 in 1849 to a maximum of 54·37 in 1850 ; the mean of the whole ten years being 52·81. This, however, it must be borne in mind is only the mean temperature of the place where these observations were taken, in the immediate vicinity of Hobart Town ; and that, before any conclusion can with propriety be drawn as to the mean temperature of the whole Island, equally precise observations, extending over even a greater length of time, must be obtained from a great number of points; as it is obvious that there are many conditions besides that of altitude and littoral position which more or less modify temperature in particular situations. For instance, at Port Arthur, near the level of the sea, the mean temperature for 1842 is stated, upon the authority of the late Assistant-Commissary-General Lempriere,* to have been 55·1; while at the Hampshire Hills, 1340 feet above the level of the sea, and more to the north, Dr. Milligan states the mean temperature for 1836 to have been only 47·69, and in 1845 only 47·49.† It is evident, therefore, that it must not be too hastily assumed that because in Hobart Town we have a temperature so mild and equable, that the same will be found to prevail generally over the colony.—The next column in the table gives the fall of rain for each year; the minimum being in 1847, 14·46, and the maximum in 1849, 33·52; the mean annual fall for the ten years being 20·713, which is nearly the same as that which is given for London, (20·686) deduced from a series of forty years' observations. Here, again, we must be cautious not to receive as the average fall of rain throughout Tasmania that which is experienced in this particular locality: for Mr. Lempriere, in the Table referred to, gave for the year 1842 at Port Arthur 32·58 inches; while Dr. Milligan gives for the five years 1835 to 1839 the following amounts respectively, viz. 55·75, 75·16, 80·59, 70·47, and 55·23—the mean annual fall for the five years being 67·44. Again, Dr. Pugh states the fall of rain at Launceston in 1849 to have been 28·716; that for Hobart Town, as

* Tasmanian Journal, vol. ii. p. 70.

† Ibid, p. 71.; vol. i. p. 380.

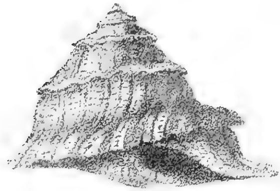
before stated, being 33·52 for the same year. The same diversity is known to exist in all countries; for while Hobart Town agrees pretty well with London, there are some parts of Lancashire in which the fall of rain is as great as at the Hampshire Hills and the north west of Tasmania.—The notes and remarks in the last column speak for themselves, and require no comment.

IV.—*On the Characters of Astele, a New Division in the Family of Trochinæ, or Trochiform Shells; together with the Description of another Species of the same Family. By* William Swainson, Esq., F.R.S., &c. [*Read 8th March,* 1854.]

The more we become acquainted with the innumerable variations under which animal and vegetable life present themselves, the more do we discover the beauty of that portion of the plan of creation by which one form is connected to another, so that by following the chain of affinity, objects the most dissimilar are insensibly connected by intermediate forms, and these will often blend the peculiarities of each so much, that, like the seasons of the year, it becomes nearly impossible to define where one terminates and the other begins.

This gradation in the scale of nature is too well known abstractedly, even to the unscientific, to be enlarged upon in this place. It is the basis of all true science and of all natural classification; and, therefore, every fresh instance of its existence claims the greatest attention from those natu-

PLATE VI.



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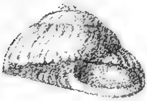

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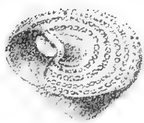

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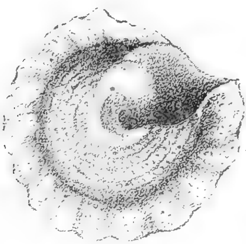


4.

Astele subcarinata fig 1. 2.
Carinidea fimbriata " 3. 4.
" granulata " 5. 6.

ralists whose ideas are not chained down to the adoption of old genera only, and who content themselves with merely studying specific differences. But it may be as well to remind dissentients from modern classification, that new objects create new ideas, and that new ideas require new combinations of terms and words to express them. This, in truth, is why new divisions (under whatever name they may be called) are found to be absolutely necessary. Were it otherwise, the *Systema Naturæ* of the immortal Swede should still be the text-book of the Zoologist, and the genera of Lamarck should be termed superfluous.

In no department of nature is the adaptation of our systems to the advanced state of knowledge become more imperative than in the elucidation of the Testaceous Molluscæ. The number of species discovered since the days of Linnæus are probably as 1 to 50, and every day fresh novelties are coming to light, requiring new divisions, new names, and new alterations in our system to make these novelties intelligible.

It is in vain, therefore, that a futile attempt has been made in England to arrange new objects under old names,* so that the Lamarckian genera may be made to contain anything and almost every thing. It is as vain, I repeat, to attempt to bring us back in these days to the infancy of science as for Mrs. Partington with her broom to stop the advance of the Atlantic.

I have been led into these remarks as introductory to the definition of a new form of the Trochidæ, discovered by Dr. Milligan on the east coast of Tasmania, and of which he was only fortunate enough to procure a single specimen. On a cursory glance it has every appearance of belonging to the beautiful genus *Calliostoma;* † the spire being nearly as

* Conchologia Systematica. London, 1841.

† Treatise on Malacology, p. 351.

much elevated as in the generality of that group, while the striæ, and even the colour, so closely resemble those of *Calliostoma Australis*, (*Zool. Journal*, V. 331), that an unscientific observer would take them to be the same. On turning the shell, however, with the mouth or aperture uppermost, it is immediately seen to belong to a different genus. There is not the slightest indication of a pillar; for the umbilicus is so open, that the very point of the apex can be seen through it: while the elevated striæ surrounding it are not only thickened, but granulated in *Solarium*. From that genus, however, it is equally distinct as from *Calliostoma*, because the substance of the shell is altogether perlaceous, although, like *Solarium*, the margin of the aperture or outer lip is thin. Condensing these remarkable characters into a formula, the genus may thus be defined from its shell:—

ASTELE.

Animal, unknown.

Shell, perlaceous; pyramidical or trochiform; unarmed, body whorl beneath convex.

Columella, none.

Umbilicus, large, closed only by the terminal whorl of the spire.

Aperture, broader than high, the margin of both lips thin.

Astele subcarinata. Plate VI., figs. 1 and 2.
Subcarinated astele.

Shell broader than high; whorls above scarcely convex; marked by 6—7 elevated, smooth, convex striæ, which leave a flattened margined rim at the top of each whorl; body whorl beneath marked with concentric grooves, which are decussated near the umbilicus.

Inhabits Tasmania. (Mus. Dr. Milligan).

Colour pale fawn, or issabella, clouded with faint transverse waves of rufous.

Margin of the body whorl, slightly carinated; there is a depression between the margin and the second elevated striæ on the upper surface, the first, or that next the margin, being very slender. The striæ beneath assume the appearance of grooves, which are wider apart as they approach the umbilicus; and the three more immediately adjoining are crossed by transverse striæ, which produces a granulated appearance, somewhat similar to that of *Solarium perspectivum.*

There are no longitudinal striæ, however slight, on the surface. The umbilicus is pure white, and the inner surface of the aperture reflects the striæ on the upper surface.

Obs.—The union of characters thus afforded between this new form and *Solarium* induces me to think that the two genera should follow each other without the intervention of *Monodonta* and its subgenera, as *Elenchus*, &c.

In the same collection with the above interesting shell I observed another of the same natural family, which, as I have never met with it before, and as being in all probability peculiar to this Island, I shall now describe ;—

It belongs to a division of those Trochidious shells which, as having a thick calcareous operculum, have long ago been separated under the name of *Canthorbis,* * in contradistinction to that of *Trochus,* where the operculum, or lid of the animal, is invariably thin and horny.

Carinidea fimbriata. Plate VI., figs. 3 and 4.

The Fringed ridged Trochus.

Shell higher than broad, marked above with narrow uniform longitudinal ribs, crossed by delicate imbricated striæ; suture

* Swainson's Shells and Shell Fish. Lardner's Cyclopedia, page 349.

dilated into a thin prominent undulated fringe, plaited into large and regular folds.

Inhabits Flinder's Island, Bass's Straits, and the north-east coast of Tasmania, (Mus. Dr. Milligan.)

Shell about $1\frac{1}{4}$ inches broad and 1 inch high, of a uniform fulvous white or light fawn, destitute, like the other species of this group, of any bright colours or distinct markings.

The transverse striæ, on the upper surface, are slender, very irregular, or rather undulated, and are imbricated by the lines of growth, which are very near each other; equally irregular are the striæ on the under surface of the body whorl, occupied by the fringe : but those in the centre are regular and concentric, and are from five to six in number. The umbilicus is quite closed, although concave in the middle, and in old shells its enamel forms a prominent elevated rim all round the aperture. The plaiting of the sutural fringe is only half as many in number as are the longitudinal ridges.

2 *Carinidea granulata.* Plate VI., figs. 5 and 6.

Granulated ridged Trochus.

Shell trochiform, suture depressed, or more or less carinated, upper half of the whorls with obliquely waved ribs; lower half with transverse series of granules, body whorl beneath slightly convex ; the margin more or less carinated.

Inhabits Flinder's Island and Bass's Straits, (Dr. Milligan).

Shell resembling a Trochus in general appearance, neither the suture nor the body whorl being very decidedly carinated, except when in a young state. It nevertheless truly belongs to this genus, both by the concave, but not perforated, umbilicus, and by the strong calcareous operculum. Its full size never exceeds $\frac{11}{16}$ of an inch broad, and $\frac{7}{16}$ high. The granulated appearance of the lower portion of each whorl is remarkable; in some lights the granules seem like a forked continuation of the upper plaits, or ribs; but in others, they look like a cross series of granules disposed in latitudinal rows, parallel with the suture.

The underside of the body whorl exhibits from five to six of these granulated striæ, parallel to the margin, which is but slightly carinated in the full-grown shell, but much more so in the young, yet without being dilated.

The colour is pale straw, the operculum is white, the lunate depression at the umbilicus very conspicuous, and the under part of the body whorl nearly flat.

N.B.—There are, I suspect, two, if not three, other species in Dr. Milligan's collection, but they are so encrusted with *Serpulæ*, &c., that I am fearful of describing them.

3. *Carinidea acuta.*

Sharp-edged Trochus.

Shell small, longitudinally plicated and transversely granulated at the lower suture and margin of the body whorl, with a sharp prominent and flattened rim.

Inhabits under stones in Burial Island, Port Arthur. Rather smaller than *C. granulata*, which it so closely resembles, that it may probably be but a variety.

The carinated line, however, is much more prominent on the suture than is usual in the young of the last species, and that round the body whorl is not only more sharply carinated, but absolutely dilated, and partially obsoletely undulated.

I have not access at present to more than two specimens, and have therefore some hesitation in giving it as a new species.

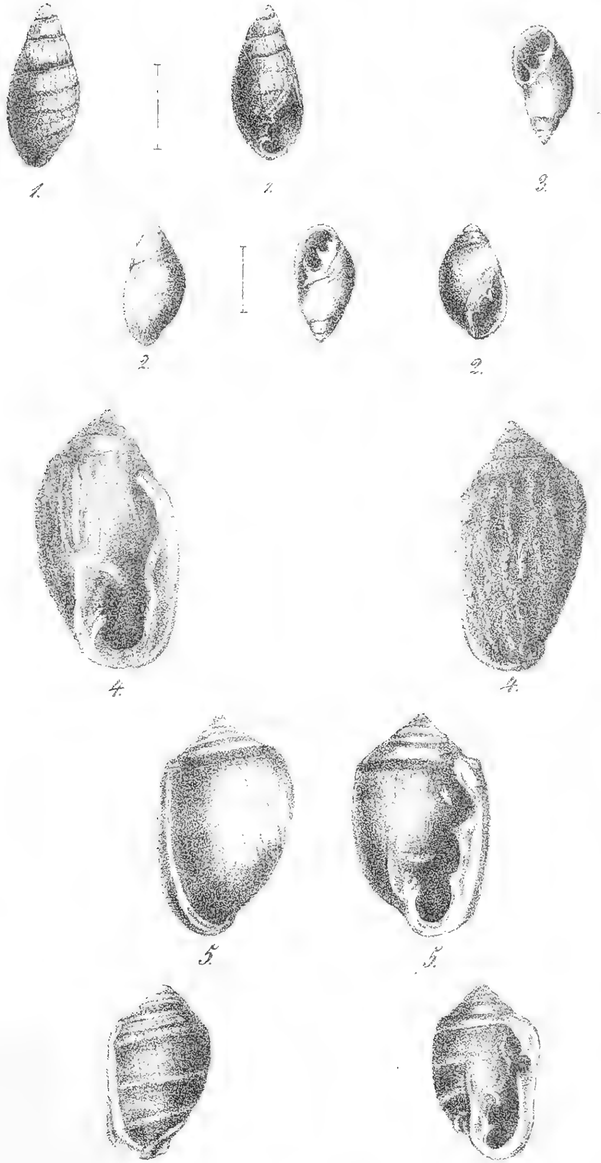
V.—*On the Characters of the several Amphibious Volutes allied to the genus Melampus. By* William Swainson, *Esq.*, F.R.S., *&c.* [*Read 9th April*, 1854.]

Between the Phytophagous *Molluscæ*, which live either upon land or in fresh water, and the marine division, which subsists upon seaweeds, there seems to intervene a remarkable group of animals of this class, which, although organized to enjoy life in both elements, can do so only by alternately changing one for the other. They are, in short, amphibious *molluscæ*, and have been placed in our arrangement next to the Linnean genus *Turbo*, because several of these latter have the same peculiarity of habit and mode of general structure. This curious group is probably represented by the old *Voluta Auris Midæ* of Linnæus, now forming the modern genus *Geovula*, or *Melampus* of Montford. In these as well as the subordinate forms of *Pedipes*, by Adamson; *Scarabus*, Montf.; and *Rhodostoma*, Sw.; the pillar, and often the outer lip, is marked by distinct plaits or fol ls, perfectly analogous to the *Volutidæ*. Hence they have been termed amphibious *Volutes*.

It must be confessed, however, that our knowledge of most of these animals, and even of their shells, is as ye very imperfect.

The opportunities enjoyed by Guilding and Lowe of examining the animal, and witnessing the habits of *Melampus* and *Pedipes*, completely establishes the fact that they do not belong to the *Pulmonaria* of Cuvier, and, consequently, have nothing to do with the true land shells, or *Helicidæ*. Of the other divisions I cannot find that any recent discoveries have

PLATE VII.



1. *Gemnobates cornea.*	4. *Rhodostoma corrugat*
2. „ *solida.*	5. „ *bidentata*
3. „ *parva.*	6. „ *notata.*

been made of their animals, and I am therefore disposed to leave them much in the same series as they stand in my treatise on *Malacology*, pp. 208 and 344.

The shells I am now about to describe belong to the singular group of amphibious *Testacea* above noticed. They are all of a small size, and the inner lip, as in *Melampus*, is strongly toothed or plaited, but, unlike the shells of that division, the inner lip is not striated ; and the spire, instead of being very short and obtuse, is produced and pointed, so as much to resemble the form of a *Bulimus*. Thus distinguished, I think it better to place them in a group by themselves, rather than under *Melampus*. All three are in Dr. Milligan's Museum ; the two first were found by him in Oyster Cove in abundance, often above high watermark; but the third, *solida*, which has every appearance of being a marine shell, was found cast up by the water on the south-west shores of Flinder's Island, along with a small species of *Paludina*, found in brackish pools and marshes, both in Australia and Tasmania.

Judging from the shells alone this little group appears to be the intermediate between *Melampus* and *Pedipes*.

Cremnobates.

Animal, amphibious. *Shell*, small, oval. *Spire*, rather pointed, as long as the aperture. *Aperture*, not contracted, *Pillar*, with strong plaits. *Inner lip*, thin, smooth inside.

Sp. 1. *C. cornea.* Plate VII., fig. 1.

Shell ovate, thin, light, covered with an epidermis ; spire rather thickened, but not longer than the aperture ; pillar with two plaits—the first large and central, the second small and basal. Inhabits Oyster Cove, near Hobart Town.

The general colour is olive brown, sometimes more or less marked by darker transverse bands on the body whorl; the spire is much thicker in proportion than that of the next; and the whole shell is larger.

Sp. 2. *C. parva.* Plate VII., fig. 3.

Shell ovate, thin, light, covered with an epidermis; spire slender, pointed; pillar plaited; first close to the top of the aperture; the second more towards the base.

Inhabits with the last, but is much smaller, more slender, and the plaits proportionately much larger.

Sp. 3. *C. solida.* Plate VII., fig. 2.

Shell small, solid, glossy, white, tinged with pink or fulvous; body whorl large; spiral whorls small, the tip rather obtuse; pillar with three unequal plaits, the first very large. Inhabits shores of Flinder's Island.

This, from its comparative weight and substance, appears to be strictly a marine shell, and seems to connect the two preceding with *Pedipes*, from which genus the shell differs only in having no teeth on the outer lip.

As a further illustration of this intricate family, I shall now describe three species of *Rhodostoma*, a genus in which the characters of *Melampus* and some of those belonging to *Tournatella* are united. The first is very remarkable, and the two others, I believe, have been overlooked.

Rhodostoma corrugata. Plate VII., fig. 4.
Wrinkled Pinkmouth.

Shell oblong-ovate, somewhat coniform, body whorl with prominent waved interrupted wrinkles. Spire very short, conic, smooth, margin of the aperture orange.

Inhabits Cape York, (?) Australia.

Only one specimen in Dr. Milligan's collection.

The base of the upper lip projects, and the umbilicus is closed, but margined externally by an elevated rim. The lower plait is the thickest, and is divided almost into two by a deep groove.

2. *R. bidentata.*

Two-toothed Pinkmouth.

Shell ovate; body whorl ventricose; outer lip with two distinct but unequal teeth on the inner margin; basal plait, with a central groove.

Inhabits ———. (Dr. Milligan's collection.)

Shell shorter, but much thicker in general form than the last; outer surface quite smooth; colour cinnamon, fulvous, with a distinct white band on the top of the body whorl, and another adjoining the suture. Umbilicus partially closed, with a prominent marginal elevation, the intermediate space being concave, and strongly marked by the lines of growth. Outer lip very thick, but with a sharp edge, the flattened portion scarcely concave; the inner margin with a gradually curved sinus, followed by two distinct, but unequal granulated, obtuse teeth; the lower one only half the size of the upper, and both feeling rough to the touch; colour of the aperture fulvous white.

3. *R. notata.*

Banded Pinkmouth.

Shell ovate, body whorl, with numerous hair-like transverse striæ; lower fold of the body whorl simple; inner margin of the outer lip with a deep semicircular notch only; the flattened surface very concave.

Inhabits ———. (Dr. Milligan's collection.)

Shell smaller and less ventricose than the last; the spire proportionably longer; umbilicus closed; the marginal rim very close below the notch; the edge of the inner lip is quite smooth. Colour rufous brown, obscurely banded with whitish. Aperture rosy.

VI.—*On the Australian Haliotidæ or Ear-shells, with Remarks on other Species. By* William Swainson, *Esq.*, F.R.S. *and* L.S., *&c.* [*Read* 10*th May*, 1854.]

Having accidentally met with Mr. Reeve's monograph of the genus Haliotis, and observing several points which require either correction or elucidation, I have thrown together the following notes, which, as they chiefly refer to such species as I have met with in this hemisphere, will probably be considered worthy a place in the Transactions of the Society.

The geographic distribution of animals should ever form one of the first objects of study with the philosophic naturalist. On this subject I find the following introductory passage :—" It is a curious circumstance in the geographic distribution of the Haliotides, that few, if any, are to be found where Chitons abound, as if they exchanged places, to a certain extent, in the two hemispheres. There are a few species from California, but along the western coast of South America, where Chitons are most abundant, not any are found, and only one small species, the *H. pulcherrima*, at any of the islands of the Pacific. They inhabit the coasts of China, Japan, &c., but the greater number of species, and the most remarkable, are from New Zealand and the continent of New Holland, displaying all the peculiarity of design which invariably characterize the Fauna of those isolated regions."

To the greater part of these opinions my own knowledge and experience is quite opposed. So far as regards the Australian and New Zealand coasts, (where, according to our author, "the greater number," and "the most remarkable," of the Ear-shells are found), the number of Chitons is numerous and most remarkable.

In a very limited portion of Cook's Straits I have found more than a dozen species of Chitons, some of them so remarkable as to constitute types of new divisions; and I have sometimes gathered them from the very same fragment of rock on which were young Ear-shells intermixed. Again, if New Holland is as rich in Haliotidæ as the writer supposes, it is equally rich in Chitons, not indeed described in books or systematic works, (which have doubtless been our author's authority), but in nature and fact. On looking over my friend Mr. G. B. Sowerby's, jun., figures of these shells, and the index he has given of their localities, I believe there are not more than six or seven described as inhabiting the whole of Australia, and yet I possess figures and descriptions of more than thirty species discovered in Port Jackson alone, besides thirteen others I procured or detected further north of that locality, near the estuary of the Hunter River. This relative proportion between the Haliotidæ and Chitons in number, but not in species, I have likewise found to prevail on all the coasts of New Zealand.

In regard to our Australian and New Zealand Ear-shells possessing, as it is stated, "all the peculiarity of design which invariably characterizes the Fauna of those isolated regions," I confess my perfect ignorance of the meaning of the author. I cannot myself detect a single point or peculiarity of design by which our Australian species can be distinguished from any of the others, but very many in which they perfectly agree. For instance, the large volutions of the *H. midæ,* found at the Cape of Good Hope, are precisely the same as those of the common *Haliotis rubra* of the Australian seas, while the small numerous depressed spiracles of the American *Haliotis Californiensis* find a perfect counterpart in those of our *Haliotis glabra* of Tasmania, here erroneously called *H. albicans.* The only peculiarity, in short, that can be found among all the Australian species, noticed as such by Mr. Reeve, lies in the following: viz. *H. tricostatus,* Lam. *Hal. pulcherrima,* Auct., and our *Haliotis costata,* here erroneously called *Hal. Emmæ.* These three species, together with some others, are indeed so peculiar, that, if not deserving the name of De Montford's genus, *Padollus,* they ought at least to have formed a separate division of the group, or, at the very least, not to have been confusedly mixed up, as they are here, with the other species. Thus far in regard to the author's ideas of the geographical distribution of these shells, which, in respect to those we have met with in the Australian seas, are the very reverse of correct. I have invariably found that the Chitons and Ear-shells accompany each other on the same coasts, and generally on the same rocks,—but as the former inhabit for the most part such rocks or stones as are always left dry at low water, or at least at neap tides, they are easily detected and collected; whereas the Ear-shells usually, when old, retire to situations where they are never exposed to the atmospheric air, and consequently are seldom seen, except by those who know their peculiar habitat. It is to this cause, and this alone, that we attribute the apparent deficiency of these shells where Chitons have been found in abundance.

Confining our remarks now to the Australian Ear-shells, we may commence with

Haliotis rubra *

of Dr. Leach, whose name should supersede all others, since he was the first who described it as a new species. Why it is here called *Nævota* does not appear, for there is no author quoted for this name; and if it is one of the author's, it is quite superfluous.

This is the most common species of the Australian and Tasmanian coasts, and we have found it in both colonies.

It is very doubtful whether the variegated specimens are mere varieties. In a series now before us of twenty-three adult shells, and in many other stages of growth, there are only two that possess these markings, and they have other indications of being a distinct species. New Zealand is given as one of its habitats, but this we believe to be altogether a mistake, never having seen or heard of the species in those islands.

The next in point of size is a species described by me nearly twenty-five years ago in the catalogue of the Bligh collection, and reprinted in the second edition of Exotic Conchology, as

Haliotis glabra,

here very inaccurately figured at Pl. 10, fig. 30, under the new name of *H. albicans*, of M.M. Quoy and Gaimard,

* Not *ruber*, as quoted by Mr. Reeve, who cites Dr. Leach for this name, but without stating where the Doctor's description is to be found. I have not the book to refer to, but the conchologist will find this shell figured and described in Dr. Leach's Zoological Miscellany, 3rd vol., 8vo., published about 1820.

very many years afterwards. It is stated to be found in New Zealand only, whereas it is strictly an Australian species, common at Port Phillip, and, as Dr. Milligan informs me, in the islands of Bass's Straits: he has also found it on the north coast of Tasmania. Among numerous examples in Dr. Milligan's cabinet there is not one specimen at all coloured like this figure, which, from this and the above circumstance regarding its locality, seems to throw a doubt even on the identity of the species : the description, moreover, is so short, and therefore imperfect, that it is quite impossible to arrive at any conclusion on this point; certain it is, however, that not a single instance has yet come to my knowledge of any species of Haliotis being found both in Australia and New Zealand. In a natural arrangement this should be placed close to *H. Californiensis*, and any other which have the open apertures of the spiracles so numerous, and small and depressed. Whether the species called *glabra* by the author, and figured on Pl. 1, fig. 2, should come in with the small-holed species is uncertain; never having seen the species (which I once possessed in England, and is here very well figured), either in Australia or New Zealand, I very much question the correctness of its presumed habitat.

We must here notice another species, stated to be also an inhabitant of Australia, and called, without reference to any authority, *Haliotis rugoso-plicata*,—Plate 3, fig. 7,—a compound name, which, if the rules of nomenclature laid down by the princes of science are to be adhered to, cannot be admitted. True, it is a species apparently answering to this that has been described by Lamarck under the name of *Australis*, but as there appeared some discrepancy I could not reconcile that description with a species in the Bligh collection, and I accordingly considered it expedient to describe this latter under the name of *H. costata.* This is now nearly twenty-three years ago; but the author takes no notice of this description, although he quotes another from the very same page: neither is the most remarkable distinction of this species alluded to, which in my original description is thus expressed—"The interior side is very elegant, being marked by fine lines crossing the sulcation of the ribs."* The locality is stated to be New Holland; but I believe this is incorrect, never having found it myself there, or seen it in any of the Australian collections. In New Zealand, however, it is met with in a few localities, but nowhere common.

I can see no difference between the species figured at Pl. 10, fig. 29, under the singular name of *H. Emmæ,* and that described by me in the Bligh catalogue as

Haliotis carinata,

and figured by Martini, tab. 14, f. 140, although to neither this description or figure does Mr. Reeve make any allusion. Dr. Milligan has fine specimens from the Tasmanian coasts; but we do not think that it also inhabits New Holland, as here stated. Of that beautiful species

Haliotis elegans,

which is here admirably figured by Mr. Sowerby, I have seen but two specimens, in the collection of my friend G. W. Walker, of Hobart Town, who thinks he procured it on some island in Bass's Straits.

The last species we shall notice in detail is the most splendid perhaps of the whole genus, namely, the

Haliotis iris,

which, by some most unaccountable mistake, is stated to inhabit Kangaroo Island, Australia. It is well known, however,

* Exotic Conchology, 2d. ed., p. 35.

in these colonies to be altogether peculiar to the islands of New Zealand.

The following species, described as peculiar to Australia or New Zealand, I have never seen either living or dead :—

Haliotis......	*squarrosa*	Australia	Pl. 7 fig. 20
"	... *Roei*	New Holland	" 4 " 10
"	... *excavata*	Kangaroo Island...	" 8 " 25
"	... *ovina*	* New Holland and Philippine Islands	" 9 " 28
"	... *squamata*............	N. W. Australia...	" 12 " 35
"	... *diversicolor*	New Holland	" 12 " 39
"	... *funebris*	Ditto.	" 12 " 38
"	... *cruenta*	New Zealand	" 15 " 56
"	... *Zealandica*	Ditto.	" 16 " 64
"	... *Dringii*	N. W. Australia ...	" 17 " 65
"	... *Lauta*	Swan River, N.Hd.	" 17 " 68
"	... *Papulata*	N. Australia...... ..	" 17 " 69
"	... *Stomatiæformis* ...	New Zealand	" 17 " 74

Presuming that the localities of these twelve species are in some degree correct, or at least that they inhabit the Pacific Ocean, we may, with the preceding species, (noticed in detail) take the number to be in all 21, being nearly one-third of all those here described. It consequently follows that the proportionate number of Chitons and of Ear-shells in this part of the world is nearly equal, and that their geographic distribution is in perfect and harmonious union.

It is much to be regretted that in this monograph of a very difficult and intricate group the author has not been at greater pains to clear up entangled synonyms, to make the reader acquainted with what other writers had published on the same subject, and to state with precision and accuracy those few references to other works which he occasionally quotes. There is, for instance, no notice whatever of the admirable figures and descriptions of this genus published by Da Costa and Humphrey in the early

* I cannot believe that the same species is found in these two widely different localities.

numbers of their general Conchology. Lamarck again, when quoted, has in many instances neither the volume or page specified, and sometimes the name only of an author is given, without any intimation of his work, as De Montford, Leach, Menke, &c.; some, again, of the species described by me in the Bligh collection are regularly cited; but several others, as *H. glabra*, *carinata*, *costata*, and *crenata*, are passed over in silence, as if they never had been published, although most of them, if I mistake not, are to be found in Monograph as new species. We hope the author will himself correct these errors, without leaving to others the necessary but ungracious task of doing it themselves. A monograph, to deserve the name, should not only exhibit with accuracy and impartiality everything that has been done to elucidate the subject-matter, but also, by the fulness and accuracy of its quotations, enable the reader, if he wishes, to test the accuracy of the author himself. Every excuse may be allowed to authors writing where costly publications cannot be consulted, but there is none for him who, being seated in the capital of the British empire, does not avail himself of the ample sources of information within his reach.

VII.—*On the Encroachments of the Sea along the North Coast of Tasmania. By* RONALD C. GUNN, *Esq.*, F.R.S., *&c.* [*Read 3rd March*, 1854.]

A COMMUNICATION of mine, "On the Encroachments of the Sea at Circular Head and along the North Coast of Tasmania," was read at a meeting of the Royal Society at Hobart Town on 17th December, 1851. This short paper was the result of observations made during an excursion along the coast from Circular Head to Launceston, in October 1851. I have now to add to the remarks I then made, that in October of this year I had occasion to ride from Circular Head to Woolnorth, the extreme north-western point of Van Diemen's Land, and I observed that throughout that line of coast the sea is steadily advancing and gaining upon the land. At the Old Store and Jetty, close to Maandai Point, the configuration of the shore is very materially altered, although the beach consists of large coarse shingle, and of a description such as one would have imagined likely to resist the action of the sea for a long time. Where the road ran in 1838, not an indication remains.

At Circular Head the encroachments still continue: the sea has advanced considerably since 1851, and I believe that within a few years a large portion of the Peninsula will be swept away. The age and size of the Honeysuckle *(Banksia)* trees which now lie strewed along the shore, and which were alive and flourishing when I lived at Circular Head in 1836 to 1838, indicate that very many years must have elapsed since the shore upon which they grew had been visited by the waves of the sea. Even so early as 1837, I remember Mr. Curr, the intelligent Chief Agent of the Van Diemen's Land Company, informing me that the sea had made considerable inroads upon the eastern side of the Peninsula, from the time of his arrival there (about 1828).

This he attributed to the greater and increasing prevalence of easterly winds. On the west coast, my recollection did not enable me satisfactorily to determine whether the sea was encroaching or not; my impression is, however, that it was. On the east coast a like result is, I am informed, taking place, and I would be glad to receive information from old residents on the coast east from George Town, and on the east coast of the colony, in confirmation or refutation of the opinion now advanced.

In connection with this subject, I may observe that it is stated that reefs now exist at the entrance of Port Phillip, upon which several vessels have recently struck, not laid down accurately in the charts, and which are believed by some nautical men to be nearer to the surface of the sea than they formerly were. Whether this is true, or whether the present greatly increased traffic has led vessels to go over places not previously examined, I know not; but it is now worthy of consideration whether permanent marks ought not to be made upon rocks in favourable situations, to ascertain positively whether the land at Port Phillip is rising and that of Tasmania slowly sinking.

This was done in Sweden, and I suggested it to be done here some ten years ago. That revolutions of this kind have taken place in comparatively recent times, there is abundant evidence in the raised beaches at Hunter's Island, near

Woolnorth, and several islands in Bass's Straits. The alterations of level at Point Nepean, Port Phillip, have already been observed and recorded by my able friend the late Dr. E. C. Hobson, in the 3rd vol. of the Tasmanian Journal.

VIII.—*On Australian Entomostracans. By the* Rev. R. L. King, B.A. [*Read 12th July*, 1854.]

SUB-KINGDOM.

ANNULOSA.

Class Crustacea. Division Entomostraca.

Legion I.

Branchiopoda.

(See "Papers and Proceedings," Vol. 2, Part II., January 1853.

Legion II.

Lophyropoda.

Lophyropa. Latreille.
Lophyropoda. Leach, &c.
Branchiopodis. Frange's (pars) Lamarck.

Character.—Mouth furnished with organs fitted for mastication; branchiæ few, attached to the organs of the mouth; body having an envelope (either in the form of a buckler inclosing head and thorax), or in the shape of a bivalve shell, inclosing the whole animal; feet few in number; articulations more or less cylindrical, and serving the animal for the purpose of locomotion; two pairs of *antennæ.*

PLATE IX.

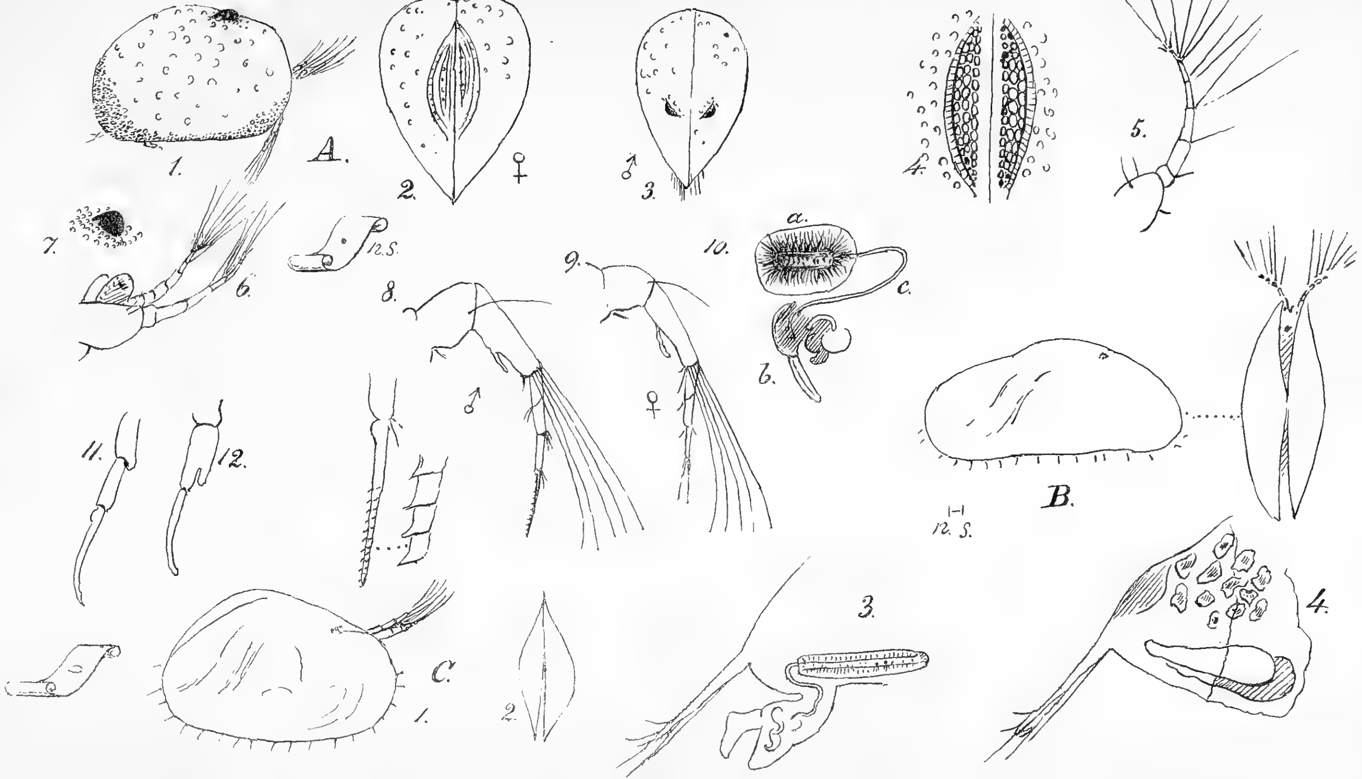
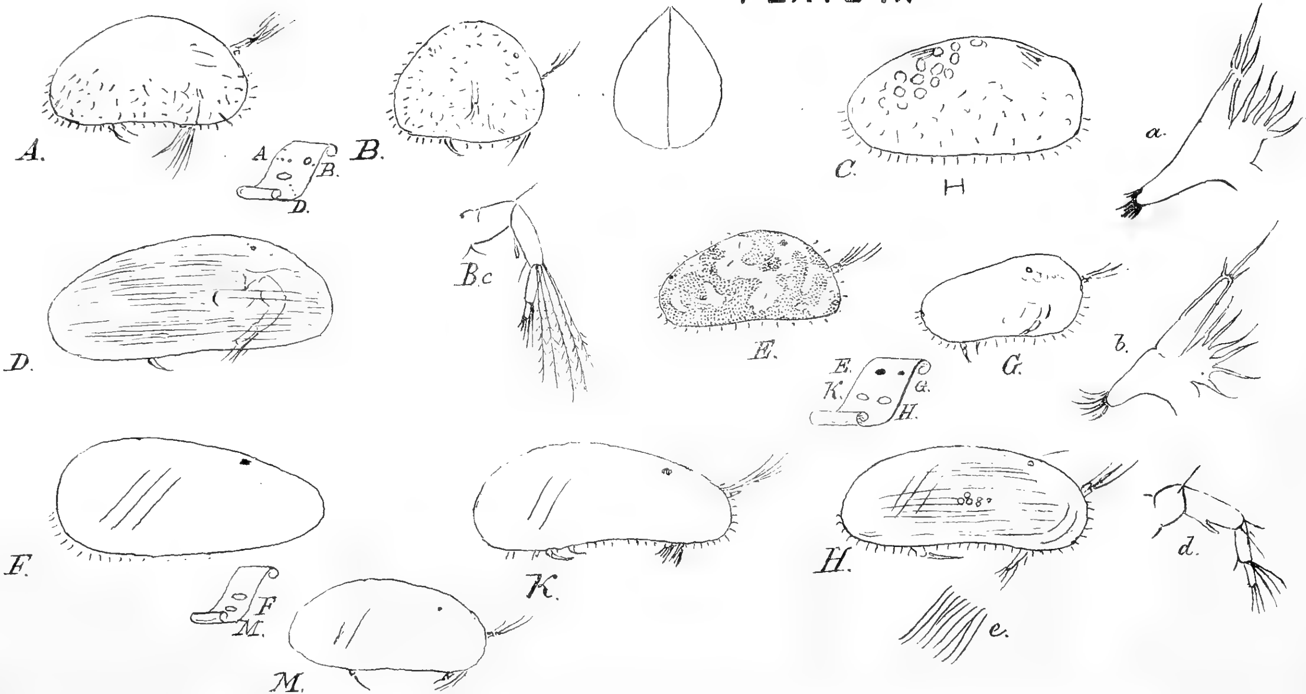


PLATE X.



Order I. Ostracoda.

Ostracoda. Latreille.

Character.—Body enclosed entirely in a covering of two valves, resembling a bivalve shell; posterior jaws branchiferous; no external ovary; feet two and three pairs, adapted for progressive motion. This order contains three families, *Cypridæ, Cytheridæ,* and *Cypridinadæ.* I shall confine myself to the first of these.

Fam. I. Cypridæ.

Cypris. Muller et Auctorum.

Character.—Two pairs of antennæ; superior, long with numerous joints, and a pencil of long filaments; inferior, stout, and pediform. Feet, two pairs.*

It would be unnecessary in this place to describe minutely the animals of this family; such a description has already been published in the Natural History of the British Entomostraca, one of the publications of the Ray Society, 1849. I need therefore but refer to that work, and add a very brief description, laying stress only on those particulars in which the Australian species appear to differ from the European.

"The body of the animal is completely enclosed within a shell of two valves of a horny cretaceous substance, which in general appearance closely resembles a small mussel:" the body consists of two rounded portions of unequal size. The thoracic, from which spring the antennæ, the antennules or rami, the organs of the mouth, and the first pair of feet and the abdominal, from which spring the second pair of feet and the tail, and which contains the generative system.

* I have copied the above almost verbatim from Mr. Baird's work;—omitting only the notice of the eye, which the discovery of *Newnhamia* proves to be a generic, and not a family characteristic.

The eye is simple, no traces of crystallines having been discovered. It varies much in colour. It is generally single, but there are two eyes in *Newnhamia.* The superior antennæ, consisting of seven articulations, which carry a pencil of long setæ, and the inferior or the antennules (or as I shall henceforth call them the rami), composed of five joints, form together the principal organs of progression. Except in *Candona,* the rami carry a pencil of long setæ, springing from the extremity of the third joint,* and by means of these rami with the antennæ, the little creature is able to swim through the water with considerable rapidity and steadiness.

The mouth is situated on the inferior surface of the thoracic portion of the body, and consists of a lip, an inferior lip, a pair of palpiferous mandibles armed with strong teeth, and two pairs of foot jaws, both of which, at least in Australian species, carry a branchial plate fringed with long thick setæ.

There are two pairs of feet, the first of which is used in creeping on plants, or on the mud. These spring from the thoracic portion of the body, and are directed forwards, and terminated by a long hook; the second pair are slender, directed backwards, and seem intended to support the ovaries; the abdomen is terminated by a moveable bifid tail. I have been much interested in finding, in two instances, the reproductive organs largely developed; I believe they have not previously been met with, or at least described, in any of the Ostracoda. In *Cypris carinata,* and in *Newnhamia fenestrata,* the sexes are easily distinguished, and the males

* Mr. Baird calls this the fourth joint, from which the setæ spring. But if this be the case, (which I will not venture to dispute, though I have not been able in that case to find the first joint), the Australian species must have six joints in each ramus.

are not uncommon, the generative system being nearly the same in both. I shall describe that of the former, although it was first discovered in the latter. The male organs consist of two testes, placed parallel to each other within the abdomen, and connected by a duct, each with its respective penis, Pl. IX., A. 10, C. 3. Each testis consists of a long narrow muscular cylindrical vessel, surrounded by hairs arranged in pyramidal tufts, the whole being enclosed within a membranous covering, so as to form an oblong capsule.

When the membrane is broken the testis assumes a curved shape, proving a considerable degree of muscular tension in its original condition. The penis, which is double and placed on the abdomen, is a pyriform organ, carrying at its extremity two short joints turning towards each other, and forming a clasping apparatus.

The female parts are simple, Pl. IX., C. 4., being composed of two long pyriform (?) ovaries, each consisting of an envelope of tubular hairs enclosed within the abdomen.

The only points of difference peculiar to *Newnhamia* are, the testes are shorter and stouter, while the penes are altogether smaller. This, however, is counterbalanced by the shape assumed by the abdominal feet of the male, Pl. IX., A. 11-12, which are evidently calculated for clasping.

In *Newnhamia* coition takes place while the animals are swimming at the surface; during the operation they sink towards the bottom. In *Cypris carinata*, on the contrary, the same operation is performed at the bottom or on the stem of a plant.

Habits.—The Cypridæ are certainly carnivorous. They are, in fact, the scavengers of the ponds in which they live. In the small basin in which I have kept several species for many months, under almost daily observation, I have frequently seen them attack other ENTOMOSTRACA, such as *Limnadia* and *Daphnia,* almost before death; and soon after death the shell has been found emptied of all its contents by these minute gourmands. A dead *Limnea* or *Planorbis,* or other small mollusk, is quite a dainty; and hundreds may be seen heaped one upon another in a perfect turmoil of delight, each striving to get at the savoury morsel. "Nec mora nec requies." And no alderman quits a civic feast with greater reluctance than these Cypridœ manifest when driven away from the sumptuous repast. This habit makes them of essential service in preventing the water from being corrupted by decaying animal matter; as soon as a leaf or stalk begins to decay, it is covered with these little crustacea. Yet I have doubted whether they attack it for its own sake, or for the sake of the animalculæ which may be feeding on it, for they generally desert it before it has quite disappeared. This is not the case when they are feeding on dead animal matter.

If we may judge from the shell of the genus *Cythereis,* (Jones), the genus *Newnhamia* supplies another link between the marine and fresh water ENTOMOSTRACA. Mr. Baird has discovered a fresh water *Cythere* in England; and here in Australia we have an animal closely connected with the marine genus *Cythereis.* Both *Newnhamia* and *Cythereis* have two eyes, and a very tuberculose shell, and, indeed, the shell of the former is only separated from that of the latter by the flat plate at the ventral margin, by which it is enabled to cling to the surface of the water. I would therefore suggest the following as, in my opinion, a natural arrangement of the genera of the OSTRACODA :—

2 pairs of feet	3 *Newnhamia*	rami natatory	having two eyes and a tubercular shell.
	2 *Cypris*		
	1 *Candona*	unable to swim	
3 pairs of feet	5 *Cythere*		
	4 *Cythereis*		

6 *Cypridina.*—Two eyes and two pairs of feet. Appears to me to form a connecting link between the OSTRACODA and the LYNCEIDÆ ; its peculiar terminal segment of the abdomen, as well as its rami, being closely analogous with those of many of the CLADOCERA. *

There are three genera belonging to the family Cypridæ in Australia.

Cypris ;—(MULLER), rami provided with a pencil of long setæ ; animal swimming, partly on its ventral edge ; eye single.

Candona ;—(BAIRD), rami destitute of the long setæ ; amimal creeping on the ground or on plants ; eye single.

Newnhamia ;—nov. gen., rami as in *Cypris ;* animal swimming freely through the water on its back ; eyes two.

GENUS I. *Cypris.*

1. *Cypris carinata,* Pl. IX. C. 1–4.

Shell nearly elliptical, but higher on the back ; the valves are unequal, the right being produced beyond the left at the

* Professor M'Coy, in his late work on the "British Palæozoic Rock Sand Fossils," has expressed his opinion that "all the *Cythereæ* of Palæozoic rocks are more properly Phyllopoda than Lophyropoda." I confess that the analogy of these fossils with the latter, through the recent species of *Cythereis*, appears to me to be almost established by the discovery of *Newnhamia*.

posterior part of the dorsal edge, giving the shell the appearance of a heel; the valves are polished, of a transparent greenish yellow colour, with a darker quadrangular mark in the middle.

In the females the ova seen through the shell give it a beautiful scarlet colour towards the abdominal parts. The males are generally darker and somewhat smaller.

The thick setæ on the branchial plate of the first pair of foot jaws are plumose; there is also a small branchial plate on the second pair, which I do not find noticed in European species. It also exists in *Cypris Scottii* (Pl. X. C. a.) The third (fourth of *Baird*) joint of the rami carries on the inner side a remarkable short but stout and rather clavate seta, which is moveable. I cannot conjecture its use. It exists, I believe, in all the Australian species of *Cypris*. The present species is very active in the day-time, and swims very rapidly in an undulating line. Its habit is to swim about from one mass of *conferva* to another, while each mass seems alive with the multitudes moving about among its tender threads. It is also a very social animal. Five or six will often place themselves side by side among the *conferva* touching each other, and remain in this position for several minutes, as if enjoying each other's company. These are generally females.

Locality;—Denham court, a large and very productive pond in the flat, about a mile from the turnpike.

2. *Cypris Stobarti.* Pl. IX. B.

The shell is oblong, and slightly sinuated on the posterior dorsal margin. The valves are unequal, the left being the larger. They are polished, and apparently of a yellowish colour. I have seen but a single specimen, which I am unwilling to destroy by dissection. I found it in a bottle of fresh water insects, collected for me by my friend the Rev. A. Stobart, in the vicinity of Moreton Bay.

Locality ;—Moreton Bay.

3. *C. Bennelong*. Pl. X. A.

A small species, in form somewhat like *carinata*, but of equal valves sinuated at its ventral edge; hairy; of a greenish colour, darker on the back. The animal is large, as compared with the shell. The setæ at the extremity of the rami are very strong.

Locality ;—pond near Sydney Cove, close to the edge of the Saltwater.

I have named it after an Australian chief.

4. *C. Clarkii*. Pl. X. E.

Shell oval, slightly reniform, the valves very convex, variegated, with brown and a light reddish green in well defined notches of irregular but constant shape; the eye is yellow, shell punctured, pilose. The male appears to differ from the female only in having large irregular masses of a yellowish substance in the abdomen, together with a considerable quantity of red globules, such as are seen in the male *Daphnia*.

This species generally prefers small shallow ponds, where it can have plenty of light and heat. It is sometimes seen in swarms in the soft mud at the edge of the water, when a pond is drying up.

I have named it after my friend the Rev. W. B. Clarke. It is one of the most beautifully-coloured of all our Cyprides.

Locality ;—Sydney: Parramatta.

5. *C. Scottii*. Pl. X. C.

In shape somewhat like *C. Clarkii*, but higher in the back. It is much larger, (being nearly the tenth of an inch in length), of a transparent green colour; the shell marked with very minute reddish spots. It is thinly pilose.

It is readily distinguished from all the Australian species hitherto known by its size. The shell is so transparent that the eggs are readily seen through the back. The thick setæ of the branchial plate on the first pair of foot jaws are plumose, as in *C. carinata,* and the second pair carry the small branchial plate already referred to in the description of that species. These peculiarities also distinguish it from *C. tri-striata,* described by Mr. Baird. It generally lives near the bottom, on the mud.

I have dedicated this species to my friend W. Scott, Esq, of Ash Island, to whom I am under much obligation for his kind encouragement of my researches into this interesting family.

Locality ;—Denham Court, with *C. carinata.*

6. *C. Minna.* Pl. X. B.

Shell nearly globular, sinuated on the ventral edge, punctured, pilose ; the valves are very convex, and generally of a transparent green colour. They are also found more opaque, and of a dark brown, and in this variety the back is more depressed ; a larger variety has its shell of a bright chestnut colour. Setæ of antennæ and rami are very plumose.

I have been inclined to consider that the chestnut variety is of a different species, but as yet have observed no other difference than those of size and colour from the ordinary form of the species named above.

The brown variety is rather more depressed ; and thus it is quite possible that there may be three species, when I have named but one. I must leave this to be determined by other observers. It is a very active species, and easily kept under observation. I have had some in my Vivarium*

* The Entomostraca are easily kept under observation in a basin containing three or four gallons of water, with a little mud at the bottom, and a few plants, Villarsia, Damasonium, Azolla, Lemna. The plants absorb the carbonic acid generated by the respiration of the animals, and supply oxygen for their inspiration, as well as provide them with food. A few mollusks assist in consuming the vegetable matter as it decays.

for several months, and in the autumn they all disappeared; but in the winter a multitude almost suddenly started into life. In their occupation as scavengers, they materially assist in keeping their habitation in proper order.

Locality ;—Ponds every where.

Var. *(a) Castania* pond :—at Varroville, near Denham Court

Var. *(b) Brunnea* pond :—in Government Domain, Sydney.

7. *C. lateraria.* Pl. X. G.

Shell clavate. The dorsal margin being straight posteriorly and the ventral margin deeply sinuated. The anterior extremity is the larger, and is much rounded. Shell greenish, pilose.

Locality ;—Pond in a Brickfield near Sydney.

I have received it, with *Cypris Stoburti*, from Moreton Bay.

The preceding seven species are able to swim freely through the water. The three following are indeed provided with the long hairs on the rami, which distinguishes the genus *Cypris*, but they are weak; and in consequence of the small size of the bodies as compared with the shells, they are hardly able to swim at all. Thus they lead into the next genus,

8. *C. Sydneia.* Pl. X. M.

Shell oval, both ends being nearly alike; the ventral edge is nearly straight. The valves are very convex, polished, yellowish, and almost opaque. The animal can swim a little, but not in a horizontal line, and cannot at all raise itself in the water. It is generally seen crawling about on the mud, or at times half buried in it in company with several of its own species.

Locality ;—a swamp near Wooloomooloo Bay, Sydney.

9. *C. Candonioides.* Pl. X. F.

Very like *C. Sydneia,* but the anterior end is much smaller than the posterior, the shell is polished, of a yellowish colour, tinged with chestnut on the back. I have never seen this species attempt to swim.

Locality ;—Varroville.

10. *C. Varrovillia.* Pl. X. D.

Shell ovate, elliptical, slightly concave at the ventral margin. Valves very flat. Deeply striate transversely, pilose, greenish, and semi-transparent. The hairs on the rami are very short and weak, and consequently the animal cannot lift its shell vertically, except in creeping. When it attempts to swim it does so on its side.

Locality;—Varroville, Sydney.

Genus II. *Candona.*

1. *C. Stanleyana.* Pl. X. H.

Shell oblong, slightly sinuated at the ventral margin. Valves deeply striate, of a dark green colour. On the rami are three strong hairs, where the long pencil is found in *Cypris.* In the centre of the valves are a few round spots. These spots, or similar ones, were noticed in several English species by Mr. Baird. But this is the only Australian species in which I have noticed them.

I have named the species after my lamented friend Capt. Owen Stanley, R.N., to whom I have been personally under very great obligation in the study of natural history, when at sea in 1846-7, on board H.M.S. *Rattlesnake,* then under his command.

Locality ;—Ponds on the top of the sandstone rocks, overlooking the sea near Coogee, associated with *Limnadia, Stanleyana,* and *Newnhamia fenestrata.*

2. *C. lutea.* Pl. X. G.

Somewhat like the preceding, but the anterior extremity is smaller than the posterior. The shell is polished, and the rami are entirely destitute of the pencil of hair; colour dark green.

Locality;—Pond near Sydney Cove, with *Cypris Bennelong.*

Genus III. Newnhamia.

Character.—Antennæ like those of *Cypris,* rami furnished with a pencil of long hairs; eyes two, distinct, pedunculated, and having a large corresponding tubercle in the shell on each valve. A boat-shaped plate on the ventral margin. The animal swims on its back, and generally is found at the under surface of the water

1. *N. fenestrata.* Pl. IX. A. 1—12.

The shell is very tuberculose. Towards the margin are a few short setæ springing from the tubercles: the back is of a light greyish colour, the ventral parts dark, the two extremities are also dark. The eyes, as seen through the ocular tubercles, are very brilliant. The tubercles are rounded at their extremities. In one instance I observed them to be of a different shape and a pointed form. The anterior extremity was larger than the posterior. This may prove a distinct species, but as I am unable to give a more detailed description of it, I can merely suggest that, should it prove distinct from that with rounded tubercles, it may be called *N. Gulielmi.*

The male differs in appearance from the female in being smaller, and of a slighter form. The female, when swimming, its valves being slightly open, appears of almost a cordate form. The rami of the male (fig. 8, 8 *a,*) carry at their extremity, instead of the four or five stout setæ found in *Cypris,* a single long and jointed seta, each joint carrying a kind of tooth. Doubtless the object of this is to assist in clasping in *coitu*. The legs are also modified to assist in the same operation, carrying stout hooks instead of the long and sharp points found in *Cypris*.

In the female the rami and legs are exactly similar to those of *Cypris*, except that the last joint of the former is very long, being nearly half as long as the preceding.

It is terminated by only two stout setæ, fig. 9.

The mandibulary palpus is very stout; it is similar in its general form to that of *Cypris*.

The first foot jaw has its extremity opposite to the branchial plate divided into three fingers, instead of four, as in many species of *Cypris*; the fourth, which is generally jointed in the latter genus, being here wholly wanting.

The generative organs correspond almost entirely with those of *Cypris carinata*.

Habit.—This very common but interesting species lives almost wholly near the surface of the water;—its boat-like plate enabling it to walk along the under surface, while its eyes, directed downwards, give immediate notice of the approach of an enemy. When alarmed, it immediately sinks to a little distance, and then swims off, only coming to the surface when all becomes tranquil. The hand passed over the water near the surface, so as to intercept the light, or the surface being disturbed by the slightest breath, instantly alarms them. They are the most active when the sun is shining; and often a whole troop of them may be noticed swimming round and round, and in and out, with a most lively and graceful motion, about an inch beneath the surface, in some spots more favoured than others by the warmth of the sun. I have never looked at them whilst thus engaged without receiving the impression, that, under such circumstances, they were perfectly happy. I have named the genus after my old college friend the Rev. W. O. Newnham, in memory of many pleasant excursions in his company in the neighbourhood of Cambridge and Farnham, in search of zoological and botanical wonders. The ocular tubercle, being in fact the *window* through which the little animal looks out upon the world around him, has supplied a specific name.

Locality ;—common in ponds.

Entomostraca.

It may be useful to add here a list of the *Fluviatile Entomostraca,* so far as they are known to the author, with a short note of each of the particulars by which these species may be distinguished from each other. I have deposited a drawing of each species in the Australian Museum.

Legion I. Branchiopoda.
Order I. Phyllopoda.

Fam. I.
Apodidæ.

Genus I. *Apus.*

I have not seen this Australian *Apus,* but know only that it has been found in the Hunter River district, and at the Murrimbidgee: I should be very much obliged to any observer who would send me specimens in spirits. The Tasmanian species have been described by Mr. Baird in the Annals of Natural History, under the name *Lepidurus viridis.*

I am indebted to R. C. Gunn, Esq., for some specimens of this very interesting *Entomostracon,* which I hope ere long to compare with our Australian species.

Fam. II.

Limnadiadæ.

Genus I. *Limnadia.*

1. *L. Stanleyana.* Branchial legs in female, 17 pairs. In male, 15. Tridactyle feet of male, 2 pairs; third finger, two jointed: last segment of body with about eleven spines on each side.

Locality;—Coogee, near Port Jackson.

2. *L. sordida.* Branchial legs as in *L. Stanleyanu;* third finger of tridactyle feet, three jointed; last segment of the body with nineteen or twenty spines on each side. This species is larger than the preceding, and bears considerable resemblance to *L. Mauritiana,* (Guevin).

Locality;—Pond near Bondi Bay; Botany Swamps.

Genus II. *Limnetis,* (Loven).

1. *L. Macleayana.* Branchial legs, 11 in female, 10 in male. Tridactyle legs, 1 pair.

Locality;—Denham Court, Botany Swamps.

Fam. III.

Branchiapodidæ.

Genus I. *Artemia.*

1. *A. proxima.* External ovary pyriform.

Locality;—Salt Pans, Newington; Parramatta.

Order II. Cladocera.

Fam. I.

Daphniadæ.*

Genus I. *Daphnia.*

1. *D. carinata.* The head and back strongly carinate;

* Note.—This family with the next has already been described in the Papers and Proceedings of the Society, Vol. II., Part 2, January 1853.

dorsal margin produced to a long straight point. Beak sharp. Antennæ composed of a few short setæ. It is subject to very great varieties.

Locality ;—common in horse-ponds.

2. *D. Elizabethæ.* Dorsal margin not produced ; superior antennæ, with a long seta springing from near the base ; otherwise very like *D. Sima :* very common.

3. *D. honorata,* like *D. reticulata.* The first joint of the inferior branch of the rami as long as the first three joints of the superior.

Locality ;—Sydney ; Parramatta, &c.

4. *D. mucronata,* Müller. Anterior margin produced into two sharp points.

Locality ;—Parramata, South Creek, &c.

Genus II. *Macrothrix.*

1. *M. spinosa.* The first joint of the long setæ on the rami is produced into a spine.

Locality ;—South Creek, Liverpool Road.

Genus III. *Moina.*

1. *M. Lemnæ.* The first pair of legs in the female are adapted for clasping.

Locality ;—pond near the Dam at Cook's River.

2. *M. Macleayii.* A seta on the basilar joint of the rami as long as the branchi.

Locality ;—Pond on the hill above Elizabeth Bay, Sydney.

Fam. II.

Lynceidæ.

Genus I. *Eurycercus.*

1. *E. spinosa.* The setæ of the rami having the spine as in *Macrothrix spinosa.*

Locality ;—Pond on Liverpool Road.

2. *E. Cookii.* Of a larger size than the rest; of a deep chocolate colour.

Locality;—Lagoon near Botany, Moreton Bay.

3. *E. Cuninghami.* Deeply striate on the carapace in three directions.

Locality;—Botanic Gardens, Sydney.

Genus II. *Chydorus.*

1. *C. Leonardi.* Almost globular. The ephippial ova placed side by side.

Locality;—Sydney.

2. *C. Augustus.* Ova placed one above the other; a large species.

Locality;—Sydney.

Genus III. *Alona.*

1. *A. Bairdii.* Setæ of rami spinous, as in *Macrothrix spinosa.*

Locality;—The Lachlan Swamps.

2. *A. pulchella.* Anterior margin concave.

Locality;—Denham Court, Sydney.

3. *A. diaphana.* Anterior margin convex.

Locality;—Sydney.

4. *A. Karua.* Beak very much produced.

Locality;—R. Karua, Port Stephens.

5. *A. mascula.* First pair of legs having hooks like *Pleuroxus hamatus.* (Baird.)

Genus IV. *Dunhevedia,* (nov. gen.)

The carapace oval, the anterior spine ending in a margin directed downwards.

1. *D. crassa.* When seen from the back, the outline is wholly convex.

Locality ;—South Creek, at Dunheved. Denham Court.

2. *D. podagra.* When seen from the back, the outline is concave at the middle.

Locality ;—Parramatta.

Legion II. Lophyropoda.

Order I. Ostracoda.

Fam. I.

Cyprididæ.

Genus I. *Cypris.*

1. *C. carinata.*
2. *C. Stobarti.*
3. *C. Bennelong.*
4. *C. Minna.*
5. *C. Scottii.*
6. *C. Clarkii.*
7. *C. lateraria.*
8. *C. Sydneia.*
9. *C. Candonioides.*
10. *C. Varrovillia.*

Genus II. *Candona.*

1. *C. Stanleyana.*
2. *C. lutea.*

Genus III. *Newnhamia.*

1. *N. fenestrata.* With rounded tubercles.

Locality ;—common in ponds and slow streams.

2. *N. Gulielmi.* With pointed tubercles.

Locality ;—Dunheved. South Creek, in a shallow pond.

Order II. Copipoda.

Fam. I.

Cyclopidæ.

Genus I. *Cyclops.*

1. *C. Australis.*

Locality ;—in all ponds.

Fam. II.

Diaptomidæ.

* Nearly transparent ; male larger than female.

Genus. *Diaptomus.*

1. *D. Pollux.* Male spindle-shaped.

Locality ;—Parramatta. Sydney, &c.

2. *D. uxorius.* Male, clavate.

Locality ;—Port Stephens.

** A deep red colour, male smaller than female.

3. *D. Maria.* Last thoracic ring, in female, with processes shorter than the abdomen.

Locality ;—Denham Court.

4. *D. Cookii.* Last thoracic ring with processes longer than the abdomen.

Explanation of Plates.

Plate IX.

A. 1.—12. *Newnhamia fenestrata.*

1. Side view when walking.
2. Ventral view of the female, showing the flat plate.
3. Dorsal view of male, showing the eye tubercles.
4. Ventral plate.
5. Antenna.
6. Antenna and eyes.
7. Eye-tubercle much magnified.

8. Ramus of male.
9. Ramus of female.
10. Generative apparatus of male.
11.—12. Feet of male.

B. *Cypris Stobarti.*

C. 1.—4. *Cypris carinata.*

1. Side view; 2, front view; 3, abdomen of male, showing the generative organs in situ.
4. Abdomen of female, showing the position of the ovaries, and the eggs after leaving the ovaries.

PLATE X.

A. *Cypris Bennelong,*
B. ,, *Minna*
C. ,, *Scottii.*
D. ,, *Varrovillia.*
E. ,, *Clarkii.*
F. ,, *Candonioides.*
G. ,, *lateraria*
H. *Candona Stanleyana*
K. ,, *lutea*
M. *Cypris Sydneia.*

a. Second foot jaw of C.
b. *Second foot jaw of Cypris carinata.*
c. Ramus of B.
d. Ramus of H.
e. Striæ of H.

On the Potato Grub of Tasmania. By Capt. H. BERTHON, H.E.I.C.S. [*Read 14th March,* 1855.]

THE grub, which did so much injury to the Potato crops in certain parts of this island last year, and which threatens during the present season to commit still further devastation, is the production of a small moth of the Tineidæ family, and appears to be identical with the insect which has of late years been making such ravages amongst the tubers in New Zealand. In fact, it is by no means improbable that it was introduced into Tasmania in some infected importations from that country.

The moth is about one-third of an inch in length, of a silvery grey colour, barred with brown, with the usual jointed antennæ, trunk, and other peculiarities of formation which characterise the order "Lepidoptera." It is distinguished from many others of the class by a peculiar pair of palpi, springing from the base of the trunk, and curving backward over the head. The ova are elliptical in shape, of the size of a very minute grain of sand, and pearly white in hue. The larva, when full-grown, are about five-twelfths of an inch in length, of a semi-transparent yellowish white, forcibly reminding one of the colour of the white currant, to which is occasionally superadded a tinge of pink. As in other members of the order, they are furnished with six thoracic legs; and four of the remaining eight sections of the body are provided with pro-legs. The pupa, or chrysalis, is of a dark amber colour, little more than half the length of the full-grown larva, and is ordinarily placed in one of the eyes of the potato, or other convenient indentation of its surface, and protected by a cocoon of very flimsy and inartificial construction.

What may be the usual period that the ova lie unhatched, it would perhaps be assuming too much to assert on the strength of only a couple of experiments. It is probable that the time varies with the temperature, with the position of deposit, and perhaps also with other concurrent circumstances. All that can be confidently made known is this, that in the experiments, which were conducted under the eye of the writer of these notes, the time that elapsed between the laying and the hatching of the eggs was ten days.

The existence of the larvæ, from their birth to their transformation into pupæ, is of about a fortnight or three weeks' duration. Their voracity, however, is so great, and their diligence in their vocation so untiring, that a couple of individuals will thoroughly riddle and destroy a potato of fair size during their brief but mischievous career.

The pupa state, it is to be presumed, as in the case of other *Lepidopterous* insects, extends over a period of some months, and it were vain, therefore, on the part of the writer, to expect that any further transformation will take place in the specimens which he has preserved until the revolution of the seasons shall have brought round the appointed time of revival. The moth itself lives but a few days, and the deposit of its ova is speedily followed by death.

Under the supposition that the root of the potato is unapproachable, and safe from the attacks of the insect, it has been surmised by some that the moth deposits its eggs on the stalk of the plant, whence the larvæ continue to draw their nourishment as long as it remains sufficiently succulent for the purpose, and whence they descend into the root itself, when desiccation ensues. This theory is opposed to the writer's experience. He has invariably found that the moth attacks the root. The uppermost potatoes, those that are nearest the surface, are of course most easily reached, nor is it by any means a difficult matter for the insect to penetrate to the depth of three or four inches when the soil is open, uncompressed, or lumpy. Not a single case of an infected stalk has been yet detected; but constant and numberless have been the instances in which, when uncovering the potatoes at the depths just indicated, moths have been dislodged, and flown uninjured away.

Before the writer correctly understood the nature and routine of the insect's tactics, and while he yet believed that its grub form was the only one in which the depredations were to be guarded against, he caused a crop of infected potatoes to be dug up, and exposed for some days to the effects of the atmosphere, thinking that the heat of the sun would put a stop to the further ravages of the larva: but this turned out to be a woeful mistake. The potatoes while lying thus exposed in rows were again attacked by the insects, and so insidious were their proceedings, that the damage had been greatly increased before their presence was discovered. And it is not unworthy of remark, that the underside of the potato, or the side in contact with the ground, was invariably the part that was selected by the moth for the deposit of the ova. This was doubtless owing to the greater security that the unexposed side of the potato afforded against the weather, as well as against birds and predatory insects, than the upper surface would have done; and it was afterwards noted, that the moths, when unengaged in laying eggs, were almost always to be found beneath the clods of earth with which the ground was encumbered, where it is to be presumed they sought shelter from the sun's rays, and protection against their natural enemies.

From the facts just narrated, it would seem that the following conclusions may not unreasonably be drawn :—

First.—That the best soil to sow potatoes in, supposing that the sole object were to exempt them from the grub, would be that which is impervious to the moth ; such, for instance, as sand, or a compact loam.

Second.—That if no such soil be available, the deeper the potatoes are sown, the safer they will be from the inroads of the moth.

Third.—That when there is reason to apprehend the presence of the moth, not a moment should be lost in housing the potatoes after they are dug up.

It has been stated in the course of these notes, that the transformation of the larva into the perfect insect is not to be expected for some months to come—not, indeed, till the ensuing winter and spring shall have run their accustomed course. Such is the ordinary routine of nature. Having found numerous empty pupa cases on potatoes of this year's growth, the writer has strong grounds for believing, however, that there has been more than one generation of the insect during the summer that is now drawing to a close ; and if this be true, it can hardly be doubted that the long continued drought, and unchequered heat of the weather, must have been the immediate cause. Rain or variable weather would in all likelihood have diminished their fecundity, and it is possible that a severe storm at the proper time might have annihilated them altogether.

Previous to concluding these notes, the writer cannot refrain from drawing attention to the peculiar palpi before alluded to, which doubtless are designed to answer some useful purpose to the insect. It may not be too fanciful a theory to suppose that they may be of great advantage to the moth in penetrating the earth, and in lifting or partially removing such particles as would otherwise impede its progress in its descent to the roots of the potatoes. This must at present be received, however, as an unsupported conjecture, for the writer has not yet been enabled to establish the fact by ocular demonstration.

But it is the only portion of the notes which partakes of the nature of theory or conjecture—all the rest are ascertained facts; and it is to be hoped that they may not only be of sufficient interest to attract the attention of the naturalist and the practical farmer, but that their further consideration and discussion may lead to the discovery of some effectual means of putting a stop to the ravages of this rapacious insect.

As a precaution against the spread of the infection throughout the island, all seed potatoes coming from places where the insect is known to prevail should be carefully sorted, and the bad ones rejected; and not only should the potatoes themselves be scrutinized, but the bags or baskets which contain them should be also closely examined, and, if infected, burnt or cleansed.

Any one who will be at the trouble of carefully inspecting a basket or sack in which infected potatoes have lain for some time will find a lot of little earthy-looking excrescences adhering to the inside;—these are the cocoons of the chrysalides covered with and concealed by earthy matter. They are the media through which the evil is spread throughout the country, and conveyed from one country to another; and they are the pests in embryo, of which every one ought to try and make a clean sweep.

X.—*On a Specimen of Shark in the Museum of the Royal Society, Van Diemen's Land.* *By* A. CROSS, *Esq.*, R.N. [*Read 4th June,* 1854.]

WHEN at Hobart Town in December 1852, in the "Equestrian," convict ship, I noticed some fine specimens of sharks in the Museum there: one in particular, peculiar to the coast of Australia and New Zealand, which I identified as belonging to the genus *Lamna*, and which I marked *Lamna cornubica;* giving the specimen the same specific appellation as our English Porbeagle shark. There is the spine, tail, and jaws of the fish in the Museum; the last remarkable for its armature of long, thick, nail-like teeth, and the pointed form of the snout; hence the shark is called in Müller and Keule's classification, *Oxyrhina gomphodon*,—it is the *Tilueron* of the Spaniards, a species of it being found in the Mediterranean, but not of the formidable dimensions of the Australian variety.

In the British Museum they have the jaws of the latter, but no complete specimen. I write this to send to Hobart Town, for the purpose of having the name which I placed on the specimen altered to *Oxyrhina gomphodon,* as I should be sorry to mislead our friends in the Southern Hemisphere by the term which I formerly applied to it, so I trust Dr. Milligan will correct the labelling accordingly, &c. &c.

ALEXANDER CROSS,
Surgeon, R. N.

Rochester,
23rd January, 1854.

XI.—*On the Trigonometrical Survey of Van Diemen's Land.* *By* Major Cotton, H. E. I. C. S.; Deputy Surveyor-General. [*Read* 10*th May*, 1854.]

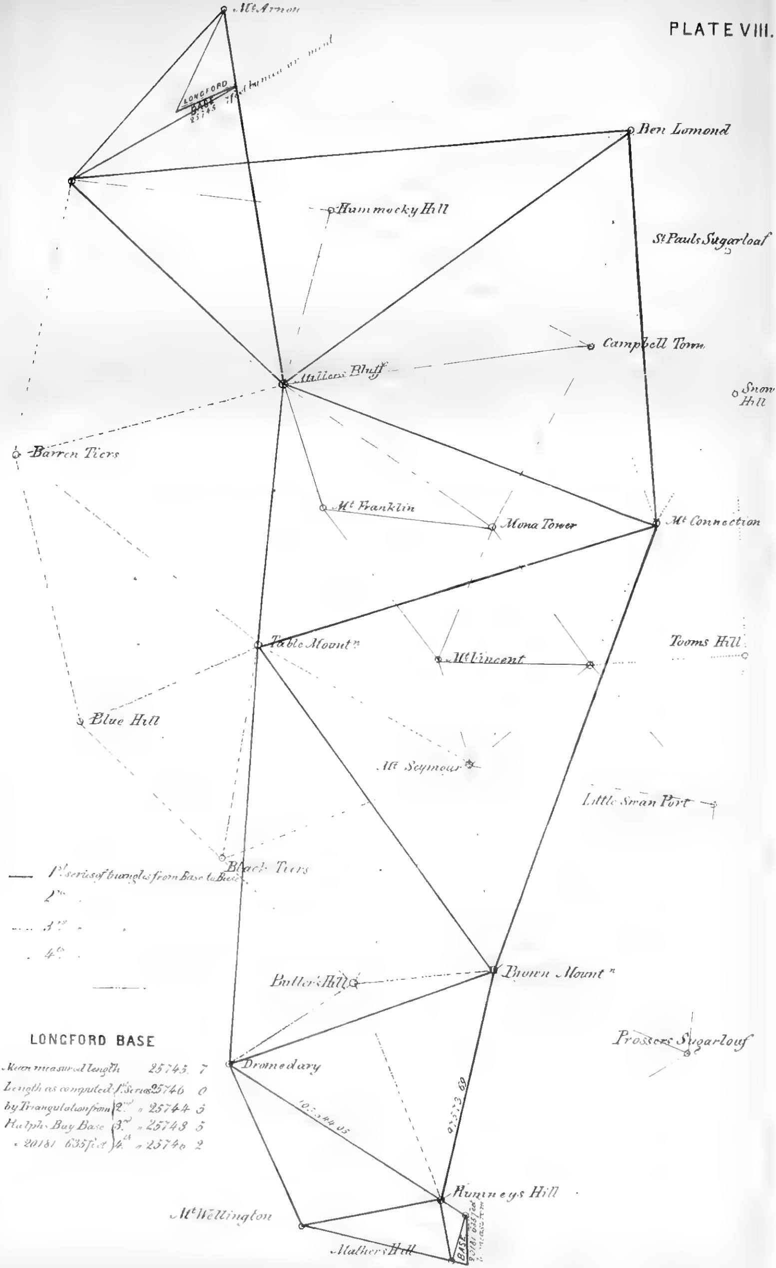
On the 21st April, 1852, I made a report on the measurements of the two Base Lines, and the result of the connecting Triangulation, of which the following is a copy:—

"Measurement of the two Base Lines, and result of the connecting Triangulation.

21st April, 1852.

The Rods used for the measurement of the two Base lines were of old Baltic fir, about fifteen feet in length and two inches square: they were saturated with boiling oil, and varnished, rolled in flannel and packed in sawdust, in coffers six inches square, closed at the ends, but leaving the rods free to contract and expand. The rods were supported centrically in the coffers by means of blocks of wood; the coffers aided by these blocks serving to truss the rods. To the ends of the rods were attached Brass Caps, rising to the level of the surface of the coffer, and bearing on their upper surface the scales, by means of which their lengths were determined. One cap bore a zero mark only, and the other a vernier scale 19-20ths of an inch divided into twenty parts. The only standard then in the colony was a four-foot steel standard, divided into inches and fortieths, and the vernier scales were made to accord with these divisions, determining the measurements to 1-400th of an inch. Besides the vernier scale attached to the cap of the rod, three similar scales were laid on the surface of the coffer at intervals, and their several distances

PLATE VIII.



LONGFORD BASE

Mean measured length		25745. 7
Length as computed	1st Series	25746 0
by Triangulation from	2nd "	25744 5
Ralphs Bay Base	3rd "	25743 5
= 20181 635 feet	4th "	25746 2

Huxtable & Deakin Lith

and the total length of the rod measured by the four-foot standard. Each rod when in use was supported on two tressels fitted with screw lifts, affording the means of raising and depressing them into their position.

The rods were made in damp weather, and were used during damp weather in the first measurements of the Base at Ralph's Bay in 1849. They were measured as soon as completed, and from time to time during the operation, and the variation in length was scarcely appreciable. Since this measurement was made, a ten-foot steel bar has been received from England, by which the four-foot standard has been tested and found to be very true, so that the measurement requires no reduction on that account, and any difference found to exist between it and subsequent re-measurements must be imputed to the apparatus used and to carefulness of operation. The Base was marked out with pickets, placed in line by means of a transit instrument, and divided into convenient gradients or hypothenuses, permanent marks, over which the altitude and azimuth instruments could be placed, being established at each extremity.

The rods were then placed on their stands, and arranged into the vertical plane of the Base line, and at the inclination of the first hypothenuse, the first rod within a few inches of the terminus, and two others in succession at similar intervals, the zero mark on one rod being antagonist to the vernier scale of the next. The intervals betwen the rods were measured by means of a small scale engraved for the purpose, which with the vernier indicated inches, twentieths, and four-hundredths of inches. The inclination of each hypothenuse was ascertained by levelling, the rise and fall being entered in the field book in feet and decimals. The horizontal value of each hypothenuse was then obtained, and the requisite reductions to the level of the sea computed.

In the summing up of the measurements much labour was occasioned by the divisions of the scale being in inches and four-hundredths, instead of decimals; but at the time I had no good dividing apparatus, and considered it necessary rather to depend on the divisions of the four-foot standard, (which I had the means of copying on to the scale used for measuring the intervals), the vernier scale alone being divided by such imperfect means as I could obtain. I pursued a better system in the measurement of this Base and the measurement of the base of verification on Norfolk Plains.

In 1851 the Base at Ralph's Bay was measured. The same rods were used and the same means of determining their lengths, but I had obtained a good dividing apparatus, and I engraved scales, the divisions of which were decimal parts of a foot. These with the verniers read to four places of decimals, the fourth decimal ambiguous, so that the reading was true to the 5000th part of a foot.

The steel bar, which with other instruments for the trigonometrical operations had been obtained from England by the Lieutenant-Governor, through the Astronomer-Royal, is one of those which were employed as Standards in the measurement of the Base line in Ireland, and the Base line here will therefore be referred to the same standard of measurement.

The only other improvement introduced was that of attaching a telescope and sights to the rods for keeping them more accurately to the line, and more attention to the piling under the feet of the tressels, where the ground was inclined to shake from the tread of the men in laying the rods.

The Field Book of the second measurement was much more simple, and the labour of computation much reduced, from the adoption of the decimal scale. The reductions to the horizontal and to the level of the sea were made as before. A third measurement was undertaken immediately on the completion of this with the same means and the same careful attention.

The three several measurements gave the following results :—

Measurement of 1849................20182·484496 feet.
First measurement of 1851........20181·692922 ,,
Second measurement of 1851....20181·577215 ,,

The difference between the measurement in 1849 and the mean of those in 1851 is ·85 foot, or $10\frac{1}{5}$ inches; that between the two in 1851 only ·115 feet, or $1\frac{1}{3}$ inch. I consider this latter accordance to prove that the slight variations in the length of the rods were truly valued, and the apparatus in all respects sufficiently true, and that Mr. Sprent, who conducted the whole operation, has obtained the nearest results obtainable by its means.

It also seems satisfactorily to show that the first measurement may be rejected, though (considering the comparative inferiority of means) not very greatly differing from what will be adopted as the actual length of the Base, viz., the mean of the two last measurements.

The Base of verification on Norfolk Plains has since been measured twice by the same apparatus, and to the same standard, by Mr. Sprent; the results of which are as follows :—

First measurement, reduced to the
level of the lowest point........25746·019443
Second ditto ditto ....25746·304833

Difference............ ·285,390 = $3\frac{1}{2}$ in.

The difference of $3\frac{1}{2}$ inches in nearly five miles is almost as good an accordance as resulted from the two last measurements of the Base at Ralph's Bay.

I must mention one other circumstance connected with these operations, and which at first led me to doubt the safety of dependence upon the deal rods.

The measurement of their length by the four-foot standard during the operations, especially at Norfolk Plains, indicated a small amount of contraction and expansion not to be expected, and in no way to be accounted for; but it appeared that these measurements were made in the extreme heat of mid-day, and arose from the steel standard being slow in following the changes of temperature indicated by a detached thermometer. The temperature of the metal, in fact, was not ascertained at a high temperature of the atmosphere; and as the rods embedded in their coffers, and screened from the sun, could undergo no such sudden changes, I rejected the mid-day measurement of their length, and adopted those taken early, when no great allowance was required to be made for the effect of temperature on the standard. The Base at Ralph's Bay being measured in cooler weather, this difficulty did not arise.

For the angular observations from the main triangles, an Altitude and Azimuth instrument had been obtained from England, with a repeating table of excellent finish, both very portable, and at the same time efficient.

The horizontal arc of the instrument is twelve inches in diameter, graduated to 10.″

Many repetitions were made of every angle with reverse observations, and every possible attention to ensure an accurate mean; and the result has been most satisfactory.

The greatest error in the sum of the angles of one triangle was 3·3 seconds, and this was in a triangle of nearly forty miles sides.

The Bases are situated nearly 100 miles asunder. The computed length of the Longford Base, taken from the measured length of that at Ralph's Bay, and carried up through thirteen triangles, compared with its measured length, gives the following results, viz.:—

Mean of two measurements........	25,746·2 feet
Reduction to level of sea	·5
Reduced measured length	25,745·7
Computed length........................	25,746·0
Difference ....feet	·3 or about $3\frac{1}{2}$

inches. The instruments are decidedly good of their kind, but not of course possessing the perfection of construction or minuteness of division of those used in the great surveys of Europe, India, and America. The observations have been entirely in the hands of one individual, Mr. J. Sprent, whose scientific knowledge, together with untiring perseverance and patient endurance, has enabled him, single-handed, to effect what would in other countries have been shared by many equally qualified for the work. But the result is such as he will, I am sure, from the interest he takes in this work of science, feel no small recompense for his efforts.

The actual distance from hill to hill, extending for nearly fifty miles in some of the triangles, and the total distance from Base to Base being determined to a very minute degree of accuracy, a foundation of the framework of the whole map of the island is established, and the future operations will be based upon it with security and confidence.

"(Signed) "H. C. Cotton."

Since the date of the above Report I have made further computations for the verification of the work, comparing the length of the Longford Base as computed by other triangles with its measured length, (the measured length of the four mile base at Ralph's Bay being the given side of the first triangle in each case), and the results are as follows:—

Measured Length of Longford Base reduced to the Level of the Sea.	Feet. 25,745·7	Difference in Feet.
Length as computed by 1st series of triangles	25,746·0	+ ·3
Do. do. 4th series	25,746·2	+ ·5
Do. do. 2nd series	25,744·5	— 1·2
Do. do. 3rd series	25,743·5	— 2·2
1st Series computed by Mr. Sprent	25,746·01	+ ·29
1st Series varied in one triangle computed by Mr. Sprent.........	25,745·35	— ·35

The accompanying diagram exhibits the character of the triangles comprising each series; and it will be observed that the series No. 1, composed of the largest and best triangles, give a result the most nearly in accordance with the measurement. The series No. 4 is that from which the next best result was to be expected from the character of the triangles, and it accords most nearly with the first.

The results of the other two series are very satisfactory, and give abundant proof that both the measurements and the observations are good. With the exception of those at Mona Tower, all the angles used in these computations are taken from the centre of the stations. The angles there were observed out of the centre and reduced.

In the triangulation to which I have adverted, and in about three hundred other calculated triangles, the nearness with which the sum of the triangles corresponds with the sum of 180°, and the spherical excess, gives the greatest proof of the accuracy of the angular observations, the error rarely amounting to more than four or five seconds, and generally not exceeding two seconds. The observations have been all made by Mr. Sprent, and with the same twelve-inch instrument.

By means of the repeating table each angle is observed under a series of repetitions, and the mean obtained is exceedingly near the truth.

At every principal station Angles of Elevation and Depression for determining relative altitudes have been observed, and at several stations astronomical observations made for the determination of the true meridian.

The observations taken for this purpose are extreme Elongations of circumpolar stars;—both the east and west elongation of one or more stars, with single elongations east or west of others;—observing their azimuthal angle from another station, or from a fixed lamp whose position with reference to some other station is known.

The observations have been made with the principal instrument at sixty-eight main stations, and with an eight-inch theodolite at sixty-five secondary stations, those at the latter being confined to the horizontal angles. Mr. Sprent is continuing the observations for the main triangulation, during the summer, in the north-west portion of the island, and preparations are made for those in the south-west next summer. In the meantime, I am in the expectation of being able shortly to appoint two other parties for carrying on the secondary and minor triangulation; but the extreme and urgent demand at present for surveys of small blocks of land, and the want of strength in the establishment, delays this work.

Besides the calculations connected with the two Base lines, and the four series of triangles between them, to which I have already adverted, about three hundred triangles have been calculated, and the latitudes at several main stations, both from the local observations and by the triangulation commencing at Hobart Town, have been computed with the true bearings of lines meeting at the same stations.

With a view to show more particularly the nature of the field operations, and of the computations and the results, I append to this Report extracts from the Field Books and examples of the method of calculation adopted. I have given also a comparison of the results of the calculations for latitude and true bearings, as derived from the local observations at each station, and as derived from the triangulation, commencing with the latitude and meridian of Church Street, Hobart Town, where Mr. Sprent took a series of observations, and calculated his latitude with great care, as will be seen by his Report attached. For the purpose of forming an accurate map of the island, and fixing its geographical position, the operations are proved to be exceedingly true, and I believe the results equal any operation of the kind in any part of the world; it being remembered that they are not intended for the measurement of an element in the dimensions or figure of the earth.

The Bases, measured nearly one hundred miles asunder, verify the operations with exceeding perfectness ; and though it would be satisfactory to measure two other base lines on the east and west coast, it cannot be considered necessary, as by multiplying the calculations of the length of every line by various chains of triangles branching from those directly verified, any accidental error must be discovered, and a very accurate mean taken, so that when the main triangulation is completed, the main stations will be most accurately fixed in position, both relatively and geographically, and the inferior triangulation and filling in will be true in detail under its control. It will be perceived that the latitudes of several of the main stations, calculated from entirely independent observations at those stations, differ in some measure from those derived by means of the triangulation from the observations at Hobart Town. Respecting this difference I must observe,—

1st. That the observations on the mountain cannot be considered so trustworthy as those taken in a secure observatory in town.

2nd. The probable deviation of gravitation from the true vertical direction may slightly throw out the observations of Elongations taken on the mountain.

3rd. The number of observations at each station is not sufficient to give so sure a mean as those taken for the same purpose at Hobart Town.

Under these circumstances, and considering the satisfactory proofs of accuracy of the triangulation, the latitudes, so far as they have been hitherto calculated by its means, from the initial latitude at Hobart Town, may be depended on in pefrerence to those derived from the local observations. I must mention further, that while all the triangles have been calculated by two or more different computers, those for the latitudes and bearings have not yet gone through this proof, having been only done by myself, and by formulæ not giving the most minute results, but such merely as I consider commensurate with the degree of accuracy to be expected from the character of the observations.

H. C. COTTON.

1*st January,* 1854.

EXTRACT FROM FIELD BOOK FOR MEASUREMENT OF BASE LINE WITH REDUCTIONS SUBSEQUENTLY COMPUTED.

SECOND MEASUREMENT OF LONGFORD BASE.

Measurement of the Rods by the Four-foot Steel Standard.

Thermometer.	Rods.	Measurement in Fortieths of Inches.	Measurement reduced to Feet.	Length reduced for Temperature of Standard
60°	A	7255·2	15·1150	15·1148
60	–	7255·2	15·1150	
61	B	7263·2	15·1316	15·1315
61	–	7263·2	15·1316	
61	C	7250·3	15·1048	15·1047
61	–	7250·3	15·1048	

4 A = 15·1148 × 4 = 60·4592
4 B = 15·1315 × 4 = 60·5260
3 C = 15·1047 × 3 = 45·3141

The reduction made to correct the length given by the Steel Standard is ·000007 feet per foot of length for each degree of temperature above or below the mean temperature of 62°.

Date.	No of Hypothenuse.	Difference of Level. Elevation. Feet.	Difference of Level. Depression Feet.	Rod.	Measurement of Interval. Feet.	Total of Hypothenuse. Feet.	Reduced Horizontal Measurement.—Feet.
					·1588		
29th April.	No. 61			A^1	·3328		
				B^1	·3456		
				C^1	·3790		
				A^2	·3390		
				B_2	·3400		
				C	·3808		
				A_3	·3370		
				B^3	·3540		
				C^3	·3752		
				A^4	·3238		
				B^4	·3442		
				Part of C	5·0042		
				4 A	60·4592		
				4 B	60·5260		
				3 C	45·3141	175·3137	175·300058
					Deduction	·013642	

$$\frac{2.187^2}{175{\cdot}3137 \times 2} = .0136 = \text{approximate deduction.}$$

$$\frac{2{\cdot}187^2}{157{\cdot}3137 \times 2 - {\cdot}0136} = 013642 = \text{correct deduction.}$$

When the difference of level is not greater than $\frac{1}{90}$ of the hypothenuse the approximate deduction is true to the 7th decimal.

FIRST MEASUREMENT OF LONGFORD BASE REDUCED TO THE LEVEL OF THE LOWEST POINT.

Numbers of Hyphothenuses.	Nos. of Classes.	Sum of Hypothenuses of each Class reduced to Horizontal Feet.	Mean Altitude above Lowest Point. Feet.	Calculated Multiplier for Reduction. $\frac{r}{r+a}$	Each Class Reduced. Feet.	Total Length of Base reduced to Level of the Lowest Point. Feet.
From No. 12 to No. 20.........	...	5399·917769	Under 25 feet	No reduction required	5399·91776900	
From No. 1 to No. 11 and From No. 21 to No. 31......	1	12501·603354	... 25 feet	99999880325	12501·58839270	
From No. 31 to No. 50.........	2	5414·243631	... 50 feet	99999760650	5414·24233510	
From No. 51 to No. 61.........	3	2430·283744	... 110 feet	99999473430	2430·27094685	25746·019443

Note.—If $r =$ Earth's radius + elevation of lowest point above the sea.
$a =$ elevation of each class above the lowest point.
$b =$ sum of each class reduced to horizontal.
$c =$ each class reduced to its value at the lowest point.

$c = \frac{r}{r+a} b$ and $\frac{r}{r+a}$ is the multiplier calculated for each class.

EXTRACT from Field Book of 8-inch Theodolite, as adopted by Mr. Sprent at the Secondary Stations.

GORDON'S SUGAR LOAF.

Name of Station observed to.	Zero Point.	Reading of Arc, Three Verniers.	Mean of Reading.	Mean Angle.
	° ′ ″	° ′ ′	° ′ ″	° ′ ″
Rumney's Hill ...	359 58 50			
Brown Mountain...		67 59 0 58 30 60 0	67 59 10	68 0 20
		6 Repetitions. 48 0 30 47 59 0 48 0 30	48 0 0	68 0 11
Rumney's Hill......	359 58 50			
Grass Tree Hill ...		21 5 30 3 0 4 0	21 4 10	21 5 20
		9 Repetitions. 189 46 30 49 0 46 30	189 47 20	21 5 23

Note.—At many of the Secondary Stations a connection by traverse survey with some natural feature or other permanent object in the neighbourhood is also recorded.

EXTRACT from Field Book of 12-inch Altitude and Azimuth Instrument, as adopted by Mr. Sprent at the Main Stations.

DROMEDARY STATION.

OBSERVATIONS.

Horizontal Angles.

Names of Stations and Stars observed to.	No of Repetitions	Reading. Degrees & Minutes.	Reading of Three Verniers Seconds	Mean Reading.	Angle.
		° ″	″	° ′ ″	° ′ ″
Butler's Hill.	...	47 57	75 65 25	47 57 55·0	
Platform Peak.	1	290 46	10 30 25	290 46 21·6	117 11 33·4
	7	307 36	40 40 45	307 36 41·6	117 11 34·2

Elongations.

Names of Stations and Stars observed to.	No of Repetitions	Reading. Degrees & Minutes.	Reading of Three Verniers Seconds.	Mean Reading.	Reading of Levels each 2 Seconds.	Date.
		° ′	″	° ′ ″		
Brown Mt.		89 59	60 60 40	89 59 53·3	39 29	1851 June 5
η Argus E.		155 56	90 50 70	155 57 10·0	35 32	
Brown Mt.		89 59	60 55 35	89 59 50		
α Crucis E.		161 19	55 10 30	161 19 31·3	43 26	
Brown Mt.		89 59	70 65 45	90 0 0·0	43 26	

Elevations and Depressions.

Names of Stations and Stars observed to.	No of Repetitions	Barometer.	Thermometer. Attd.	Thermometer. Detd.	Reading Degrees and Minutes	Reading of Vernier Seconds	Mean of Verniers	Angle.
					° ′			° ′ ″
Rumney's Hill, Top of Stones.		27·016	46	46	88 46	74 40	57	1 13 3
					1 12	36 24	30	1 12 30
					88 46	74 42	58	1 13 2
					0 12	38 24	31	1 12 31
					88 46	74 44	59	1 13 1
					1 12	38 24	24	1 12 31
								1 12 45·6

EXTRACT FROM BOOK OF TRIANGLES.

No. of Triangle.	Angular Points.	No. of Repetitions.	Spherical Excess.	Observed Angle.	Corrected Angle.	Reduced from Spherical Excess.	Sine of Angle	Log of Sides.	Sides in Feet.
No. 11.	Mount Arnon.	28	3″·1	55 37 41·2	41·5	55 37 40·5	9·9166585	5·1042901	127142·31
	Miller's Bluff.	10		42 5 38·8	39·5	42 5 38·5	9·8263011	5·0139327	103260·14
	Dry's Bluff.	11		82 16 41·6	42·1	82 16 41·0	9·9960438	5·1836754	152642·46
				1·6	3·1	180 0 0·0			
				3·1					
				Error... 1·5					

The spherical excess has been calculated by multiplying the area in square miles by ·0132, and the area is derived from a plotting of the triangles. One-third of the spherical excess is the correction applied to each angle after the error of observation is removed, in proportion to the weight of each angle.

Extract from Book of Calculations of Latitudes and Bearings.

E	Observed greatest Elongation of a Star.
E E	Angle subtended by point of reference and greatest elongation east.
W E	Ditto ditto ditto west.
A	Elevation of a Star at its greatest Elongation.
PD	South Polar distance of star.
L	Latitude of place of observation.

Dromedary Station.

Observation.—α Argus	= 179° 29′ 16″·6	α Argus west.....	= 247° 10′ 3″·3
Brown Mountain	= 121 35 53·3	Brown Mountain	= 80 15 16·6
E E	= 54 53 23·3	W E...	= 166 19 46·7
Mean of W E	= 166 19 47·9	α Argus W.........	= 181 24 25·0
		Brown Mountain	= 15 4 35·8
	2)111 26 24·6		
E	= 55 43 12·3	W E	= 166 19 49·2

$\text{Cos. L.} = \dfrac{\text{Sin. P D}}{\text{Sin. E}}$

α Argus P D	= 37 23 1·8	Sin. 9·7832971
E	= 55 43 12·3	Sin. 9·9171355
L	= 42 42 38·8	Cos. 9·8661616

Assuming this to be the Latitude of the Dromedary Station and $\text{Sin. A} = \dfrac{\text{Sin. L}}{\text{Cos. P D}}$ and $\text{Sin. E} = \dfrac{\text{Sin. P D}}{\text{Cos. L}}$, E is calculated from each observed elongation.

α Crucis P D = 27 43 32·2

L = 42 42 38·8	Sin. = 9·8314204		Cos. = 9·8661616
PD = 27 43 32·2	Cos. = 9·9470343		Sin. = 9·6676750
Nat. Sin. *A* = .77	= 9·8843861	E = 39 17 1·1	Sin. = 9·8015134

Observation.—Brown Mountain.........	89 59 55·0	Levels.
α Crucis......	161 19 31·3	43 26
		43 26
	71 19 36·3	
Correction for level......	+ 13·1	43—26 = 17 +
		·77
	71 19 49·3	
E	39 17 1·1	119
		119
Bearing of Brown Mountain	S 110 36 50·4 E	
		13·09

In like manner the bearing of Brown Mountain is calculated from each of the other observations at the Dromedary with the following results:—

	Results of Eastern Elongations.	Results of Western Elongations.
	° ′ ″	° ′ ″
α Crucis ...	110 36 50·4	
Ditto ...	110 36 46·7	
η Argus ...	110 36 54·0	
Ditto ...	110 36 50·8	
Ditto ...	110 36 54·0	
α Argus ...	110 36 36.4	110 36 33·1
Ditto		110 36 32·2
β Centauri	110 36 11·9	
α Eridani		110 36 58.6
Means...	110 36 43.6	110 36 41·3

Mean of all...... S. 110° 36′ 42·4 E.

At Brown Mountain the bearing of the Dromedary from three Eastern and four Western elongations is—

	° ′ ″	
	S. 69 6 25·2 W.	
Convergence of Meridians	0 16 42·4	
	69 23 7·6	
	180 0 00	
	S. 110 36 52·4 E.	Bearing referred to the meridian of Dromedary.
	S. 110 36 42·4	Do. do. from observations at Dromedary.
	10·0	Difference.

The convergence of the meridians of the different stations has been computed by the formula 36549·2 Cos. Lat.—305·8 Cos. 3 Lat. + 4 Cos. 5 Lat. = length of 1 degree of parallel at the latitude of the Station, (their difference giving the convergence in feet due to the difference of latitude), and

$$\frac{\text{Convergence in feet}}{\text{Difference of latitude in feet}} = \text{Tan. of angle of convergence}$$

or at once by the formula.

$$Z - z = 180 - \frac{w}{a} \times d. \text{ Sin. } z \text{ Sec. } l \text{ Sin. } \tfrac{1}{2}(L + l) \text{ Sec. } \tfrac{1}{2}(L - l)$$

where Z and *z* are the azimuths at the two extremities of the line from Station to Station.

L. l. Their latitudes.

a Earth's radius in feet.

d Distance or length of line in feet.

w 206264·8 seconds.

The convergence of the meridians of Brown Mountain and Dromedary is computed as follows :—

Latitude of Dromedary ...	42° 42′ 38″·8	from local observation.
Lat. of Brown Mountain ...	42 36 7·7	ditto ditto
Length of line..............	117825 feet.	
Bearing	69° 6′ 25″·2	

Log. w =	206264.8 =	5·3144251
Log. $\frac{1}{a}$		2·6801158
Log. d =	117825	5·0712374
Sin. z =	69 6 25·2	9·9704622
Sec. l =	42 42 38·8	0·1338385
Sin. $\frac{1}{2}(L+l)$	42 39 20·5	9·8309677
Sec $\frac{1}{2}(L-l)$	0 3 16·7	0·0000002
Log.	1002″·4	= 3·0010469

= 0° 16′ 42″·4 Angle of convergence.

The above calculations of Azimuths and Latitudes wholly depending on the local observations, I proceed to give the calculations for the same, derived from the latitude of Hobart Town, through the triangulation. The following is a copy of Mr. Sprent's Report on the observations made by him at his Observatory in Church-street.

Mr. Sprent's Report.

" The following results are derived from observations upon σ Octantis, for ascertaining the latitude of my observatory. They are obtained from 108 elevations of that star taken with the Altitude and Azimuth circle. The error of the chronometer was ascertained by transits of the sun or stars on my meridian, taken as near the times of observation as convenient.

The observations were taken in groups of four, viz.: four with instrument direct or reading Altitudes, and four with the instrument inverted or reading Zenith distances. They have been calulated in sets of two direct and two inverted; the mean of these giving one of the results stated below. The whole form 27 sets of four Altitudes each.

°	′	″
42	52	26
,,	,,	28·4
,,	,,	24·9
,,	,,	26·8
,,	,,	27·9
,,	,,	26·2
,,	,,	26·5
,,	,,	27·1
,,	,,	25·3
,,	,,	27·2
,,	,,	23·8
,,	,,	25·6
,,	,,	26·3
,,	,,	25·6
,,	,,	24·7
,,	,,	24·3
,,	,,	24·7
,,	,,	26·5
,,	,,	26·1
,,	,,	24·1
,,	,,	23·6
,,	,,	23·1
,,	,,	24·5
,,	,,	27·9
,,	,,	25·3
,,	,,	26·1
42	52	25·66

In August 1851, I took several elongations of α Centauri, α Crucis, η Argus, for fixing my Meridian mark, and from these I find the latitude. They give results as follows,—

		°	′	″	
α Centauri	Lat	42	52	28·1	S
α Crucis...		,,	,,	28·5	
η Argus		,,	,,	29·5	
Mean		42	52	28·7	S

It is to be observed that in the observations from which the above results were obtained, refraction forms no function in the elements for the calculation.

The elongations gave for my Meridian mark the following results,—

Instrument at zero on the mark, or	0 0 0
Reading of the instrument South	180 0 44·9
That is the mark is to the Eastward of North..	4·″97 of arc

I took this month, (August 1853), 36 angles of η Argus with the Meridian mark, using the chronometer. They gave the following results,—

	Instrument direct.	Instrument inverted.
	12 Sets 180 0 8·3	180 0 4·2
	12 ,, 3·4	4·0
	12 ,, 4·98	5·9
	36 Sets 180 0 5·56	180 0 4·7
	,, ,, 4·7	
Mean	180 0 5·13	

Agreeing very nearly with those derived from the greatest elongations.

By a series of small triangles connected with the main triangulation, I find the difference of latitude between my Observatory and the Magnetic Observatory — 30″·41, hence 42° 52′ 25″·66—30″·41=42° 51′ 55″·25 = latitude of Magnetic Observatory, and the difference of latitude between my Observatory and the Hobart Town Semaphore is + 43·48, hence 42°52′25″·66 + 43·48 = 42° 53′ 9·″14 latitude of Hobart Town Semaphore.

		° ′ ″	
Bearing of Meridian mark from my Observatory...	N.	0 0 5	E.
Angle of mark with Rumney's Hill.................		81 3 31·2	
Bearing of Rumney's Hill from my Observatory...	N.	81 3 36·2	E.

		°	′	″	
Bearing of Meridian mark from my Observatory ...	N.	0	0	5	E.
Angle of Meridian mark with Wellington..............		108	5	55.6	
	N.	108	5	50·6	W.
Bearing of Wellington from my Observatory.........	S.	71	54	9·4	W.

(Signed)

30th August, 1853. JAMES SPRENT.

Taking then the latitude of Hobart Town to be 42° 52′ 25″·66, and the bearing of Mount Wellington from the Observatory in Church-street to be S. 71° 54′ 9·″4 W.

The diff. of latitude $L - l = \left(\frac{w}{a} d \cos. z - \frac{w d^2}{3 a} \text{Sin.}^2 Z \text{ Tan. } l. \right)$ Seconds

Here $d = 23486{\cdot}7$ = distance by the triangulation.
z = 71 54 9·4 = Azimuth.
l = 42 52 25·66 = Latitude.
w = 206264·8

$$a = \frac{24856 \times 5280}{6{\cdot}28318} = \text{Earth's radius in feet.}$$

Log. w = 206264·8	=	5·3144251
Log. d = 23486·7	=	4·3708232
Log. $\frac{1}{a} = \frac{6{\cdot}28318}{24856 \times 5280}$	=	2·6801158
Cos. z = 71 54 9.4	=	9·4922478
		1·8576119 = 72·046 = 1st Term.
Log. w	=	5·3144251
Log. d^2 = 2 Log. d	=	8·7416464
Log. $\frac{1}{a^2}$ = 2 Log. $\frac{1}{a}$	=	5·3602316
Log. $\frac{1}{3}$	=	9·5228787
Sin.² z = 2 Log. Sin. z ...	=	9·9559316
Tan. l = 42 52 25·66 ...	=	9·9677377
		8·8628511 = 0.073 = 2nd Term.

Difference of Latitude .... = 71·973 = 0° 1′ 11″ ·97

	°	′	″
Latitude of Church-street	42	52	25·66
Difference of Latitude..........................		1	11·97
Latitude of Wellington	42	53	37·63
½ Sum of Latitudes..............................	42	53	1·64
½ ,, Difference ditto			35.98

$\frac{w}{a}$ Constant Log ... 7·9945409
d = 23486·7 ... = 4·3708232
Sin. z = 71 54 9·4 = 9·9779658
Sec. l = 42 52 25·66 = 0·1349824
Sin. ½ Sum 42 53 1·64 9·8328368
Sec. ½ Difference 35″98 00·00000

Log......204″7 = 2·3111491

= 3′ 24″·7 = Angle of convergence.
71 54 9·4 Bearing of Wellington from Church-street.

N. 71 57 34·1 E. Bearing of Church-street from Wellington.
97 51 41·6 Angle at Wellington ; – Church-street,—Dromedary.

N. 25 54 7·5 W. = Bearing of Dromedary at Mount Wellington.

74244·02 Dist. by triangulation from Mt. Wellington to Dromedary.

$\frac{w}{a}$ Constant Log ...... = 7·9945409
Log. d=74244·02 = 4·8706615
Cos. z =25 54 7·5 = 9·9540214

2·8192238 = 659·51

$\frac{w}{3a^2}$ Constant Log ...... = 0·1975354
Log. d^2 = 2 Log. 74244·02 = 9·7413230
Sin. ^{2} z = 2 Sin. 25 54 7·5 = 9·2806338
Tan. l = 42 53 37·63 = 9·9680415

9·1875337 = ·15

659·″36

Difference of Latitude...... = 10′ 59″·36
Latitude of Wellington ... = 42 53 37·63

Latitude of Dromedary ... = 42 42 38·27
½ Sum. of Latitudes ...... = 42 48 7·95
½ Difference .... = 5 29·68

$\frac{w}{a}$ Constant Log. .... = 7·9945409
d = 74244·02 .... = 4·8706615
Sin. z = 25 54 7·5 .... = 9·6403169
Sec. l = 42 53 37·63 .... = 0-1351231
Sin. ½ Sum. = 42 48 7·95 = 9·8321701
Sec. ½ difference = 0 5 29·68 = 0·0000006

Log. ...... 297·04 = 2·4728131

= Angle of convergence	=	0° 4′ 57″·04
Bearing of Dromedary at Mount Wellington	=	25 54 8·5
Bearing of Wellington at Dromedary	=	S. 25 49 11.46 E.
Angle;—Table Mt.,—Dromedary	=	152 9 31·7
		177 58 43·16
		180
Bearing of Table Mountain at Dromedary N.		2 1 16·84 E.

Distance by triangulation from Dromedary to Table Mountain 173875 feet.

$\frac{w}{a}$ Constant Log	= 7·9945409	
Log. d = 173875	= 5·2402390	
Cos. z = 2 1 16·84	= 9·9997297	*Note,* 2nd term of no value.
17 15·9	= 3·2345096	
= Difference of Lat. =	28 35·9	
Lat. of Dromedary =	42 42 38·27	
Lat. of Table Mt. ...	42 14 2·37	
½ Sum.	42 28 20·32	
½ Diff.	14 17·95	

$\frac{w}{a}$ d Log.	= 3·2347799
Sin. z = 2 1 16·84	= 8·5474275
Sec. l = 42 42 38·27	= 0·1338376
Sin. ½ Sum. 42 28 20·32	= 9·8294542
Sec. ½ Diff. 14 17·95	= 0·0000038
Log. 55′65	= 1·7455030
= Angle of Convergence	55·65
Bearing of Table Mountain at Dromedary............	2 1 16·84
Bearing of Dromedary at Table Mountain.........	2 0 10·2
Angle {Dromedary,— Miller's Bluff}	177 6 11·8
Bearing of Miller's Bluff, at Table Mountain ...	175 6 0·6
	180 0 0·0
	4 53 59·4

Distance by triangulation from Table Mountain to Miller's Bluff 109893·82 feet.

$\frac{w}{a}$ Constant Log.	=	7·9945409
Log. d = 109893·82	=	5.0409733
Cos. z = 4 53 59·4	=	9·998400
Log. 1081·25	=	3·0339242

$\frac{w}{3a^2}$ Constant Log.		$= 0{\cdot}1975354$
Log. d^2	$= 2$ Log. d	$= 0{\cdot}0819466$
Sin.^{2} z	$= 2$ Sin. 4 53 59·4	$= 7{\cdot}8630584$
Tan. l	$=$ 42 14 2·37	$= 9{\cdot}9580041$
Log. ·013		$= 8.1005445$
1081·25		

		° ′ ″
Difference Latitude ... 1081·24	=	0 18 1·24
Latitude of Table Mountain ...	=	42 14 2·37
Latitude of Miller's Bluff	=	41 56 1·13
½ Sum	=	42 5 1·75
½ Diff...........................	=	9 0·62

$\frac{w}{a}$ d Log.		$= 3{\cdot}0355142$
Sin. z	$=$ 4 53 59·4	$= 8{\cdot}9315292$
Sec. l	$=$ 42 14 2·37	$= 0{\cdot}1306452$
Sin. ½ Sum. 42 5 1·75		$= 9{\cdot}8262156$
Sec. ½ Diff. 0 9 0·62		$= 0{\cdot}0000015$
Log. 83.9		$= 1{\cdot}9239057$

	° ′ ″
z Angle of convergence	0 1 23·9
Bearing of Miller's Bluff at Table Mountain	N. 4 53 59·4 E.
Bearing of Table Mountain at Miller's Bluff...........	S. 4 52 35·5 W.

Distance by Triangulation from Dromedary to Brown Mountain 117825·21 feet.

	° ′ ″
Bearing of Mount Wellington at Dromedary	S. 25 49 11·46 E.
Angle ;—Wellington,—Brown Mountain	84 47 17·70
Bearing of Brown Mountain at Dromedary	110 36 29·16 = Z.

$\frac{w}{a}$ Constant Log.		$= 7{\cdot}9945409$
Log. d	$=$ 117825·21	$= 5{\cdot}0712383$
Cos. z	$=$ 110 36 29·16	$= 9{\cdot}5465107$

Difference of Latitude $= 2{\cdot}6122898 = 409{\cdot}6 =$ 0° 6′ 49·6″

Note.—2nd term of no value.

		° ′ ″
Difference of Latitude		0 6 49.6
Latitude of Dromedary		42 42 38·27
Latitude of Brown Mountain ...		42 35 48·67
½ Sum	=	42 39 13·47
½ Differences	=	0 3 24·80

Log. $\frac{w}{a}$ d		° ′ ″	= 3·0657791
Sin. z	=	110 36 29.16	= 9·9712805
Sec. l	=	42 42 38·27	= 0·1338375
Sin. ½ Sum.	=	42 39 13·47	= 9·8309517
Sec. ½ Diff.	=	0 3 24·8	= 0·0000002
			= 3·0018490 = 1004·24=16 44·2 Angle of convergence.

		° ′ ″
Angle of convergence	=	0 16 44·2
Bearing of Brown Mountain at Dromedary..............	=	110 36 29·2
		110 53 13·4
		180 0 0·0
Bearing of Dromedary at Brown Mountain........................		S. 69 6 46·6 W.
Angle; — Dromedary,— Table Mountain.........		72 23 46.6
Bearing of Table Mountain at Brown Mountain	...	S. 141 30 33·2 W.
		180 0 0·0
	Z. =	N. 38 29 26·8 W.

Distance by Triangulation from Brown Mountain to Table Mountain d = 168374·26

Log. $\frac{w}{a}$ Constant	= 7·9945409
Log. d	= 5·2262757
Cos. z = 38 29 26·8	= 9·8936008
	3·1144174 = 1301·4

Log. $\frac{w}{3a^2}$ Constant	= 0·1975354
Log. d^2 = 2 Log. d	= 0.4525514
Sin.^{2} z = 2 Sin. 38 29 26·8	= 9·5881234
Tan. l = 42 35 48·67	= 9·9635262
	0·2017364 = 0 ·16

Difference of Latitude = 1301″ 24 =	0° 21′ 41″·24
Latitude of Brown Mountain	42 35 48 ·67
Latitude of Table Mountain	42 14 7 ·43

In like manner of computation the Brown Mountain at Table Mountain is S. 38° 13′ 38″·6 E.

COMPARISON of Latitudes and Bearings obtained from Local Observations with those obtained by the Triangulation commencing at Hobart Town.

Stations.	Latitudes from Local Observations.			Latitudes from the Triangulation from Hobart Town.		
	°	′	″	°	′	″
Dromedary Station....	42	42	38·8	42	42	38·27
Brown Mountain.......	42	36	7·7	42	35	48.67
Table Mountain.	42	14	28·9	42	14	7·43
Miller's Bluff.	41	56	18·2	41	56	1·13

Lines.	Bearings from Local Obervations.			Bearings by Triangulation from Hobart Town.		
	°	′	″	°	′	″
Dromedary,—Brown Mt.	110	36	40·6	110	36	29·2
Brown Mt.,—Table Mt.	38	29	48·2	38	29	26·8
Table Mt.,—Brown Mt.	38	13	46·8	38	13	38·6
Miller's Bluff,—Table Mt.	4	52	21·0	4	52	35·5

(Signed) H. C. COTTON.

XII.—*Report on the Chemical Qualities and Analysis of a Combustible Mineral Substance from the Mersey River, Tasmania, forwarded by Mr. A. M'Naughtan, of Hobart Town. By* PROFESSOR PENNY, *of the Andersonian University, Glasgow.* [*Read* 13*th September,* 1854.]

THIS mineral consists essentially of a mixture of silicious sand and clay, with a combustible fossil substance, resembling resin. It also contains small quantities of water and iron pyrites, (sulphuret of iron).

One hundred parts gave by analysis the following results:—

Resinous matter	26·64
Sand and clay	69·83
Pyrites	2·16
Water	1·37
	100.

Under the microscope the leading ingredients may be easily recognized and distinguished. The clay and sand, which are nearly colourless, form the basis, and by far the greater bulk, of the mineral, while the resinous matter, which is of a light amber-brown colour, is disseminated through the clay basis in extremely minute particles or flakes.

The resinous matter renders the mineral highly combustible. When heated in the open fire it readily kindles, and burns with a bright voluminous flame, giving off much smoke. The sand and clay are left as a bulky reddish coloured ash.

When distilled in a closed vessel, or retort, at a temperature below a red heat, it yields an oil, a strong acid, and tarry matter, leaving a carbonaceous residuum in the retort. The volatile products are of course derived exclusively from the resinous ingredient. The quantity of mineral received for examination was too small to admit of an extended investigation being made into the exact nature of the liquid products afforded by distillation. Even if there had been sufficient for the purpose, I should not have considered it necessary to incur the expense of pursuing this part of the inquiry, for, although exceedingly interesting in a scientific point of view, it appears to me to be altogether irrelevant to the principal questions submitted for my consideration, viz.,—Whether this mineral can be employed in the manufacture of gas, or be applied to steam purposes, or to any other practical use in the arts?

I have tried its gas-producing powers very carefully. When strongly and quickly heated, in the same way that coal is treated in the manufacture of gas, it affords a notable quantity of gas, which is similar in qualities and powers to that obtained from cannel coal. In consequence, however, of the very large proportion of earthy matter existing in it, the amount of gas that it gives is very small, as compared with the quantity afforded by Scotch and English gas coal. From a careful trial on a limited scale, I estimate that a ton of the mineral will produce about 3000 cubic feet of gas, which is a little more than one-fourth of the quantity yielded by good cannel coal of this country. Lesmahago coal, which is, with the exception of Boghead coal, the most productive cannel coal in Scotland, gives about 11,500 cubic feet of gas per ton, and the Boghead coal nearly 14,000 cubic feet.

The following Table exhibits the results obtained by analyzing this mineral, according to the method generally employed in the analysis of gas coal ; and I have added, for the purpose of comparison, a statement of similar results from Lesmahago and Boghead coals :—

Ingredients.		Mineral from Mersey River, Tasmania.	Lesmahago Gas Coal.	Boghead Gas Coal.
Volatile Matters		20·41	55·23	67.11
Coke	Fixed Carbon ...	5·50	36·72	10·52
	Ash	71·20	4·35	21·00
Sulphur		·73	·55	·32
Water		2·16	3·15	1·05
		100	100	100

The results in the above Table are replete with information. The actual quantity of gas that any coal will afford may in general be fairly estimated from the proportion of "volatile matters" that it gives when analyzed according to the foregoing method. The larger the proportion of these matters, (which consists of gases and volatile liquid substances), the greater will be the quantity of gas procurable from the coal by distillation in the usual way. On reference to the Table, it will be at once seen that the amount of these ingredients (volatile matters) in the Van Diemen's Land mineral is comparatively small: and accordingly, as a gas-yielding material, it is very inferior to ordinary cannel coal.

The coke from it is utterly worthless. It consists almost entirely of clay and sand, and a very small quantity only of combustible matter, or "fixed carbon." The following Table shows the per-centage amount of coke afforded by this mineral and by the coals previously referred to, and also the proportion of "fixed carbon" and ash in each coke:—

	Coke from	Fixed Carbon in Coke.	Ash in Coke.
	per cent.	*per cent.*	*per cent.*
Tasmanian Mineral.........	76·70	7·17	92·83
Lesmahago Gas Coal	41·07	89·50	10·50
Boghead Gas Coal	31·52	33·38	66·62

In estimating the value of coal for the manufacture of gas, the quality of the coke which is used as fuel in the distillation of the coal, and also sold for other purposes, is an important item of consideration. The heat-producing powers of coke, when used as fuel, depend exclusively on the "fixed carbon," or charcoal, it contains, and accordingly its economic value is directly proportioned to the amount of this ingredient. In the coke from Lesmahago coal, there is a large per-centage of "fixed carbon," and it is therefore very valuable as fuel. Boghead coke, on the contrary, is very deficient in this respect, and almost valueless. The product from the present mineral is little else, as already mentioned, than clay and sand, (nearly 93 per cent.), and scarcely entitled therefore to the name of coke.

I made a careful analysis of the ash which this mineral gives when completely burned, with a view to ascertain whether it could be applied to any useful purpose. The following statement gives the results obtained from one hundred parts :—

Sand and silica....................	85·50
Alumina...	10·71
Oxide of iron.........................	1·29
Lime, magnesia, &c.	2·50
	100.

From these results it is evident that this ash consists of little else than sand, and is obviously of no value whatever.

With regard to the nature of the combustible matter in this mineral, I may mention that it is essentially different from coal. In its chemical composition, as well as in some of its leading qualities, it is more analogous to resinous matter than any other known substance, though I must add that in many particulars it presents some striking peculiarities. Generally speaking, resins are more or less soluble in alcohol, ether, naphtha, and oil of turpentine; but this mineral is very little acted upon by these solvents. It gives a small quantity of soluble matter to ether and oil of turpentine. It also partially dissolves in potash. It cannot be considered as a "bitumen," as all true bitumens dissolve to a greater or less extent in naphtha and oil of turpentine, which, even after protracted boiling, have very little action on the present substance. I find also that the combustible portion of this mineral contains a large amount of oxygen, whereas in ordinary bitumen there is comparatively a very small proportion of this elementary substance. The following statement contains the results of an elementary analysis of the combustible matter of the mineral, and also that of coal and of resin :—

	Mersey Mineral.	Resin.	Coal Lesmahago	Coal Boghead.
Carbon	61·62	72·0	80·45	81·16
Hydrogen	9·78	9·3	6·89	11·25
Oxygen and Nitrogen	28·60	18·7	12·66	7·59
	100	100	100	100

In conclusion, therefore, I have merely to repeat that this mineral consists of clay and sand, highly impregnated with a combustible substance analogous to resin, on the presence of which all its peculiar as well as useful properties entirely depend. The principal use to which it is capable of being applied is in the manufacture of gas for illumination. It is, however, very inferior in this respect to gas coal, both as regards the quantity and the quality of the gas it will give. Unless, indeed, it can be procured very cheaply and abundantly, I am clearly of opinion that it can scarcely be worked with advantage even for this purpose. In its natural state it cannot be used as fuel, in consequence of the considerable amount of clay it contains ; and hence it is not available for steam purposes. Its coke also for the same reason is perfectly worthless. The gas from it will require to be carefully and extensively purified, in order to remove the injurious products afforded by the sulphur existing in it; and the large amount of "oxygen" it contains will have the effect of making the gas very thin, or, in other words, of diminishing its illuminating powers. The only other application of it I can suggest is for the manufacture of oil, similar to the oil obtained from rosin and coal, called rosin oil and paraffin. These oils, now so extensively employed in this country in preparing grease for machinery and for railway carriages, are made by cautiously distilling rosin and coal at a heat below that at which they yield gas. I am not prepared to state whether it could be economically applied to this purpose, as it would be necessary to make an experiment on a large scale before a trustworthy opinion could be formed. It is, however, in my opinion well worth the trial in the country where this mineral is found. I would also recommend a diligent search for richer specimens of the mineral, and perhaps the resinous substance could be found in a state of greater purity.

(Signed) FREDERICK PENNY,
Professor of Chemistry.

TABLE showing the Proportions per Cent. of Volatile Matters, Fixed Carbon, Ash, Sulphur, and Water, of Various Cannel Coals, analyzed by Dr. PENNY, with the Quantities of Fixed Carbon and Ash in the Coke of each.

CANNEL or PARROT COALS.	COAL.						COKE.		
	Sp. Gr.	Volatile Matters.	Fixed Carbon.	Ash.	Sulphur.	Water.	Total Amount of Coke in Coal.	Carbon in Coke.	Ash in Coke.
		per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.
1. Rochsoles (1851)	1·448	53·7	4.9	37·4	1·6	1·	42·3	11·58	88·42
2. Hardie's 1852	1·420	34·	4.	58·4	*	3·5	62·4	6·44	93·56
3. Boghead, *Brown* (1851)	1·160	71·06	7.10	26·2	·24	·4	28·3	25·09	74·91
4. Boghead, *Black* (1851)	1·2185	62·7	9.25	26·5	·35	1·2	35·75	25·88	74·12
5. Torbanehill (1853)	1·1892	67·11	10.52	21·	·32	1·05	31·52	33·38	66·62
6. Boghead, (1849)	1·1550	71·3	11.3	16·8	(·34)·	·6	28·1	40·22	59·78
7. Bathville	1·201	64·35	12.6	22·2	·25	·60	34·80	36·21	63·79
8. Stan, (Ayrshire)	1·4647	52·08	14.77	32·	*	1·15	46·77	31·52	68·48
9. Methill	1·3002	49·23	17.57	29·7	*	3·50	47·27	37·17	62·83
10. Capeldrae	1·3603	45·73	19.97	31·5	*	2·80	51·47	38·80	61·20
11. Wemyss	1·1831	58·52	25.28	14·25	*	1·95	39·53	63·95	36·05
12. Balbardie (1852)	1·420	38·96	29.66	28·	·38	3·0	57·66	48·56	51·44
13. Hillhead (Kilmarnock)	{1·602 1.320}	36·65	32·34	27·4	·61	3·	59·74	54·14	45·86
14. Brymbo	*	32·10	36·4	29·4	*	2·1	65·80	55·32	44·68
15. Lesmahago (Auchinheath)	1·1990	56·23	36·7	4·3	·55	3·15	41·	89·50	10·50
16. Bartonshill	1·280	48·	39·6	10·	2·	2·4	49·6	79·84	20·16
17. Bartonshill	1·350	38·	37·9	18·7	2·2	3·2	56·6	66·96	33·04
18. Stevenson (Ayrshire)	1·3850	40·21	40·14	19·35	*	·3	59·49	67·64	32·36
19. Lesmahago (Southfield)	1·228	49·34	40·97	6·34	1·35	2·	47·31	86·60	13·40
20. Knightswood	1·234	44·77	41·13	11·05	*	3·05	52·18	78·83	21·17
21. Cairnbroe	1·247	42·83	42·67	8·50	*	6·	51·17	83·39	26·61
22. Skaterigg	1·252	49·32	44·83	2·50	*	3·35	47·33	94·42	5·58
23. Cowdenhill	1·299	46·0	45·	5·	·50	3·50	50·	90·	10·
24. Breadisholme	1·335	39·	48·5	8·1	·4	4·	56·6	85·69	14·31
25. Ruchill	1·223	45·73	49·27	2·5	*	2·5	51·77	95·17	4·83
26. Kelvinside	1·231	40.17	53·42	1·9	·21	4·3	55·32	96·57	3·43

* Not Estimated.

XIII.—*Report on the Geological Relations of some of the Coal-Seams of Van Diemen's Land,—their probable Extent,—and relative Economic Value; made to His Excellency Sir H. E. F. Young. By* ALFRED R. C. SELWYN, *Government Geologist, Victoria.*

THE Districts visited and partially examined were:—

1st. The Valley of the Derwent from Bridgewater to about seven miles above New Norfolk, including a few observations in the immediate vicinity of Hobart Town and New Town.

2nd. From Risdon Ferry over Grass-tree Hill to Richmond; thence to Spring Bay on the east coast by the Brushy and Prosser's Plains.

3rd. The immediate vicinity of Spring Bay and the Township of Triabunna, where various trials for coal have been made in the Township and on the estate of Captain Vicary.

4th. The country extending from Bicheno, Waubs Harbour, to Falmouth on the east coast, including the Douglas River and a small portion of the upper part of the Valley of the Apsley, near the Township of Llandaff.

5th. From Falmouth over St. Mary's Pass to Fingal, Avoca, and Cleveland, on the Hobart Town and Launceston Road.

6th. The Coal-works on the Rivers Don and Mersey executed by the Mersey Coal Company and others.

1.—THE VALLEY OF THE DERWENT.

On the north bank of the Derwent, seven miles above New Norfolk, a seam twenty to twenty-two inches thick of a

PLATE . I.

Fig I

VERTICAL SECTION shewing the succession of the beds in the Valley of the DERWENT

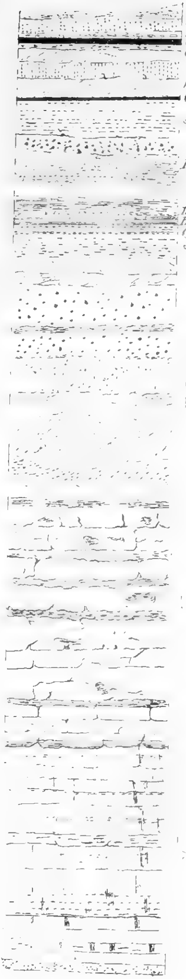


Fig II

SECTION from RISDON on the DERWENT over GRASSTREE HILL to RICHMOND

Length 12 miles

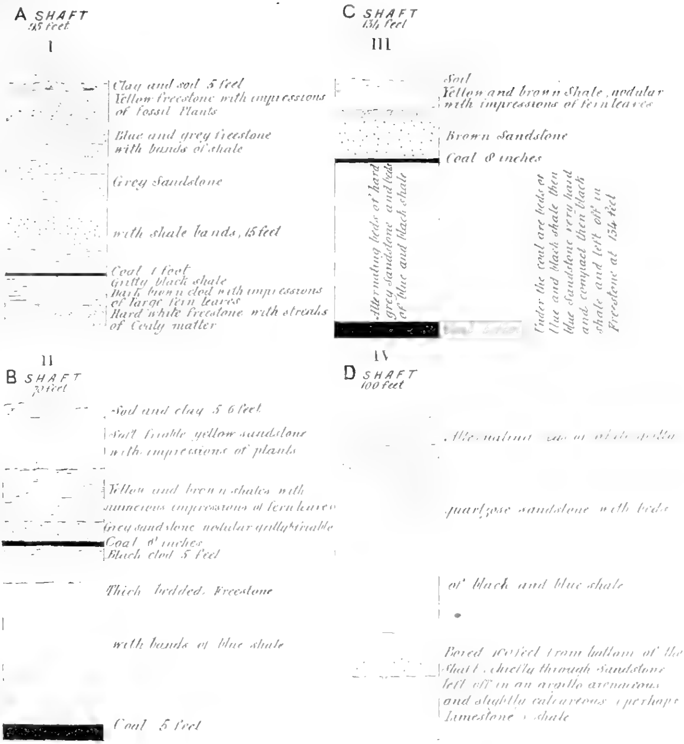
a a a Sandstone. b b Clay Stone Rock. c Probable Position of Fossiliferous Limestone. d d d Hard Black Basalt and Crystalline Greenstone. e e e Beds of Coal at Richmond, very poor slaty Anthracite.

Fig III.

SECTION from near the residence of S. Cruttenden Esq. PROSSERS PLAINS to the BACK RIVER

PLATE II

Scale 40 ft to 1 inch



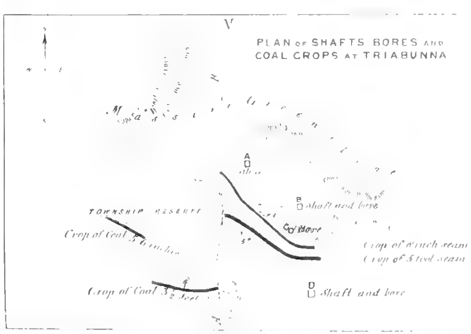
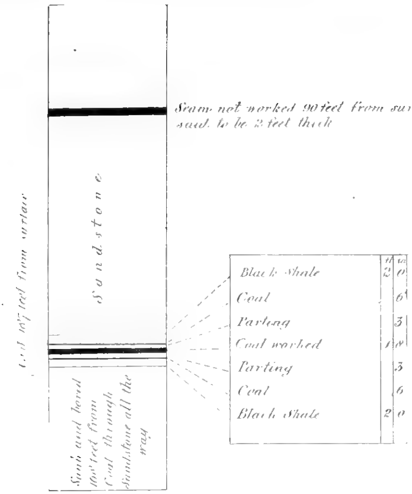


PLATE III

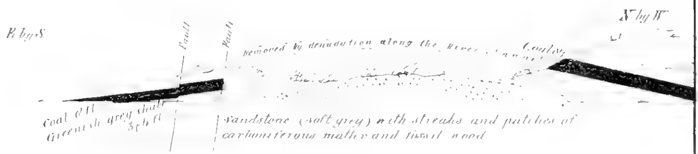
I



II

SECTION OF THICK COAL AS SEEN IN THE DOUGLAS RIVER

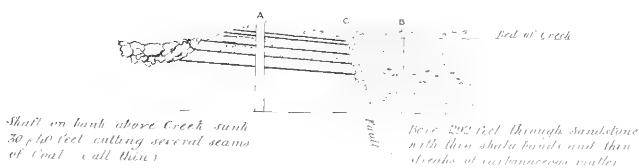
4 MILES FROM THE SEA



III

SECTION SEEN IN THE DENISON RIVULET

NEAR THE COMPANY'S OLD SHAFTS



Huxtable & Deakin Litho

PLATE IV

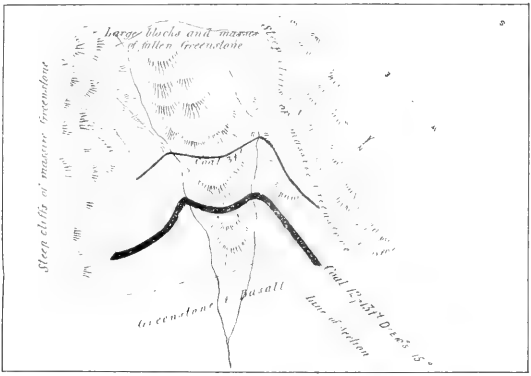
SECTION OF A HILL BETWEEN S^T MARY'S PASS AND FINGAL NEAR M^R GROOM'S

I

A *Greenstone*... B *Yellow Coal Measure Sandstone*... C *Clayey Conglomerate rock*
D *Limestone replete with fossil Corals Spiriferæ and other Shells*....
E *Coarse white quartz conglomerate the pebbles very rounded*.......
F *Older upheaved & contorted clay slates & sandstones with Quartz veins*..

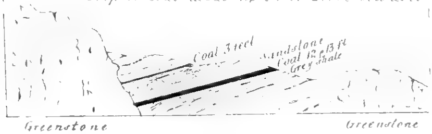
PLAN AND SECTION OF THE THICK COAL 2½ MILES S.E. OF FINGAL

II



III

Crop of Coal about 1400 feet above sea level



The Coals are seen only in the Creeks the rest of the ground being entirely covered up by fallen blocks of Greenstone.

[illegible] & Deakin Lith

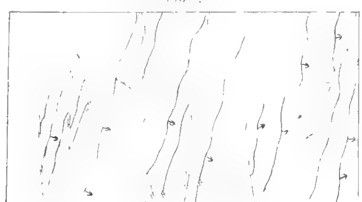
PLATE V

Fig 1

SECTION FROM RIVER DON TO WILLIAMS' SHAFT

DIAGRAM representing a faulted piece of Country such as that at the DON & MERSEY

Fig 2



Red lines Faults Black lines Strike of Beds
Limestone Shales & Conglomerate White Carboniferous

Harfield & Newton Lith

hard anthracite coal, of very poor quality and slaty structure, crops out. Immediately underlying it are thin beds of greyish-blue shale, with impressions of fern leaves, &c.; and resting on it is a band of hard, grey, nodular shale, which is again overlaid by thick bedded sandstones (yellow and brown soft freestone), enclosing numerous fragments of roots, stems, and branches of fossilized trees converted into silica or iron, but still presenting the most perfect woody structure.

About two hundred yards higher up the river a solid mass of greenstone presents itself, occupying both banks of the stream for some distance, and apparently completely cutting off the continuity of the coal-measure series in this direction.

I was unable to extend my observations above this point, but I believe that at Hamilton, some ten or twelve miles higher up the river, the coal again crops out in a seam upwards of eight feet* in thickness.

If of good quality and sufficient extent, a seam of this thickness would, I should think, well repay the outlay necessary for the construction of a tramway for transporting it to the shipping-place at New Norfolk,—a distance, I believe, of about eighteen miles.

What the dip and direction of this bed is, I was unable to ascertain. Should it be the same as the small 20-inch seam above described, viz. (W. 20° S.) 10°, and is not cut off by faults, or by greenstones or other igneous rocks, we might expect to find it much nearer New Norfolk in a south-easterly direction, and on the south side of the Derwent.

* The seam of coal cut through in the vicinity of Hamilton by Mr. Chilton, in the process of sinking a well in his farm-yard, was at a depth of 40 feet; the quality was highly bituminous, and the thickness 4 feet.—J. M.

These are questions, however, which can only be decided by a very minute and connected geological examination of the whole area.

In descending the valley of the Derwent from the first-mentioned thin seam of coal, after passing over the edges of the underlying sandstones for about three quarters of a mile, another thin seam of coal may be detected cropping in the bed of the stream. What the exact thickness of it is I could not ascertain, as where it crops it has been washed away, forming a pool in the river with an overhanging ledge of sandstone rock.

It did not appear to be more than a foot thick, and of similar quality to the one above.

This would be about fifty or sixty feet below the first seam, the beds between being nearly all sandstone.

A little lower down, where the river makes an elbow, and nearly opposite the junction of the Plenty with the Derwent, we again find the bed of the river, and both banks for a considerable distance occupied by a solid mass of hard, dark, augitic, columnar basalt: on the south bank it rises into cliffs some thirty or forty feet high, through which the road has been cut, exposing a good section of the igneous rocks in various forms, and thus again cutting off the continuity of the carboniferous series. From the above point for rather more than four miles down the Derwent to the confluence of the "Back River," there occur constant alternations of greenstone dykes and carboniferous strata, the latter preserving an almost uniform dip about W. 10 to 15 S. 5° to 8°.

This would, supposing the igneous rocks to have been erupted through the carboniferous beds without shifting them, and the succession to be regular, give a total thickness of carboniferous strata between the first-mentioned seam of coal and the Black River of nearly nineteen-hundred feet, consisting chiefly of sandstones, with a few beds of black and grey shales towards the upper part, but in which no seams of coal occur.

About four hundred yards below the junction of the "Back River" with the Derwent, and nearly opposite the Falls, a considerable fault shows itself in an almost perpendicular cliff on the south bank of the river, where what would appear to be the lowest sandstone of the carboniferous series is brought in contact with a set of beds composed of a very hard, white, compact, and regularly bedded claystone rock, with occasional thin beds or partings of dark blue and grey micaceous and arenaceous shales.

On the weathered faces of these beds numerous large cavities occur, which are often coated with efflorescences of sulphate of magnesia and alum in small crystals. In some places the beds are conglomerate, and contain pebbles of quartz, granite, quartz rock, and a very hard dark siliceous rock.

Up the "Back River," and in the hill opposite the Government Cottage at New Norfolk, where these beds are well exposed in bold, nearly vertical, cliffs, they are distinctly seen passing conformably under the carboniferous sandstone, the whole dipping about (W. 10° S.) 5° to 6°.

The total thickness of beds exposed in this hill cannot be much less than 700 feet, or about 400 feet of clay-rock and 300 feet of sandstone—the latter forming the capping of the hill, and being in all probability the same beds which a mile and a half higher up the river, at the Falls, are thrown against the former by the fault before mentioned.

In following the Hobart Town road from New Norfolk, the only sections exposed for about four miles consist of alternations of basalt, and recent river deposits of sand and gravel resting on the former.

We then come on a small section, 20 or 30 yards in length, where the clay-rock is exposed, the beds still dipping as at New Norfolk (W. 20° S.) about 5°; and, rising apparently conformably from underneath them, we find a series of limestones, shales, and calcareous sandstones, many of the beds being almost entirely composed of fossil shells and corals.

These beds have been worked along the road-side for a considerable distance, and burnt for lime.

In the quarries I found the following fossils, examined and named by Professor M'Coy of the Melbourne University.

PLANTÆ :—

Pecopteris, fragments of an undetermined species allied to P. odontopteroides.

BRYOZOA :—

Fenestella internata.
———— fossula.
Polyparia ampla.
Stenopera Tasmaniensis.

MOLLUSCA :—

Leminula biundata.
Productus brachythyrus.
Spirifer subradiata.
——— duodecimcostata.
——— vespertilio.
——— Darwinii.
Aviculo-Pecten Tasmaniensis.
Sanguinolites, doubtful sp.
Eurydesma cordata.
Plolyschisma (doubtful) fragments,

These fossiliferous beds extend to within about two miles of Bridgewater, exposing a thickness, I should think, of not less than 200 or 250 feet.

Towards the lower portion of the section the beds are more solid, hard, compact, and crystalline, and much less mixed with arenaceous matter: the organic contents are also somewhat different, numerous large univalves occurring which are not found in the upper beds, and corals being less abundant.

Where last seen these beds pass under thick masses of gravel and superficial detritus, and are nearly horizontal.

At Bridgewater we again come on the white claystone rock of New Norfolk, exposed in large quarries, which have been excavated to obtain material for the formation of the long embankment which here crosses the Derwent.

The beds dip (E. 10° S.)

From this point to Hobart Town, wherever the stratified rocks are exposed, they appear to consist of the soft sandstones and shales of the carboniferous series.

Thus, between New Norfolk and Bridgewater there appears to be an anticlinal axis, the lowest exposed beds of which consist of a series of sandy and calcareous strata, replete with fossils, and which, with the overlying clay-rock, together near eight hundred feet, forms, I believe, in this portion of the Derwent the base of the true Coal-measure series. If coal-beds exist lower, they must be underneath the lime-stones; and, therefore, any attempt to discover them should of course be made where the lowest beds of that series are exposed on the surface.

From all I have seen, however, I believe these fossiliferous limestone beds to constitute the base of the whole carboniferous series of Van Diemen's Land; and, therefore, any attempt to find Coal underneath will always prove fruitless.

The diagram, Pl. I. fig. 1, shows the probable sequence of beds as exposed in the valley of the Derwent, from seven miles above to the same distance below New Norfolk. In many parts the series is much broken by faults, probably often repeating the beds, and by intrusions of large masses of igneous rock, basalts and greenstones of different ages. On this account it is almost impossible to estimate correctly the thickness of the whole series of strata, from the first Coal, seven miles above New Norfolk, to the lowest exposed bed of limestone, the same distance below the above Township.

2.—RISDON TO RICHMOND AND PROSSER'S PLAINS.

From the mouth of the Valley of Risdon over Grass-tree Hill to within three miles and a half of Richmond the section exposed is precisely similar to that seen in the hill opposite New Norfolk. Thence to the Village of Richmond the strata occur as represented in the Diagram, Pl. I., fig. 2.

The three seams of Coal (*e e e*) are seen cropping in the south bank of the river, about three quarters of a mile below the village.

All three are anthracite, of poor quality and very slaty structure, dipping (W. 15° S.) 15°, and apparently cut off on all sides and within a few yards by eruptive greenstones.

A shaft now abandoned and full of water has been sunk about twenty yards from the margin of the river, in which the lowest and the thickest seam has been cut at a depth of about 35 feet.

On the crop in the river this seam is apparently 2 to 3 feet thick; but from the poor quality of the coal, the high angle at which the seams are dipping, and the fact above alluded to of their being cut off on all sides within a very short distance, none of these seams would, I imagine, be worked to advantage.

For more ample details of the geological features of this District than I am able to give, and its relation to the Coals found at Jerusalem, which I was unable to visit, I can hardly do better than draw attention to the able Report on these Districts by Dr. Joseph Milligan, published in the "Papers and Proceedings of the Royal Society of Van Diemen's Land," Vol. I. Part I.; May, 1849. At Prosser's Plains in the Back River, a branch of Prosser's River, and about five miles from the residence of T. Cruttenden, Esq., two seams of Coal occur, together about 4 feet thick, dipping (S. 15° W.) to (W. 20° S.) from 35° to 50°, and passing under a flat of about 2000 acres.

These Coals are bituminous, though not of first-rate quality; they ignite freely, and burn with a bright flame, but are of rather slaty structure, and contain a large percentage of earthy and incombustible matter. On three sides of the flat the carboniferous beds are cut off by high ridges of massive greenstone; but on the fourth side towards the plain, and in the direction of the dip, no eruptive rocks occur.

In this direction the above seams of Coal, and perhaps others, might be found at no great depth over a considerable area: the distance, eight or ten miles, from the nearest shipping-place in Prosser's Bay, and the great expense attendant on the construction of the necessary road, appears the chief difficulty in the way of their being worked to advantage. The greater part of the ground is, I believe, the property of the Crown.

The very high angle at which the seams are dipping where exposed in the Back River is probably only local; and they would most likely be found to flatten at a short distance on the dip, in conformity with the overlying sandstones to the S.W., as shown in Diagram, Pl. I, fig. 3.

From Prosser's Plains to the Bay, the road follows the course of the river through a narrow defile, crossing and recrossing the river several times in a few miles.

With the exception of one point about eight miles from Spring Bay, where the fossiliferous limestone crops out, the entire distance is occupied by massive crystalline green-stones, rising on either hand into high ridges and abrupt escarpments. This extends to the N.E. corner of Prosser's Bay, where we again come on the coarse, gritty, yellow, and white sandstones of the carboniferous series; and these extend uninterruptedly to the Township of Triabunna on the north-east side of Spring Bay.

3.—SPRING BAY AND THE TOWNSHIP OF TRIABUNNA.

The vertical sections, Pl. II., figs. 1, 2, 3, 4, are drawn from data furnished by Mr. Vicary.

The works are all abandoned for the present, and the shafts full of water. I was, therefore, unable to examine any of them.

As I had no map of the locality, the plan is merely a sketch of the surface, in which I have attempted to show the position of the different workings, and the general relation of the beds as seen on the surface.

The shaft marked D was the first work executed, and was sunk with the intention of cutting the $3\frac{1}{2}$-foot seam of coal, which is seen cropping below high-water mark on the west bank of the estuary, and which but for the existence of the fault A B, of which the parties do not seem to have been aware, would have been successful. Owing to this circumstance, however, they sank and bored two-hundred feet in beds immediately underneath the crop of the coal, and which are exposed to view on the surface to the south along the shores of the estuary,—thus wasting both time and money.

In the several bores and shafts A B C D, a thickness of nearly four-hundred feet of coal-measures has been proved, in which only one seam of coal of a workable thickness exists.

This seam could however, I think, be worked over an area of at least 300 acres: this, taking the seam at 3 feet, and the cubic foot of coal at 56 lbs., would give something like 900,000 tons of Coal. The seam is said to be 5 feet, but it has never been cut except with boring rods at B and C on the plan.

The largest workable area would probably be on the west bank of the estuary, where no works have hitherto been executed, the land being a Government Township Reserve.

In the area above described no shaft would, I think, require to be carried more than 200 feet in order to obtain Coal. I was unable to obtain specimens from which the quality of the Coal could be judged; but Captain Vicary states that it is an excellent bituminous Coal, ignites freely, and burns with a bright flame. Such being the case, and considering the proximity to the shipping-place, some additional outlay in this locality would, I think, be desirable, and would, if properly expended, in all probability result in the discovery of a workable Coal-field.

4.—THE DOUGLAS RIVER.

From the Schouten Island to about three miles north of the Douglas River Company's Jetty at Waub's Harbour, the coast-line is entirely occupied by granite; thence for about six miles along the coast to near Long Point we find the sandstones of the Coal-measure series exposed at intervals, occasionally rising into low cliffs, or forming low shelving plateaus below high-water mark, backed by steep hillocks of blown sand.

At Long Point granite, with vertical clay slates and sandstones resting against it, is exposed; and thence to St. Patrick's Head and Falmouth, with only one exception, about two miles south of Piccaninni Point, where a very coarse granitic conglomerate, probably the base of the carboniferous series, is exposed on the back, dipping south 5°.

Granite and clay-slate are the only rocks seen in place; the before-mentioned six miles of coast occupied by carboniferous strata varies in width from one to four miles, at which distance inland the country rises into massive greenstone ridges against the steep escarpments, and in the hollows of which the carboniferous beds have in all probability been deposited.

One is irresistibly led to this conclusion from the apparently undisturbed and unaltered condition of the latter, even where they are in closest proximity to the igneous mass. At the southern extremity of the above tract of country are situated the Douglas River Coal Company's works.

The land occupied by the Company extends over about 2100 acres, bounded on the north by the Denison Rivulet.

Over nearly the whole of this area workable seams of Coal will, I think, be found to exist. Numerous shafts and boreholes have been sunk, and in most of them Dr. Milligan states that seams of Coal have been cut. All the shafts were at the period of my visit full of water; I was therefore unable to inspect the seams, nor could I at the time obtain the measurements of the different strata penetrated in the shafts and bores.

The vertical section, Pl. III., fig. 1, is a section of the seam for the purpose of working which the Company are now erecting a 20-horse-power engine.

The central or 20-inch portion of the seam is the only part available for a supply of fuel. This, supposing it to extend only over an area of one square mile, or 640 acres, would at a moderate computation yield about 800,000 tons of Coal; and there is little doubt that this seam, and probably others, exist over a much larger area between the present works and Allen's Point, half a mile south of the Douglas River.

In ascending the Douglas River, after passing over a series of soft grey and brown sandstones, dipping from (E. 20° S.) to (S. E.) 5° to 10°, for about four miles, we come on the crop of a magnificent seam of Coal eight feet thick, with only one six-inch parting, and apparently of first-rate quality; it dips (E. 30° S.) 6°. Now, as in ascending the river from its mouth there appears no evidence of the existence of any great fault or dislocation, but a regular succession from higher into lower beds, the above seam would, in all probability, be found to extend underneath nearly the whole of the flat country from four miles south to at least two miles north of the Douglas, including the land occupied by the Douglas River Coal Company. In the vicinity of Allen's Farm, or about 2½ miles in a south-easterly direction from the crop, supposing the seam continues to dip at the same angle—viz. 6°, or 1 in 9—we might expect to find it at a depth of 1400 feet: apparently, however, the beds flatten considerably in this direction, and at the mouth of the river they are nearly horizontal. This would, of course, throw the coal much nearer the surface.

Prior to any deep sinking being undertaken near the coast, a boring might be made higher up the river, and within half or three quarters of a mile of the crop, which, if carried from 300 to 400 feet, would prove the continuance or otherwise of the seam in the direction of the dip.

That it is permanent over a considerable area, is evidenced by the fact that about half a mile above the first crop, after passing over a small anticlinal axis, we again come on the Coal in its original thickness dipping up the stream, or nearly north, at an angle of 7°, the intermediate portion of the arch having been denuded with the Coal along the river channel. *Vide* Pl. III., fig. 2.

This seam would, taking the cubic foot at 56 lbs., and not allowing for loss in working, yield about 5,200,000 tons per square mile.

On either bank of the stream the beds are overlaid by large masses of greenstone, which have fallen or been transported from the surrounding high peaks and ridges: this greenstone drift at several points along the course of the river has been cut through to a depth of 30 or 40 feet, and I have no doubt it often attains even a much greater thickness.

It is universally distributed along the flanks of all the higher ranges, extending from the solid greenstone which usually forms their summits nearly to the sea level, and thus almost invariably concealing the actual junction of the latter with the beds of the carboniferous series, which are seldom exposed on the surface except in the river channels, where the overlying drift has been cut through, or on the sea-beach.

Besides the seams already noticed, several other smaller ones occur, associated with beds probably above those sunk through in the Company's works.

The crop of one, if not two, of these is partly exposed in a cutting on the tramway about three quarters of a mile south from the "New Coal Shafts," marked in the accompanying plan.

Again, at three points in the banks of the Denison Rivulet seams of Coal are seen cropping.

The first is situated on a line bearing N. 15° W. from the "Old Coal Shafts," and about 450 yards distant.

The others are about two miles higher up the Rivulet, where all the beds are again overlaid as in the Douglas, by enormous masses of fallen greenstone.

At the first-mentioned point the section Pl. III, fig. 3, is seen.

In the shaft A, commenced on the bank about 35 feet above the level of the Creek, five or six seams of Coal were cut in something less than 50 feet.

Two of these are seen partly exposed in the river bank below the shaft: they dip at a low angle in the direction from A to B, or down the Creek; and at the latter point about 300 yards distant from A, a bore-hole B was commenced for the purpose of further proving these seams. It was, however, carried 290 feet without cutting a single seam, and passed the entire depth through brown and grey sandstone rock.

On examining the strata exposed in the bed of the Creek from A to B, the cause of this is apparent; the vertical strata seen at C indicating the existence and position of an extensive dislocation of the beds.

Whether the sandstones passed through in the bore-hole B are above or below the Coal-seams at A, there is not here sufficient evidence to determine; nor is at all certain what position they occupy relatively to the two seams which have been cut in the "Old Coal Shafts" on the south side of the Creek.

Much more ample details of the general geological features of this district, including the valleys of the Apsley and South Esk, than I am able to furnish, are given in Dr. Milligan's "Report on the Coals of Fingal and the East Coast," published in the Transactions of the Royal Society of Van Diemen's Land, Vol. I., Part I.

As I only paid a very hasty visit, and to a limited portion of the valley of the Apsley, I can merely state that all the evidence I saw led me to form a very favourable opinion as regards the existence in it of workable seams of Coal.

The general dip of the carboniferous strata where seen near the Township of Llandaff is in the same direction as at the Douglas River Coal Company's works—viz., E. 10° S.; and they would be nearly on the same geological horizon as the sandstones which are there found overlaying the Coal-seams.

They are, however, not continuous as between the two points; and about one mile from the coast there runs a low ridge forming the watershed between the Denison Rivulet and other Creeks running to the eastward, and the Apsley, which runs south to Moulting Bay.

To the southward and eastward towards the Township of Bicheno this ridge is composed of granite, and to the northward entirely of greenstone,—thus completely separating the carboniferous strata of the Douglas and the Apsley.

About one mile westward from the Township of Bicheno, at the junction of the granite with the greenstone, a low gap occurs in the ridge through which the road from the Apsley to the east coast now passes, and which would afford an easy line for the construction of a tramway for the conveyance to the shipping at Waubs Harbour of any Coals which may eventually be discovered in the valley of the Apsley.

That such do exist has already been shown by Dr. Milligan in the Report before referred to; and it now remains to prove their thickness and extent, which can only be accomplished by a series of borings,—the sites for which should be selected after a careful examination of the surface, and not merely at random, as is too much the fashion in undertakings of a like nature, thereby often causing a useless expenditure of both capital and labour.

For the present wants of the Colony, however, I should say that the Douglas River District possesses in several respects advantages and facilities for the production of Coal not to be found combined in any other District I have visited in Van Diemen's Land: these are—proximity to the point of shipment,—absence of large masses of intrusive igneous rock in the area to be worked,—and thickness, extent, and number of workable seams.

Supposing, however, only two workable seams to exist,—one 8 feet, and one 1 foot 8 inches,—they would together, after deducting one-fourth for loss in various ways, yield upwards of 5,160,000 ton per square mile.

The great depth (1500 or 1600 feet) at which over some portion of the area the 8-foot seam would, in all probability, have to be worked need not be regarded as an insurmountable obstacle in the way of its being profitably worked.

5.—FALMOUTH TO FINGAL, AVOCA, AND CLEVELAND.

From Falmouth to the top of St. Mary's Pass the formation consists entirely of granite: descending towards the Break-o'-day Valley at an elevation of about 1000 feet, vertical clay-slates first make their appearance; and resting on these are beds of a very coarse quartz conglomerate, principally composed of rounded pebbles of white quartz. These beds would appear here to form the base of the carboniferous series, and are probably part of the same series as are found cropping on the east coast south of Piccaninni Point.

In a high, flat-topped hill south of St. Mary's Pass the section Pl. IV., fig. 1, presents itself.

Lower down the Break-o'-day Valley, nearly opposite the residence of F. L. Steiglitz, Esq., and at other points, the limestone (D) crops out in the bottom of the valley. In the flanks of the hills on either side, and along the valley of the South Esk, at elevations of from 400 to 500 feet above the level of the valley, several seams of Coal are found cropping.

They occur on the Mount Nicholas range, on the estate of F. L. Steiglitz, Esq., and close to the Township of Fingal. These latter were the only seams I had an opportunity of examining in this neighbourhood.

They are situated about 2½ miles S. 10° E. from the Township, upward of 500 feet above the level of the South Esk, and about 1500 feet above the level of the sea. The seams, two in number, respectively 14 feet and 3 feet thick, are exposed in the upper part of two branches of a small creek which run at this point about 100 yards apart down the steep slope of a hill, cutting through the greenstone debris with which the face of the hill is thickly covered.

The seams are dipping about 10° to 15° into the hill, or from E. 10° S. to about 10° N. Between the uppermost or 3-feet seam, and the thick seam below there are about 100 feet of soft grayish and brown sandstone, and some thick beds of shale. Except in the channels of the two creeks for a few yards, the Coal is no where visible on the surface.

It appears to be of good quality, though of rather slaty structure, and, like most of the Coals in Van Diemen's

Land, contains a very large per-centage of incombustible matter.

On all sides the beds are surrounded and appear to be overlaid or cut off by massive greenstone, as represented in the plan and section, Pl. IV., figs. 2 and 3. What the actual geological relations of the greenstone and the carboniferus beds are, is very difficult to determine; that the latter do not pass conformably underneath them is, I think, certain; and it, therefore, remains to decide whether they are completely cut off and isolated by the greenstone, as represented in the plan and section, Pl. IV., fig. 2,—or whether the latter have been forced to the surface through numerous and distant vents and fissures, and quietly overflowed the already upheaved and denuded edges of the carboniferous beds.

In either of these cases similar appearances would be found on the surface; but a very wide difference would exist as regards the economic value of the several seams of Coal.

From the dip and direction of the Fingal seams, I have little doubt that they are portions of the same, and were once continuous with those which occur on the north side of the Break-o'-day Valley in the flanks of the Mount Nicholas Range,—the intermediate portions being entirely swept away during the formation of the valley of the South Esk and Break-o'-day, and thus exposing the lower beds consisting of clay-rock and fossiliferous limestones which, as before stated, are found cropping at several points from a few miles below Fingal to the entrance of St. Mary's Pass. From Fingal to Avoca and Cleveland on the Hobart Town and Launceston road, the carboniferous beds do not again make their appearance; and the hills which arise from the valley on either side are chiefly composed of the older upheaved and contorted clay-slates and sandstones: wherever these do not come to the surface, the bottom of the valley seems exclusively occupied by hard dark augitic basalt, often becoming scoriaceous and vesicular.

These basalts are evidently of more recent date than the crystalline greenstones associated with the carboniferous beds. In lithological character they precisely resemble the basalts and lavas which form many of the extensive plains of Victoria. Here also, as there, they form a fine rich agricultural country, openly timbered, rather flat, and covered with a stiff black soil, and I have little doubt are of the same geological age, viz., tertiary or post-tertiary: they have, as in many similar instances in Victoria, evidently flowed in a molten state through the present valley.

I had no opportunity of visiting the diggings near Fingal, but was much struck when passing over the country occupied by the old clay-slates and sandstones with their resemblance to the auriferous rocks of Victoria, and the promising aspect of the very numerous quartz veins which every where traverse them in all directions; and I have little doubt that gold will eventually be found along many portions of the South Esk Valley.

6.—THE COAL-WORKS ON THE MERSEY AND DON.

The principal works which have been executed in searching for Coal in the above Districts are those of the Mersey Coal Company, of Mr. Williams, and of Messrs. Dean and Denny.

The Mersey Coal Company have expended upwards of £14,000; and the works executed are, one shaft between 250 and 300 feet, and numerous bore-holes.

Up to the period of my visit they had not succeeded in discovering any Coal: since then I have learnt they have cut a seam of Coal in a bore-hole which was then being executed. This bore is situated at the extreme N.W. corner of the Company's property, and about 50 or 60 yards from the East bank of the River Don.

With the exception of, perhaps, over one or two acres in this corner, I do not believe any Coal will be found on the lands occupied by the Company.

In the shaft before mentioned the work was, fortunately for the pockets of the Company, stopped by an enormous influx of water, which the engine could not keep under.

At the period of my visit they proposed erecting another and more powerful engine: this I strongly persuaded them against, as, on examining the debris of the rocks that had been raised from the shaft, I found them to consist of the fossiliferous limestone shales, which in Van Diemen's Land as in New South Wales form the base of the carboniferous system, and under which no Coal is likely to be discovered.

About two to three miles nearly south of the above shaft a bore-hole was being executed by the Company: it had reached a depth of 102 feet, passing the whole distance through grey arenaceous shales.

This I also recommended them to abandon, as it was almost directly on the strike of, and therefore in, the same beds passed through in the shaft.

The whole of the Company's land with the exception above mentioned is, I believe, occupied by these fossiliferous beds, with a few isolated and very thin patches of carboniferous strata resting on them.

Mr. Williams' works are situated near the south-west corner of the Township of Tarleton, and consist of one shaft 270 feet deep.

In this shaft the beds passed through were,—

Blue argillaceous marl or shales with numerous fossil shells, Producti, Spiriferæ, &c..........	70 feet.
Hard grey sandstone and conglomerate rock, fossil shells very scarce..........................	200 feet.
Total..........................	270 feet.

Here again we have a shaft 270 feet deep sunk entirely through beds beneath the carboniferous series, and in which, of course, no Coal was discovered,—nor, as I told Mr. Williams, would he have the smallest chance of finding Coal were he to sink another thousand yards: he, however, is firmly persuaded to the contrary, and intends, if he can raise funds, and find men to undertake the work of sinking through a quartz conglomerate nearly as hard as cast-iron, to carry the shaft deeper.

About one mile north-west from this shaft Mr. Williams has discovered a seam of Coal cropping in a small water-course; it is about 2 feet thick, and dips (S. 23° E.) 3°.

He had only just commenced opening into it at the period of my visit. I have been informed since that, following it up the hill, or on the rise, it was found to be suddenly cut off and completely thrown out by a fault: in the opposite direction or on the dip it is evidently cut off between the place opened and the deep shaft towards which it dips,—so that there would be only a narrow strip of coal measures let down by faults between the lower fossiliferous beds. See Section Pl. V. fig. 1.

Notwithstanding this, unless the two above-mentioned faults are within a very short distance of each other, run together at an acute angle, and are also crossed at a short distance in the opposite direction by another fault, thus forming a small triangular patch, I think Mr. Williams will be able to raise a considerable quantity of excellent

Coal at a very small expense,—it being very near the surface. On the River Don the Coal is seen cropping in two places, and here Messrs. Dean and Denny's works are situated; the seam is from 2 feet 2 inches to 2 feet 4 inches thick, and the Coal in quality is by far the best I have seen in Van Diemen's Land, the per-centage of incombustible matter being 22 per cent. less than any other. Three shafts have been sunk on this seam; the first was sunk within a few yards of where the seam is seen cropping in the river, and in close proximity to a large fault which completely cuts it off.

In this shaft the Coal was soon, as miners term it, "run out," and the shaft abandoned; another shaft was then sunk about 30 or 40 yards distant from the first, directly on the strike of the seam, and was carried 80 ? feet through fossiliferous grey shales without meeting with any indication of Coal, thus proving the existence between the two shafts of the fault above-mentioned.

The other two shafts are both on the strike of the seam, close to the banks of the river, and about a quarter of a mile apart.

The one sunk some time since when the Coal was first discovered I could not examine, it being full of water: the Coal was cut in it about 20 feet from the surface, and some six or eight tons raised, which now lies on the bank.

The other shaft, which had just been completed at the period of my visit, I examined, and obtained the following section:—

	Feet.	*Inches.*
Mould	3	6
Yellow Clay	2	6
Grey Sandstone	1	6
Blue Bind or Shale	2	5

	Feet.	Inches.	
Coal	0	6	
Blue Fire Clay	0	8	
Clod	4	4	
White Sandstone	0	4	
Coal	2	3	Dip (E. 20°N.) 10°
Total	18	0	

The Mersey Coal Company's bore-hole before mentioned in which they had cut a seam of Coal is situated about 80 or 90 yards north-easterly from the above shaft, and the seam cut is the same as the one in Messrs. Dean and Denny's shaft on the opposite bank of the river: the rise of the ground, the distance, and dip of the seam will hardly explain without another fault the greater depth (134 feet) at which the Coal was cut in the bore-hole. Should a shaft be sunk on the site of this bore, I believe that to the eastward or towards the Company's land the Coal will be found to be again cut off by a fault; as in ascending the hill in the above direction we come on beds of yellow gritty and argillaceous shales full of corals and other fossils of the limestone series. See Section Pl. V., fig. 1. The Coal discovered by Mr. Williams is, I believe, a portion of the same seam.

Wherever this seam has been cut it is of excellent quality; but the very small area over which it appears to extend on the River Don (from 50 to 80 acres) renders it very doubtful whether the large outlay would be repaid which is necessary for the construction of four miles of tramway, the erection of an engine, and other expenses (not much less than £14,000), before the Coals could be shipped.

Taking the area at 70 acres it would give a yield of

105,000 tons of Coal, deducting $\frac{1}{4}$ for loss in various ways. This, taking the value to the producer at ten shillings per ton, would give £52,500 as the nett proceeds of the undertaking.

Such being the case, I should advise that before any great outlay be incurred a series of bores should be executed accurately to prove the workable area of the 2 feet 4 inch seam; and also a bore from the bottom of the present shaft to prove the existence, or otherwise, of other seams underneath the one already discovered.

From the very faulted character of the country on the Don and Mersey, I do not think that a Coal-field of any great extent will ever be discovered: there are, however, a number of narrow bands and patches of various sizes of the Coal-measure series, which have been preserved from denudation with the Coal-seams they contain by being dropped down between lower beds by faults crossing each other in all directions. I have attempted to show this in Section and Diagram Pl. V.

What the thickness or number of seams below the 2 feet 4 inch seam in these narrow bands and patches may be has as yet never been proved, owing to all the deep sinkings and bore-holes having been executed at random, and always unfortunately in the underlying fossiliferous strata.

This, of course, is a very important question to decide, and one which must be determined before the workable value of the Mersey and Don Coal-fields can be accurately estimated. Less than half the money which has already been uselessly expended had the works been executed under proper superintendence, and with due regard to the geological features of the country, would have been amply sufficient to decide both the extent of the several bands and patches of the carboniferous strata, and the number and thickness of the Coal-seams contained in them.

The following information I have recently received from Mr. Dean of the River Mersey:—

"The Mersey Coal Company have commenced boring on my land about 400 yards from the house: they bored 30 feet, and came into a quicksand, which ran in very fast and gave the miners much trouble; they then wished to prove that you were in error; and made an offer to the Company that if they would find them in rations, without wages, they would get the Coal for the Company at the shaft* where the water runs over the top: the men were allowed to leave my land, and are now boring close to the shaft, but have not yet got the Coal."

This, of course, is a most absurd waste of labour, unless some very large faults exist, of which I could see no evidence, close to the shaft in question.

Mr. Dean adds:—

"Mr. Williams is hard at work stripping the Coal, and will have a large quantity to ship in the spring. Mr. Johnston has found the Coal cropping $2\frac{1}{2}$ miles south east from Mr. Williams on crown land; it appears to be the same seam, about 2 feet 2 inches thick, and butts against the yellow Coal."

(This yellow Coal is the Dysodile, or combustible schist, which has been known to exist for some time on the Mersey: the same kind of schist is found near Syracuse, in Sicily.)

"The Mersey Company are now boring close to the Don,

* This shaft is the one before mentioned by me as having been abandoned owing to the great influx of water.

exactly opposite our shaft, trying for a second seam, and have sunk 110 feet through soft sand stone and dark "clod" or argillaceous schale." This bore is about 50 to 80 yards from the one before mentioned in which the Company had cut the Coal at 134 feet, and about the same distance nearer the river, in fact close on the bank,—the Coal on the opposite bank being only 18 feet deep.

Thus a considerable fault must exist, if the information I have received be correct, along the bed of the Don at this point. See Section Pl. V., fig. 1.

I much regret not having received a map of the surveyed and purchased lands on the Don and Mersey,—which I have twice applied for at the Survey Office, Hobart Town,—as I could then have pointed out very nearly the relative position of the different shafts and bores, as well as the ground over which Coal is most likely to be found.

From a few rough experiments on specimens from the various Coal-seams, I have obtained results which places them in the following order as regards quality :—

1. Mersey.
2. Douglas River, 8-feet seam.
3. Douglas River, 20-inch seam.
4. Fingal.
5. Prosser's Plains.

XIV.—*List of the Birds of Tasmania. By* the Rev. T. J. Ewing, of New Town.

RAPTORES.

1 Fam. Falconidæ.

1. *Aquila*, Mœhring. *audax*, Latham. *A. fucosa*, Gould. Wedge-tailed eagle. Eagle-hawk of the Colony.

2. *Pontætus*, Kaup. *leucogaster*, Latham. *Ichthyætus leucogaster*, Gould. White-bellied sea-eagle

3. *Pandion*, Savigny. *P. leucocephalus*, Gould. White-headed Osprey. Fish-hawk of the Colony.

4. *Falco*, Linnæus. *F. melanogenys*, Gould. Black-cheeked falcon. Blue hawk of New South Wales.

5. *Hypotriorchis*, Boie. *frontatus*, Gould. *Falco frontatus*, Gould. White-fronted falcon. Little falcon of the Colony.

6. *Ieracidea*, Gould. *berigora*, Vigors and Horsf. „ *berigora*, Gould. Brown hawk.

7. *Astur*, Lacepede. *albus*, Shaw. „ *Novæ Hollandiæ*, Gould. White goshawk. White hawk of the Colony.

8. *Accipiter*, Brisson. *approximans*, Vigors and Horsf. *Astur approximans*, Gould. Australian goshawk.

9. *Accipiter*, Brisson. *torquatus*, Cuvier. „ *torquatus*, Gould. Collared sparrow-hawk. Sparrow-hawk of the Colony.

10. *Circus*, Lacepede. *assimilis*, Jardine and Selby. „ *assimilis*, Gould. Allied Harrier. Swamp hawk of the Colony.

2. Fam. STRIGIDÆ.

11. *Strix,* Linnæus. *castanops,* Gould.
 ,, *castanops,* Gould. Chesnut-faced owl.

12. ,, Linnæus. *S. delicatulus,* Gould.
 Delicate owl.

13. *Athene,* Boie, *boobook,* Lath. *A. boobook,* Gould.
 Boobook, or brown owl of the Colony.

14. ,, *maculata,* Vigors and Horsf.
 ,, *maculata,* Gould. Spotted owl.

INSESSORES.

FISSIROSTRES. 3 Fam. CAPRIMULGIDÆ.

15. *Œgotheles,* Vig. and Horsf. *Novæ Hollandiæ,* Latham.
 ,, *Novæ Hollandiæ,* Gould. Owlet night jar.

16. *Podargus,* Cuvier. *cinereus,* Vieillot.
 ,, *Cuvieri,* Gould. More-pork of the Colony.

4 Fam. HIRUNDINIDÆ.

17. *Acanthylis,* Boie, *caudacuta,* Latham.
 ,, *caudacuta,* Gould. Australian spine-tailed swallow.

18. *Hirundo,* Linnæus. *H. neoxena,* Gould.
 Welcome swallow.

19. ,, ,, *nigricans,* Vieillot.
 Chelidon arborea, Gould. Free-martin.

5 Fam. ALCEDINIDÆ.

20. *Alcyone,* Swainson, *azurea,* Latham.
 ,, *Diemenensis,* Gould. King-fisher of Tasmania.

TENUIROSTRES. 6 Fam. MELIPHAGIDÆ.

21. *Meliphaga,* Lewin. *Novæ Hollandiæ.* Vig. and Horsf.
 ,, ,, *Novæ Hollandiæ,* Gould.
 New Holland honey-eater.

22\. *Meliphaga,* Lewin. *Australasiana,* Shaw.
,, *Australasiana,* Gould. Tasmanian honey-eater.

23\. *Glyciphila,* Sw. *melanops,* Lath. G. *fulvifrons,* Gould. Fulvous fronted honey-eater.

24\. *Ptilotis,* Sw. *P. flavigula,* Gould.
Yellow-throated honey-eater.

25\. *Anthochæra,* Vigors and Horsf, *inauris,* Gould.
,, *inauris,* Gould. Wattled honey-eater.
Wattle-bird of Tasmania.

26\. *Anthochæra,* Vigors and Horsf. *mellivora,* Latham.
,, *mellivora,* Gould. Brush wattle-bird.

27\. *Acanthorhynchus dubius,* Gould.
Slender-billed Spine-bill.

28\. *Melithreptus,* Vieillot. *agilis,* Latham.
,, *melanocephalus,* Gould.
Black-headed honey-eater.

29\. *Melithreptus,* Vieillot. *virescens,* Wagler.
,, *validirostris,* Gould. Strong-billed honey-eater.

30\. *Myzanthe,* Vigors and Horsf. *garrula,* Latham.
,, *garrula,* Gould. Garrulous honey-eater.
Miner of Tasmania.

DENTIROSTRES. 7 Fam. LUSCINIDÆ.

31\. *Malurus,* Vieillot, *M. longicaudus,* Gould.
Blue-headed wren of Tasmania.

32\. *Stipiturus,* Lesson. *malachurus,* Latham.
,, *malachurus,* Gould. Emu wren of Tasmania.

33\. *Sphenæacus gramineus,* Gould. Grass-loving Sphenæacus.

34\. *Calamanthus,* Gould. *fuliginosus,* Vigors and Horsf.
,, *fuliginosus,* Gould. Striated reed-lark.

35\. *Anthus,* Bechstein, *Australis,* Vigors and Horsf.
,, *Australis,* Gould. Australian pipit.

36\. *Sericornis humilis,* Gould.
Sombre coloured sericornis.

37\. *Acanthiza,* Vigors and Horsf. *A. Diemenensis,* Gould.
Tasmanian Acanthiza. Brown-tail of the Colony.

38\. ,, ,, *A. Ewingii,* Gould.
Ewing's Acanthiza.

39\. ,, ,, *chrysorrhœa,* Qu. & Gai.
chrysorrhœa, Gould. Yellow-tailed Acanthiza. Yellow-tail of the Colony.

40\. *Zosterops,* Vigors and Horsf. *lateralis,* Latham.
,, *dorsalis,* Gould. Grey-backed Zosterops. White-eye of the Colony.

41\. *Epthianura,* Gould. *albifrons,* Jardine and Selby.
,, *albifrons,* Gould. White-fronted Epthianura.

42\. *Petroica,* Swainson. *rhodinogaster,* Drapier.
Erythrodryas rhodinogaster, Gould.
Pink-breasted wood-robin.

43\. ,, ,, *multicolor,* Gmelin.
multicolor, Gould. Scarlet-breasted robin.

44\. ,, ,, *phœnicea,* Gould.
Flame-breasted robin.

45\. ,, ,, *fusca,* Gould.
Dusky robin.

INSESSORES.

Dentirostres. 8 Fam. Muscicapidæ.

46\. *Myiagra,* Vigors and Horsf. *M. nitida,* Gould.
Shining-flycatcher. "Satin sparrow" of Tasmania.

47\. *Rhipidura,* Vig. and Horsf. *R. albiscapa,* Gould.
White-shafted fantail.

9 Fam. TURDIDÆ.

48. *Oreocincla lunulata,* Gould, Mountain thrush.

49. *Cinclosoma punctatum,* Vig. & Horsf.
„ „ Gould. Spotted ground thrush.

11 Fam. LANIIDÆ.

50. *Colluricincla,* Vig. & Horsf. *rectirostris,* Jard. & Selby.
„ *Selbii,* Gould. Whistling Dick of the Colonists.

51. *Cracticus,* Vieillot. *C. cinereus,* Gould.

CONIROSTRES. 12 Fam. CORVIDÆ.

52. *Gymnorhina,* G. R. Gray. *C. organicum,* Gould.
Tasmanian crow-shrike.

53. *Strepera,* Lesson, *S. arguta,* Gould.
Hill crow-shrike.

54. „ „ *fuliginosa,* Gould.
Black magpie of the Colony.

55. *Corvus,* Linnæus, *Australis,* Latham.
„ *coronoides,* Gould. White-eyed crow.

13 Fam. FRINGILLIDÆ.

56. *Estrelda,* Swainson, *bella,* Latham.
„ *bella,* Gould. Fire-tail finch. "Fire-tail" of Tasmania.

DENTIROSTRES. 10 Fam. AMPELIDÆ.

57. *Graucalus,* Vig. & Horsf. *melanops,* Latham.
„ *parvirostris,* Gould. "Blue Pigeon" of the Colony.

58. *Pachycephala,* Swainson. *olivacea,* Vig. & Horsf.
„ *olivacea,* Gould.
Olivaceous thick-head.

59. „ „ *glaucura,* Gould.
Grey-tailed thick-head.

60. *Pardalotus*, Vieillot *P. affinis*, Gould.
Allied Pardalote.

61. ,, ,, *punctatus*, Latham.
,, ,, *punctatus*, Gould. Spotted Pardalote. " Diamond Bird" of Colonists.

62. ,, ,, *quadragintus*, Gould.
" Forty-Spot" of Tasmania.

63. *Artamus*, Vieillot, *sordidus*, Latham.
,, *sordidus*, Gould. Wood swallow.

SCANSORES. 14 FAM. PSITTACIDÆ.

64. *Cacatua*, Brisson, *galerita*, Latham.
,, *galerita*, Gould. Crested cockatoo. White cockatoo of Tasmania.

65. *Callocephalon*, Lesson. *galeatum*, Latham.
,, *galeatum*, Gould. Gray cockatoo.

66. *Calyptorhynchus*, Vigors. *C. xanthonotus*, Gould.
Black cockatoo.

67. *Platycercus*, Vig. & Horsf. *eximius*, Shaw.
,, *eximius*, Gould. Ross-hill parrakeet.

68. ,, ,, *caledonicus*, Gmelin.
,, *flaviventris*, Gould. Yellow-bellied parrakeet.

69. *Eupheme*, Wagler. *chrysostome*, Kuhl.
,, *chrysostome*, Gould. Blue-banded Grass parrakeet.

70. ,, ,, *aurantia*, Gould. Orange-bellied Grass parrakeet.

71. *Lathamus*, Lesson. *discolor*, Shaw.
,, *discolor*, Gould. Swift Lorikeet.
" Swift parrakeet" of Tasmania.

72. *Pezoporus*, Illiger. *formosus*, Latham.
,, *formosus*, Gould. Ground parrakeet.

73. *Trichoglossus*, Vig. & Horsf. *Swainsonii*, Jard. & Sel.
,, *Swainsonii*, Gould. *Swainson's* Lorikeet. Blue-bellied parrakeet.

74. *Trichoglossus*, Vig. & Horsf. *Australis*, Latham.
,, *concinnus*, Gould. Musk parrakeet.

75. ,, ,, *pusillus*, Shaw.
,, *pusillus*, Gould. Small parrakeet.

15 Fam. CUCULIDÆ.

76. *Chrysococcyx*, Boie. *lucidus*, ————
,, *lucidus*, Gould. Shining cuckoo.

77. *Cuculus*, Linnæus. *flabelliformis*, Latham.
,, ,, *cineraceus*, Gould. Ash-coloured, or lesser cuckoo.

78. ,, ,, *inornatus*, Vig. & Horsf.
,, ,, *inornatus*, Gould. Greater cuckoo.

RASORES.

16 Fam. COLUMBIDÆ.

79. *Lopholaimus*, G. R. GRAY. *L. antarcticus*, Gould. Top-knot pigeon of New South Wales.

80. *Phaps*, Selby. *chalcoptera*, Latham.
Peristera chalcoptera, Gould. Bronze-winged pigeon.

81. ,, ,, *elegans*, Temminck.
,, ,, *elegans*, Gould. Brush bronze-winged pigeon.

17 Fam. TETRAONIDÆ.

82. *Coturnix*, Mœhring. *C. pectoralis*, Gould. Stubble quail of Tasmania.

83. *Synoicus*, Gould. *Australis*, Latham.
,, *Australis*, Gould. Australian Partridge. Brown quail.

84. ,, ,, *Diemenensis*, Gould. Greater brown quail.

85. *Turnix*, Bonnaterre. *varia*, Latham.
Hemipodius varius, Gould. Painted quail.

18 Fam. Struthonidæ.

86. *Dromaius*, Vieillot. *Novæ Hollandiæ*, Latham.
,, *Novæ Hollandiæ*, Gould. Emu.

GRALLATORES.

19 Fam. Charadridæ.

87. *Hæmatopus*, Linnæus. *H. fuliginosus*, Gould.
Sooty oyster-catcher.

88. ,, ,, *longirostris*, Vieillot.
,, ,, *longirostris*, Gould.
White-breasted oyster catcher.

89. *Lobivanellus*, Strickland. *lobatus*, Latham.
,, *lobatus*, Gould. Wattled pewit.

90. *Sarciophorus*, Strickland. *tricolor*, Vieillot.
,, *pectoralis*, Gould. Black-breasted pewit.

91. *Charadrius*, Linnæus. *xanthocheilus*, Wagler.
,, *xanthocheilus*, Gould. Golden plover of Australia.

92. *Hiaticula*, G. R. Gray. *bicincta*, Jard. & Selby.
,, *bicincta*, Gould. Double-banded dottrel.

93. ,, ,, *monacha*, Geoffroy.
,, *monacha*, Gould. Hooded dottrel.

94. ,, ,, *ruficapilla*, Temminck.
,, *ruficapilla*, Gould. Red-capped dottrel.
Sandlark. Red-necked plover.

20 Fam. Scolopacidæ.

95. *Himantopus*, Brisson. *leucocephalus*.
,, *H. leucocephalus*, Gould. White-headed stilt.

96. *Recurvirostra*, Linnæus. *rubricollis*, Temm.
,, *rubicollis*, Gould. Red-necked Avocet.

97. *Cladorhynchus*, G. R. Gray. *pectoralis*, Dubois.
,, *pectoralis*, Gould. Banded stilt.

98. *Limosa*, Brisson. *L. uropygialis*, Gould.
Barred-rumped godwit.

99. *Schœniclus* ——— *Australis*, Jard. & Selby.
„ *Australis*, Gould. Australian Tringa.

100. „ ——— *albescens*, Temminck.
„ *albescens*, Gould. Land snipe. Little sand-piper.

101. „ ——— *subarquata*, ———
„ *subarquata*, Gould. Curlew. Sand-piper.

102. *Glottis*, Nilson. *glottoides*, Vigors.
„ *glottoides*, Gould. Australian greenshank.

103. *Strepsilas*, Illiger. *interpres*, Linnæus.
„ *interpres*, Gould. Turnstone.

104. *Scolopax*, Linnæus. *Australis*, Latham.
„ *Australis*, Gould. Australian snipe.

105. *Numenius*, Mœhring. *N. Australis*, Gould.
Australian curlew.

106. „ „ *N. uropygialis*, Gould.
Australian whimbrel.

21 Fam. Ardeidæ.

107. *Ardea*, Linnæus. *Novæ Hollandiæ*, Latham.
„ „ „ Gould.
White-fronted heron. Blue crane of the Colonists.

108. *Herodias*, Boie. *H. syrmatophorus*, Gould.
Australian egret.

109. *Nycticorax*, Stephens. *Caledonicus*, Latham.
„ „ „ Gould. Nankin night-heron. Nankin-bird of the Colonists.

110. *Botaurus*, Stephens. *B. Australis*, Gould.
Australian bittern.

22 Fam. RALLIDÆ.

111. *Porphyrio*, Brisson. *melanotus*, Temminck.
„ „ Gould.
Black-backed porphyrio. Black-backed gallinule.

112. *Tribonyx*, Dubois. *Mortieri*, Dubois.
„ „ Gould.
Native-hen of the Colonists.

113. *Fulica*, Linnæus. *F. Australis*, Gould.
Australian coot.

114. *Rallus*, Linnæus. *pectoralis*, Cuvier.
„ *pectoralis*, Gould. Land-rail of the Colony.

115. „ „ *Lewinii*, Swainson.
„ *Lewinii*, Gould. Lewin's water-rail.

116. *Ortygometra*, Linnæus. *immaculata*, Swainson.
Porzana immaculata, Gould. Spotless gallinule. Little swamp-hen of the Colonists.

117. „ „ *O. fluminea*, Gould.
Spotted water-crake.

118. „ „ *O. palustris*, Gould.
Water-crake.

NATATORES.

23 Fam. ANATIDÆ.

119. *Cereopsis*, Latham. *Novæ Hollandiæ*, Lath.
„ „ Gould.
Cape Barren goose.

120. *Cygnus*, Linnæus. *atratus*, Lath.
„ *atratus*, Gould. Black swan.

121. *Casarca*, Bonaparte. *tadornoides*, Jard. & Selby.
„ „ Gould.
Chesnut-coloured shieldrake. Mountain duck.

122. *Anas,* Linnæus. *superciliosa,* Gmelin.
,, *superciliosa,* Gould. Australian wild-duck. Black duck.

123. *Mareca,* Stephens. *punctata,* Cuvier.
Anas punctata, Gould. Chesnut-breasted duck.

124. *Spatula,* Boie. *rhyncotis,* Latham.
,, *hyncotis,* Gould. Australian Shoveller. Shovel-nosed duck of Tasmania.

125. *Malacorhynchus,* Swainson. *membranaceus,* Latham.
,, *membranaceus,* Gould. Pink-eyed duck.

126. *Biziura,* Leach. *lobata,* Shaw.
,, *lobata,* Gould. Musk duck.

127. *Nyroca,* Leach. *N. Australis,* Gould.
White-eyed duck.

24 Fam. LARIDÆ.

128. *Larus,* Linnæus. *Pacificus,* Latham.
,, *Pacificus,* Gould. Pacific gull. Large gull of the Colonists.

129. *Xema,* Leach. *Novæ Hollandiæ,* Stephens.
,, *Jamesonii,* Gould. Little gull of the Colony.

130. *Stercorareus,* Brisson. *Antarcticus,* Lesson.
Lestris catarractes, Gould. Skua gull.

131. *Sylochelidon,* Brehm. *S. strenuus,* Gould.
Powerful tern.

132. *Thalasseus,* Boie. *T. poliocercus,* Gould.
Bass's Straits Tern.

133. *Gelochelidon,* Brehm. *G. macrotarsus,* Gould.

134. *Sterna,* Linn. *S. melanorhynca & velox,* Gould.
Black-billed tern.

135. *Sternula.* Boie. *S. Nereis,* Gould.
Australian little tern.

25 Fam. PROCELLARIDÆ.

136. *Diomedea*, Linnæus. *exulans*, Linnæus.
,, *exulans*, Gould. Wandering albatross.

137. ,, ,, *D. cauta*, Gould.
Cautious albatross.

138. ,, ,, *D. culminata*, Gould.
Culminated albatros.

139. ,, ,, *chlororhynchus*, Latham.
,, *chlororhynchus*, Gould. Yellow-billed albatross.

140. ,, ,, *melanophrys*, Temminck.
,, *melanophrys*, Gould. Black-eyebrowed albatross.

141. ,, ,, *fuliginosa*, Gmelin.
,, *fuliginosa*, Gould. Sooty albatross,

142. *Procellaria*, Linnæus. *gigantea*, Gmelin.
,, *gigantea*, Gould. Giant petrel.

143. ,, ,, *P. conspicillata*, Gould.
Spectacled Petrel.

144. ,, ,, *hasitata*, Kuhl.
,, *hasitata*, Gould. Great grey petrel.

145. ,, ,, *P. Solandri*, Gould.
Solander's Petrel.

146. ,, ,, *glacialoides*, A. Smith.
,, *glacialoides*, Gould. Silvery grey petrel.

147. ,, ,, *Lessonii*, Garnot.
,, *Lessonii*, Gould. White-headed petrel.

148. ,, ,, *Cookii*, G. R. Gray.
,, *cookii*, Gould. Cook's petrel.

149. ,, ,, *cærulea*, Gmelin.
,, *cærulea*, Gould. Blue petrel.

150. ,, ,, *capensis*, Linnæus.
Daption capensis, Gould. Cape petrel. Cape pigeon.

151. *Prion*, Lacepede. *turtur*, Banks.
,, *turtur*, Gould. Dove-like prion.

152. ,, ,, *vittatus*, Forster.
,, *vittatus*, Gould. Broad-billed prion.

153. ,, ,, *Banksii*, A. Smith.
,, *Banksii*, Gould.

154. *Puffinus*, Brisson. *brevicaudus*, Brande.
,, *brevicaudus*, Gould. Short-tailed petrel.

155. *Pelecanoides*, Lacepede. *urinatrix*, Gmelin.
Puffinuria urinatrix, Gould. Diving petrel.

156. *Thalassidrome*, Vigors. *T. melanogaster*, Gould.
Black-bellied storm petrel.

157. ,, ,, *T. leucogaster*, Gould.
White-bellied storm petrel.

158. ,, ,, *T. nereis*, Gould.
Grey-backed storm petrel.

159. ,, ,, *T. Wilsonii*, Bonaparte.
,, *Wilsonii*, Gould. Wilson's storm petrel.

26 Fam. PELICANIDÆ.

160. *Phalacrocorax*, Brisson. *P. carboides*, Gould.
Australian cormorant. Black shag.

161. ,, ,, *P. leucogaster*, Gould.
White-breasted cormorant.

162. ,, *melanoleucus*, Vieillot.
,, *melanoleucus*, Gould. Pied cormorant.

163. *Pelecanus*, Linnæus. *conspicillatus*, Temminck.
,, *conspicillatus*. Gould. Australian pelican.

164. *Sula*, Brisson. *Terrator*, Banks.
,, *Australis*, Gould. Australian gannet.

27 Fam. COLYMBIDÆ.

165. *Podiceps*, Latham. *P. Australis*, Gould.
Australian tippet grebe. Diver of Colonists.

166. ,, ,, *poliocephalus*, Jard. and Selby.
,, *poliocephalus*, Gould. Hoary-headed grebe.
Dab chick.

28 Fam. ALCIDÆ.

167. *Eudyptes*, ——— *chrysocome*, Forster.
,, *chrysocome*, Gould. Crested penguin.

168. *Spheniscus*, Brisson. *minor*, Forster.
,, *minor*, Gould. Little penguin.

169. ,, ,, *S. undina*, Gould.
Fairy penguin.

RECAPITULATION.

	FAM.	GENERA.	SPECIES.
RAPTORES	2	11	14
Fissirostres	3	5	6
Tenuirostres	1	7	10
INSESSORES—Dentirostres	5	20	28
Conirostres..........................	2	4	5
Scansores	2	10	15
RASORES	3	6	8
GRALLATORES	4	22	32
NATATORES	6	29	51
TOTAL............	28	114	169

Proceedings.

11TH JANUARY, 1854.—Monthly Meeting; Joseph Hone, Esq., senior member of the Council, occupied the chair.

The following gentlemen were balloted for and elected Fellows of the Society: Lieutenant-Colonel Kenny, Thomas Macdowell, and J. R. Bateman, Esquires, of Hobart Town; other candidates for membership were proposed.

The Secretary laid on the table a complete series of forty-four charts of winds and currents in the Atlantic and Pacific Oceans, with "Pilot" and "Whale Charts" of Lieutenant Maury, of the United States Navy, forwarded by the Author through S.P. Griffin, Esq., U.S.N., to His Excellency the President, for the Royal Society's Library.

Sir William Denison also forwarded a Geological Report of Mr. Stutchbury's, dated 1st July, 1853, and printed by order of the Legislature of New South Wales.

The Ven. Archdeacon Davies presented "A Lecture on China, past and present," from the author, the Rev. A. Morrison.

The Secretary drew attention to two skins of birds of the Cuckoo tribe, (*Eudynamis taitensis ?*) forwarded to the Museum by Abraham Hort, Esq., of Wellington, New Zealand, and by him procured from Walter Mantell, Esq., who obtained them from Mr. Lonqust, of Purakami, by whom they were shot in the Otago district. This bird is named *Roekoca* or *Rohoperon* by the natives: it has a general resemblance to *Eudynamis Flindersii*, LATHAM, as figured by Gould, but differs somewhat in plumage, and has a more tapering, elegant, and graceful figure. Mr. Hort's communication was read.

A note was read from James Dixon, Esq., of Skelton Castle, presenting to the Museum the frontal bone of a human cranium picked up by himself on the field of Waterloo in 1825; and stating, with reference to a grass seed brought from New South Wales by James Macarthur, Esq., of Deloraine, and of which a small parcel was sent to the Society for distribution some months ago, as follows:—"The grass seed you gave me was sown in separate seeds about eight inches apart, and has all come up well: it is now about a foot high, it stools out in a grassy manner, and seems now to have a good deal of seed in it. It keeps its green colour well, and if carefully planted out may prove a valuable grass for fodder or for eating down. This dry season is, I think, much against it; we have watered one spot, the other stands the weather," &c. &c. Mr. Dixon adds—"I think it is from want of proper application that we have overlooked the value of the Bokhara clover. I had almost seed enough to spread over a forty-five acre paddock now in wheat, and trust to see the plant flourish as grass, to be eaten down when the wheat is off: I have also two other plots of Bokhara growing, which will produce a large quantity of seed.

Mr. Dixon's efforts fully and fairly test the adaptation of these grasses to the soil and climate of this island, and their value for the purposes of dry provender and pasturage cannot be estimated too highly, subject, as we are, to seasons of aridity, in which every green thing becomes withered and dried up.

A few small cubes of yellow pyrites of iron from the Fingal gold diggings were presented by Mr. H. Hull.

Mr. Belbin, of Liverpool-street, sent to the Museum skins of the Australian Egret *Herodias syrmatophorus*, GOULD, and King-fisher *Alcyone azurea*, LATH., shot by him at Kent's Group, Bass's Strait.

Alexander Reid, Esq., of Bothwell, presented, through Dr. Officer, a stuffed specimen of an unusually large *Ornithorhynchus*, obtained in the Clyde River.

A specimen of Malachite, picked up by Mr. W. R. Giblin in this neighbourhood, but probably of Adelaide origin, was presented by that gentleman.

From Alexander Macnaughtan, Esq., were received a fine model of a Chinese war junk, two glazed cases of insects, and one hundred preserved bird skins from India, together with a magnificent collection of corals from the Indian Ocean, numbering upwards of twenty species, and comprising *Fungiæ, Caryophylliæ, Pavoniæ, Meandrinæ, Astreæ, Catenoperæ, Madreporæ, Porites clavaria*, &c., with a miscellaneous collection of shells, embracing species of the following genera—*Melo, Cymba, Conus, Turbo, Turbinella Meleagrina, Tridacne, Rostellaria, Pteroceras, Fusus, Strombus, Cassis, Dolium, Terebra, Cyprea, Voluta, Oliva, Bulla, Auricula, Nerita.*

Captain Edward Sayers, of the *James Cruickshank,* sent a few fresh Nutmegs for the purpose of being planted and cultivated at the Society's Gardens.

The receipt, per *Creole*, of a case containing twenty-two plants, chiefly Australian, for the Society's Gardens, from Mr. Mason at Melbourne, was announced.

A Meteorological Table, exhibiting a daily statement of observations on the Aneroid and Syphon Barometers, the Sympiesometer and Thermometer, &c., for the month of December, taken at Government House by Mr. Hull and Mr. F. Stanley Dobson, was placed before the meeting.

A letter from S. P. Griffin, Esq., U. S. Navy, written on behalf of Lieutenant Maury, and addressed to His Excellency the President of the Royal Society of Van Diemen's Land, and Sir W. Denison's reply, were read. The Secretary also read a communication from Sir W. Denison to the Society representing the importance to science, navigation, and commerce, of the inquiries and pursuits to which Lieutenant Maury has devoted himself, and soliciting the co-operation and aid of members in accumulating information and facts, to enable Lieutenant Maury to construct charts of the winds and currents, &c., in these latitudes, which may be sufficiently accurate to be practically available in the navigation of the neighbouring seas and coasts.

After examination of the various specimens presented, conversations ensued, and soon after nine o'clock it was moved by Dr. Bedford, seconded by Mr. Henslowe, supported by Dr. Butler, Mr. Perkins, and Mr. Courtnay and others, and carried,—"That the thanks of the Society are due to His Excellency Sir W. Denison, and to the other persons who have made communications and donations, and especially to Mr. Macnaughtan for his extensive and valuable gifts this evening."

On motion of D. T. Kilburn, Esq., seconded by Colonel Last, a vote of thanks was unanimously accorded to Mr. Hone "for his attention to matters before the meeting, and his great urbanity in the chair," when the meeting broke up.

8TH FEBRUARY, 1854.—Monthly Meeting; the chair was occupied by His Excellency the President, Sir W. T. Denison, F.R.S., &c. &c.

The following gentlemen were, after a ballot, declared to be duly elected into the Society:—

Peter Roberts, Esq., of Ashgrove; W. H. Archer, Esq., of Melbourne, late Registrar-General for Victoria; the Rev. P. V. M. Filleul, M.A., Warden of Christ's College, Bishopsbourne; Henry Berthon, Esq., H.E.I.C.S., the Very Rev. William Hall, (Vicar-General) of Hobart Town; John Thomson, Esq., Robert Pott, Esq., William Tyson, Esq., Henry Graham, Esq., M.D., of Launceston. Other candidates for membership were nominated for next ballot.

The following donations were announced by the Secretary:—

To the Library:—From the Ven. Archdeacon Davies; Linnæus's System of Natural History, by Turton, in 7 volumes, 8vo.

From Charles Mason, Esq., Commissioner of Patents, Washington, U.S.; Reports to Congress (1851), 2 vols., 8vo.: 1st, Arts and Manufactures. 2nd, Agriculture.

From E. Hathaway, Esq., U.S. Consul; Reports to Congress (1848), by Commissioner of Patents, 1 vol., on Agriculture and Machinery, &c.

To the Museum:—From John Johnson, Esq., of Port Albert; the dried skin of a musk duck, *Biziura lobata.*

From James Barnard, Esq.; a specimen of an elegantly-branched *Gorgonia.*

From J. Lucas, Esq., through Mr. Hull; 2 specimens of brown-throated Dragon, *Dracocella hæmatopogon* (J. E. Gray), native of Sumatra.

A diminutive but pretty specimen of *Argonaut,* lately found on the beach at Wedge Bay, Tasman's Peninsula, by William Swainson, Esq., F.R.S., &c., was presented by that gentleman, who considers that it is likely, from the almost total absence of even the rudiments of a whorl, its dwarf size, extreme delicacy, and other peculiarities, to prove a new and undescribed species. Mr. Swainson also laid on the table twigs having seed vessels, of what he considers to be three distinct species of Blue Gum. Mr. Swainson rested his distinction on marked permanent peculiarities in the form of the capsules, and observed, "these are three only of six, if not *seven* species of this remarkable division of the *Eucalyptinæ*, hitherto confounded by all botanists under the common name of *Eucalyptus globulus*." Mr. Swainson says he has found sufficient characters in these trees to separate them as distinct from all others, and that they will be described by him as a new genus, under the name of *Denisonia*, and that the smallest species yet discovered has been found on the higher parts of Mount Wellington.

Mr. Milligan presented specimens of one of the handsomest and least common sea shells of Tasmania, *Voluta fusiformis* (Swainson); and of another, scarcely less beautiful and quite as rare, the *Volutæ papillaris* of Swainson; both from the vicinity of Circular Head. Mr. Milligan also submitted for examination a specimen of another rare Tasmanian volute from the same locality, which is probably the largest member of this family known; and though it bears a close resemblance to *V. magnifica* of New South Wales, may yet, Mr. Swainson has reason to think, prove a distinct species. This shell was formerly used by the Aborigines as a vessel for holding and carrying water in; and it is curious to remark that a very large *Cymba* (a shell nearly allied to the volutes), found on the northern coasts of New South Wales, and capable of holding nearly a gallon, is applied to a similar purpose by the Aborigines there.

A case per *Antipodes*, containing 34 plants, (of which 16 are dead), has been presented to the Society's Gardens by the Venerable Archdeacon Davies.

A case per *Antipodes* has been received at the Gardens from Messrs. Lee of Hammersmith, containing 27 plants, of which 16 only are alive.

A note was read by the Secretary from Mr. John Abbott transmitting an extract of a letter from his brother, now on a six months' tour in Cashmere, promising to make large collections for the Society's Museum.

A letter to the Secretary from Mr. R. C. Wood, of Singapore, was read, giving advice of the shipment of a collection of Corals of that region for the Museum.

A paper by Mr. Swainson on the best method of relaxing the dried skins of birds and other animals, in order to fit them for being stuffed and mounted, was read by the Secretary.

A paper was next read by Mr. Swainson on the cultivation of English grasses, and the formation of artificial pastures, in which a comparison of the productiveness, as regards dairy produce and the feeding of live stock upon the native and artificial pastures, is made, greatly in favour of the latter. Mr. Swainson says that, having observed in the Illawarra District of New South Wales an indigenous grass of a nutritious character as cattle-feed, which continued green and succulent throughout the hottest and driest summer months, he secured so much of the seed as has enabled him to make up about 60 packets (laid on the table) for distribution, and that any member or other person who will give the necessary care and attention to its culture may have a packet for experimenting with or for further dissemination over the colony, the bare, dry, arid, withered aspect of which, he does not hesitate to say, would by the introduction of this grass be changed to a luxuriant and lively green. Mr. Swainson has named it provisionally "Red Timothy Grass."

The English grasses which Mr. Swainson considers best adapted for cultivation in the climate and soil of Tasmania are :—

1. *Phleum pratense*—Timothy grass, or cat's tail.
2. *Alopecurus pratensis*—Fox-tail.
3. *Festuca elatior*—Tall meadow grass.
4. *Festuca arundinacea*—Reed ditto.
5. *Dactlylis glomerata*—Cock's-foot grass.
6. *Holcus mollis*—Woolly soft grass.
7. *Anthoxanthum vernum*—Sweet vernal grass.
8. *Poa pratensis*—Smooth meadow grass.
9. *Agrostis stolonifera*—Fiorin grass.
10. *Avena flavescens*—Yellow oat-grass.
11. *Holcus avenaceous*—Tall oat-grass.

Mr. Swainson mentions that white clover grows so luxuriantly, and the risk of loss from having cattle "blown" by it in moist weather in New Zealand is so great, that he carefully avoids its introduction (!) upon his estates there. Rib grass *(Plantago lanceolata)* he considers also so inferior in point of value for cattle food as not to be worthy of introduction amongst good grasses.

His Excellency the President laid before the meeting an elaborate and carefully constructed table of meteorological observations taken during the month of January last at Government House by Messrs. H. Hull and F. Stanley Dobson, with the aneroid and syphon barometers, the sympiesometer, wet and dry thermometers, &c. &c. &c.

Sir William Denison then read a very lucid and exceedingly valuable paper on the principle, practical working, and economical application of that most useful hydraulic machine, the Water Ram; which, of all engines, is said to transmit the largest amount of the power applied to it, which is of all others the most easily managed and most economically kept in operation, and is equally applicable to the raising of large bodies of water to small heights, or of a small proportion of the water employed to considerable elevations; the proportion being nearly 65 to 100, as has been ascertained by repeated experiments, conducted with every possible care. In a dry country, therefore, where irrigation may be made to add so materially to the fertility of the soil, and where it is quite practicable to collect upon most farms at the cost of a small embankment or excavation a sufficiency of water to afford a head of a few feet or yards, this machine, from its simplicity and its perfectly independent and inexpensive action when once set agoing, requires but to be familiarly known to be generally employed wherever streams or rills, or even where considerable springs, exist on a surface more or less inclined.

Sir William, who had sent to the meeting for examination a model Ram, having a brass body and reservoir of glass, with glass ascension tube, &c., so as to permit of its action being distinctly observed throughout, was obliging enough to fit together its different parts, and exhibit it in full and continuous operation.

About ten o'clock it was moved by Joseph Hone, Esq., seconded by D. T. Kilburn, Esq., and carried unanimously, that the thanks of the Society are due to His Excellency Sir W. T. Denison, Mr. Swainson, and other gentlemen from whom written communications and presentations have been received; and the President having risen, the members soon after separated.

8TH MARCH, 1854.—Monthly Meeting; His Excellency the President, Sir W. Denison, in the chair.

The following gentlemen were ballotted for and duly elected into the Society:—

The Reverend Francis Hales, B.A., of Launceston. The Rev. J. Tice Gellibrand, M.A., of Richmond. William Henry Barnard, Esq., of Geelong, Victoria. Robert Clark, Esq., of Malahide. John Murphy, Esq., of Sydney. Frederick Robert Lees, Esq., Edward Swarbeck Hall, Esq., George Hutton, Esq., and Samuel Tapfield, Esq., of Hobart Town.

Upon the recommendation of the Council, W. J. Macquorn Rankine, Esq., C.E. F.R.S.E., F.R.S.S.A., &c., was elected a Corresponding Member.

The Secretary announced the presentation, by John Lyne, Esq., of Apslawn, Swanport, of an English translation of Dr. Dodoen's Herbal, published in London, in 1619, substantially bound in calf;—considered a curious, rare, and valuable work.

The Tasmanian Athenæum for February received from the Editors.

A note was read from Lieutenant Lochner transmitting, by direction of the Lieutenant-Governor, the First Report of the Mineralogical Surveyor of Victoria, "On the Geology and Mineralogy of Mount Alexander and the adjacent country lying between the Rivers Loddon and Campaspe," with Map and Sections.

Specimens of Lignites and associated tertiary Clay-beds were received from Mr. P. S. Tomlins, who procured them at Fresh Water Point, on the River Tamar. The Secretary read a note from Mr. Tomlins explaining the relative position of the different beds represented by the specimens submitted, setting forth the great advantages which would accrue to Launceston and neighbourhood from a discovery of coal on the Tamar River, and soliciting the opinion of the meeting as to the value of the indications afforded by the specimens submitted.

A note was read from Mr. H. Hull giving an account of a brilliant display of Aurora Australis, about 12 o'clock on the night of the 21st ultimo, as seen from Tolosa, and of a loud rushing or rumbling noise which was simultaneously heard high overhead, recurring in five distinct shocks or paroxysms between midnight and 2 o'clock.

Mr. John Lucas forwarded for the Museum nine very diminutive coins; five of silver and four of copper, said to be from Cochin, on the Malabar coast.

From Mr. Jones, of Liverpool-street, was received a silver coin (date 1711) of Spanish America.

Extracts were read of the following letter from Dr. Knight to Sir William Denison, on the native gold of New Zealand. According to Dr. Knight's researches, it consists of pure gold 7·4275, and silver 2·06, with quartz as a matrix, and he estimates its value at £3 8*s.* 10*d.* per ounce; Tasmanian gold being worth £3 19*s.*, and that of Victoria from £4 to £4 2*s.*, in the London market.

"*Auckland,* 12*th January,* 1854.

I had an opportunity, a few days, since of perusing for the first time Your Excellency's interesting paper on the value of gold, read before the Royal Society of Van Diemen's Land, on the 22nd June, 1852.

My attention was directed to the same subject early in 1853, in reference to the value of gold obtained in this district. Although my investigations were limited to gold in a quartz matrix, it appears to me that they are of sufficient interest to excuse my taking the liberty of addressing Your Excellency on the subject.

The New Zealand gold is mostly found in a quartz matrix or mixed with iron-sand, (specular iron).

It appeared to me that the quantity of gold in the quartz matrix could be determined with facility by taking the weight of the specimen in air and in water. We should then have the following known quantities:—

Weight of specimen in air	....	$= a$
Ditto in water	....	$= e$
Specific gravity of gold	....	$= b$
Ditto of quartz	....	$= c$

From which the quantity of quartz $= (y)$ could be readily determined, that of gold being $(a-y)$

For $\frac{(b-1)\ (a-y)}{b}$ weight of gold in water

also $\frac{(c-1)\ y}{c}$ = weight of quartz in water

$$\therefore \frac{(b-1)\ (a-y)}{b} + \frac{(c-1)\ y}{c} = \text{weight of specimen in water}$$

$$\therefore y = \frac{(eb + a - ba)\ c}{c-b}$$ A convenient expression for the quantity of quartz without first computing the specific gravity.

I may mention here that the absence of silver had been (as it was thought), satisfactorily shown by the analysis published in the Wellington Government *Gazette.*

Having determined by the above method the value of two or three specimens of gold in a matrix of quartz, I was surprised to learn that when the ore was run out in Sydney, the value was declared to be much higher than my estimate; suspecting this discrepancy to arise from the presence of silver, I undertook the chemical analysis of a few grains of the gold, and found it alloyed with silver in the following proportions:—

Gold	7·4275
Silver..................	2·06
	9·4875

The weight of this specimen in water previous to analysis was 8·905, (hence the specific gravity 16·2875.) Now, substituting the specific gravity of silver (10·474) for that of quartz, and taking the specific gravity of cast gold as stated in Your Excellency's paper, we have—

$a =$ 9·4875	= 0·9771518		
$b =$ 19·258	= 1·2846112		
	2·2617630 =		182·71
$e =$ 8·905	= 0·9496339		
$b =$ 19·258	= 1·2846112		
	2·2342451	= 171·492	
	+ a	= 9·4875	
			180·9795
1·7305	= 0·2381716		1·7305
$c =$ 10·474	= 1·0191126		
	1·2572832		
$c—b =$ 8·784	= ·9436923		
	·3135909 =	2.0587	= quantity of silver.

The quantity of silver found by analysis was 2·06,—an approximation so close that, considering the small quantity operated upon, it must be considered accidental. As I thought it desirable to test whether the metals in combining increased in density or not, I selected a new sovereign, and by means of a balance whose beam when unloaded was depressed more than $\frac{5}{8}$ths of an inch with $\frac{1}{70}$th of a grain, I found the weight in air and in water to be:—

In air...............	4·5035 drams avoird.	= 123·1426 grs.	$= a$
In water	4·248 „ „	= 116·15625 grs.	$= e$

∴ Specific gravity .... 17·62623

New standard British gold consists of gold 22 parts, copper 2 parts. Taking the specific gravity of hammered gold to be 19·361 and that of copper 8·878, we find by the following formula,—

$$\frac{a}{a-\left\{\frac{(b-1)\ (a-y)}{b}+\frac{(c-1)\ y}{c}\right\}}=\text{Sp. Gr.}$$

That the Specific Gravity of standard gold is 17.62632. The weighings were made with the greatest care, and the difference between the Specific Gravity found by actual weighing, and that found by computation, is too small to be noticed. It appears, therefore, that no considerable alteration takes place in the density of gold and copper when combined. I do not, however, overlook the circumstance that the usefulness of this is interfered with by a doubt as to the exact proportion of copper in the coin; which I believe in different sovereigns varies within certain limits, the limit of fallibility for fineness being 1-16th of a carat.

Returning to the value of New Zealand gold, it is estimated from the above experiments, that an ounce entirely free from quartz or other substance except silver is worth £3 8*s.* 10*d.*; (that of pure gold being 2.1237*d.* per grain, and that of pure silver, ·1367*d.* per grain, as found by Your Excellency.)

Trusting that Your Excellency will overlook the liberty I have taken in addressing you,

I am, &c.,

CHARLES KNIGHT.

"His Excellency Sir W. T. Denison, F.R.S."

Mr. Milligan placed on the table ripe capsules of the Blue gum, recently collected by him in the vicinity of the Apsley River, in the Swanport district. Mr. Swainson said that he recognized amongst them six distinct species of his proposed new genus DENISONIA; two of which, he says, differ specifically from any previously seen by him.

Mr. Milligan also exhibited a curious dwarf specimen of she-oak (*Casuarina,*) not quite a foot high, bearing a cluster of full-sized, monstrous, abortive cones. This led to an interesting conversation on the influence of temperature, &c., on the forms, characters, and geographic distribution of plants and animals, in which His Excellency Sir William Denison, Drs. Agnew and Crooke, Mr. Walker, and others joined, when Mr. Swainson took occasion to express his conviction that "there exists a wide and marked difference between the trees of Tasmania and those of Victoria, notwithstanding the positive assertions to the contrary published in the recent report of the Victorian Colonial Botanist." In proof of this, Mr. Swainson stated that "out of more than sixty (!) different species of Casuarinæ discovered, drawn, and described by him during his short residence in this island, he has not met with one which is also a native of Victoria;" and adds, that "more than one-half of those discovered by him at Launceston are totally different from those met with at the southern end of the island."

Mr. Swainson remarked "that this diversity is equally conspicuous among the Gum trees, only *two* out of more than forty species detected in Tasmania being considered by him as common to the opposite coasts of Bass's Strait—while of the genuine Blue gums, so common on the southern and eastern parts of Tasmania, not one has been observed by Mr. S. in the province of Victoria: one, indeed, he says, has been recently said to have been found growing near Cape Otway, on the coast of Victoria; but he thinks the fact requires verification."

A paper embodying descriptions, and accompanied with beautifully executed figures by Mr. Swainson, of some undescribed Trochiform shells of Tasmanian seas, now in Mr. Milligan's collection, was then read:—One closely resembling *Calliostoma* in its colouring, perlacious structure, and elevated apex, and *Solarium* in its absolute want of a pillar, and in the thickened and granulated character of the internal edge of the whorls, Mr. Swainson has made the type of a new genus, to which he has given the name of *Astele*. The other shells of the same tribe Mr. Swainson has referred to his genus *Carinidea;* the largest, from Flinder's Island, he has named *C. fimbriata;* a second, from the same locality, *C. granulata;* and a third, discovered by Mr. Swainson himself at Port Arthur, he has named *C. parva*.

His Excellency Sir William Denison then placed before the members Tabular Statements of the extraordinary Fall of Rain at Hobart Town on the 26th and 27th ultimo—of the direction and force of the wind, and of the condition of the Barometer and Thermometer, &c., compiled from observations made at short intervals during the storm, by Mr. S. Jeffrey, of the Observatory, who also furnished a memorandum of the fall of rain during each month of 1853, and during January and February of the present year, by which it appears that the sum total of rain during 1853 was only 14·48 inches, while January and February of 1854 have yielded 9·69 in.; the mean average of the 12 years from 1841 to 1852 having been 20·30 inches.

Sir William Denison also laid before the meeting tables showing all the remarkably heavy falls of rain here since 1841—their dates, with the period of the day, rate of descent, and total fall in each case. Sir William also supplied a Table exhibiting the months in which the greatest and least falls of rain have occurred during 13 years; from which, December, August, and October appear to be the driest, and as compared with each other in the order in which they are here named, while November is by far the wettest: the former three months having yielded together only 11·53 inches during this long period, while November alone yielded 37·83 inches during the same time,—facts worthy of consideration in the calculations and arrangements of the farmer and horticulturist in this quarter of the island.

Mr. Jeffrey also submitted diagrams showing the comparative rapidity of the several heavy falls of rain which are recorded as having taken place on the 25th November, 1842,—on the 6th November, 1849,—and on the 26th and 27th February, 1854, respectively; amounting in the first case to 3·75 inches in 16½ consecutive hours; in the second case to 3·25 inches in 11 hours; and in the last and recent case to 6·25 inches in 13 hours.

His Excellency the President then read an interesting and important paper, supplementary to that read to the Society at the last November meeting, upon the Drainage and Sewerage of Hobart Town and Launceston, and having reference to the unprecedentedly heavy rains of the 26th and 27th ultimo, to the new demand thus made on the channel of the Hobart Town Rivulet as a main sewer, and its capacity for discharging perhaps the greatest amount of water which may ever have to flow through it within a given time; the fall of rain during thirteen hours of the two days referred to having been at such rate as would give in twenty-four hours a cubic foot of water to every foot of superficial area, thus rendering the number of cubic feet of water passing down the channel of the town rivulet during the continuance of such rain, the measure in square feet of the surface, for which it subserved the purpose of a main drain. Sir William observed the height of the water in the rivulet during the flood when unimpeded, and has had levels and measurements taken at two points since, the mean of which has been used to determine the velocity and rate of discharge during the flood,—the former having been 14·3 feet per second a little above Wellington Bridge, and 9·6 feet per second near the bridge at Campbell-street; but His Excellency does not consider the results now obtained as more than an approximation, and thinks it highly desirable that a series of experiments should be made in the course of the ensuing winter to determine the area and rate of discharge with precision, and suggests, as deserving of consideration, the adoption of means for intercepting during winter a large portion of the water which would otherwise be forced through the town rivulet, and "retaining it for the use of the inhabitants during the dry summer months;" and adds, "were a scheme of this kind carried out with judgment and boldness, it would not only relieve the lower parts of the town from the risk of being flooded, but would afford an ample supply of water, available at all times for the extinction of fires, as well as for the more ordinary purposes of domestic economy."

Mr. Kilburn submitted for inspection by members a few well-executed and carefully coloured Daguerreotype portraits, groups and landscapes, prepared by himself with two lenses set at some distance apart (angle not determined), in order to adapt them for exhibition in the Stereoscope, which Mr. Kilburn produced for the purpose. One group, in which the prominent figure is a handsome bay pony, the property of Sir William Denison, was particularly admired, equally for the life-like fidelity of its fine proportions, obtained by great accuracy of focal arrangements, as for the beautiful and brilliant touch of natural colour thrown over it.

A lengthened discussion ensued upon the great advantages which would accrue to natural science from the discovery of a cheap mode of applying photography to the representation of nice organisms in botany, &c., and upon the principles and practical details of the production of binocular photographic pictures, when Mr. Kilburn gave the results of his own experience, and made observations on the art of taking impressions on glass, on the chemicals requisite in each case, and their imperfections, on the luminous and chemical rays of light, and the difficulties to be overcome in regard to solarization, focal arrangements, &c.

A paper on the Trigonometrical Survey of the island was laid on the table to be read at next meeting.

About ten o'clock, the thanks of the Society having been voted for papers and other contributions, the President left the chair, and the meeting, which was numerously attended, broke up soon after.

19th April, 1854.—Monthly Meeting; the chair was occupied by Joseph Hone, Esq.

The following gentlemen having been ballotted for were declared duly elected Fellows of the Society:—

John Michael Gould, Esq., of Hobart Town.
William Newman Shadwell Keen, Esq., ditto.
William Lempriere, Esq., ditto.
John Whyte, Esq., ditto.
Hugh Percy Sorell, Esq., ditto.
Alfred Selwyn, Esq., Government Geologist, Victoria.
William Sorell, Esq., of Melbourne.

The following gentlemen were, upon a recommendation from the Council, elected Corresponding Members of the Society.

John Joseph Bennett, Esq., F.R.S., F.L.S., &c., British Museum.
Edward Forbes, Esq., F.R.S., F.G.S., Botanical Professor, King's College, London.
Adam White, Esq., F.L.S., &c., British Museum,
Samuel Stutchbury, Esq., A.L.S., Government Geologist, New South Wales.

The following donations were made to the Library and Museum by R. H. Bland, Esq., of Melbourne:—

5 vols. Lamarck's Histoire des Mollusques, par MM., G. P. Deshayes and H. Milne Edwards.
2 ditto Sowerby's Genera of Shells.
1 vol. Sowerby's Conchological Manual.
1 ditto Swainson's Treatise on Shells and Shellfish.
1 ditto Schumacker's Essai d'un Nouveau Système des Habitation des Vers Testaceés', &c.
1 ditto Moriss's Catalogue of British Fossils.
1 ditto Proceedings of Zoological Society of London.
6 parts (yearly) of ditto.
1 vol. Annals of Natural History.
1 ditto Hooker's Journal of Botany.
1 ditto Lindley's Introduction to Botany.
1 ditto ditto Synopsis of the British Flora.
1 ditto Organographie Vegetale, by De Candolle.
3 vols. (2nd, 3rd and 4th) De Candolle's Prodromus Syst. Natural. Regni Vegetabilis.
1 vol. Link's Elements of Philosophical Botany.
1 ditto Pamphlets on the Microscope, &c.
1 ditto Mrs. Gray's Molluscs, &c.

By Mr. P. S. Tomlins; Narrative of the Atrocities committed by Michael Howe and his associates, Bushrangers, in Van Diemen's Land;" printed and published at Hobart Town in 1818, and said to be the first book which issued from the Press of this colony.

By His Excellency Sir W. T. Denison, the 10th and 11th Tri-monthly Reports of Mr. Stutchbury, the Government Geologist and Mineralogist of New South Wales, with coloured plans, &c.

By His Excellency Charles Joseph La Trobe, Esq., the First General Report of Dr. Müller, Government Botanist of Victoria, together with the First Report of Mr. Selwyn, Government Geologist there.

By Andrew Clarke, Esq., Surveyor-General of Victoria, Mr. Selwyn's Report on the Coal Field at Cape Patterson, Victoria; also the First Mineralogical Report on the Gold Fields, by Mr. Selwyn, with plans and sections.

A letter was read from F. H. Henslowe, Esq., transmitting, by direction of the Hon. R. Dry, Esq., Speaker of the Legislative Council, one volume containing the Votes and Proceedings, and another the Acts, of the Legislature of Tasmania for the Session of 1853.

A letter was read from the Rev. D. Galer transmitting a small bible, one of a consignment curiously mutilated by insects, though soldered up apparently with the usual care in *tin* and enclosed in a deal case—a board from which, half eaten away on the inside, accompanied the book. Mr. Galer states that the case of books was sent out from England by the *William Woolley*, and that the cargo was sent ashore at the Mauritius while the vessel underwent repair, from which it would appear probable that the species of *Termites*, commonly known as the white ant, had there gained a footing in the wood, and afterwards, through some accidental aperture left in soldering up the tin, had found admission to the books, disclosing, however, on the box being opened here, no trace of itself save by its ravages.

The Secretary reported the despatch of five cases of plants, indigenous to these colonies, to London, in exchange for plants received or ordered.

Mr. Clarke forwarded to the Museum a rich specimen of native sulphuret of antimony, said to occur in granite near Heathcote, at the M'Ivor Diggings, Victoria; also a dried spike of a Liliaceous plant, from the Australian Alps, Gipps' Land, which may probably prove to be a new species of the genus *Milliganea*, lately founded by Dr. Hooker, upon specimens collected on Mount Sorell, and near the Gordon River, Macquarie Harbour, by Mr. Milligan, in 1846-7.

From Ronald C. Gunn, Esq., were received two specimens of the handsome Snail-shell of Tasmania, *Helix Launcestoniensis*, discovered by that gentleman in dense forests on the northern flank of the Ben Lomond range, and recently well figured by Reeve in his Conchologia Iconica.

Mr. Propsting presented the skin of the Diving Petrel, (*Puffinuria urinatrix*, GOULD), drifted ashore near Muddy Plains.

From Mr. Belette, of Pittwater, was received the skin of an Owl, (*Strix castanops*, GOULD), in good preservation.

From Mr. Bland, of Melbourne, were also received for the Museum samples of tin-ore from the Ovens Gold Field in the rough state, and as prepared for the London market; together with an ingot of the metal reduced from a portion of the ore. Mr. Bland also sent a specimen of the consolidated beach at the Island of

Ascension, mainly composed of finely comminuted shells; and also a small mummy-looking representation of the human form in a state of repose, covered from the breast downwards in front, and from the neck along the back to the heel with oriental characters and symbols, and presenting on the surface a semivitrified aspect. Mr. Bland obtained this specimen from one of the Sarcophagi on his visit to the Pyramids.

From Mr. Selwyn, of Melbourne, was received a valuable collection of fossil shells, from a geological formation of limited extent showing itself on the seacoast of Victoria, about forty miles below Williams Town, on the eastern or Brighton side. The fossils are identical in several instances with shells which occur in the cliffs between the Inglis River and Table Cape, on the north coast of Tasmania, described by Count Strzelecki as a raised beach, and resemble the fossils of the Paris basin and London clay. The following families are recognizable—*Cyprea* (several species), *Pleurotoma, Turbinella, Conus, Murex, Ranella, Typhis, Terebratula, Patella, Phorus, Turbo,* with *Dentalium, Serpulæ, Corals,* &c.

From the same locality Mr. Selwyn forwarded fragments of a fossil-wood imbedded in a siliceo-argillaceous matrix, and having some resemblance to the fossil *Casuarina* of Flinder's Island.

Mr. Milligan read the following estimate of the cost of forming a line of Electric Telegraph from Hobart Town to Launceston at the existing prices of labour and materials, furnished by Mr. M'Gowan, Director of the line from Melbourne to Williams Town, who also forwarded samples of the wire, insulators, &c., which are in use there: his estimate is £100 per mile, and he would undertake to find a contractor and give a guarantee that the line would be in operation within six months from the time of commencing. Short as the Melbourne line is, and only recently established, its convenience and value are becoming rapidly appreciated by the citizens there.

Estimated cost of constructing a line of Electric Telegraph between Launceston and Hobart Town.

Per Mile.	£	s.	d.
For thirty posts, including the expence of distributing on the route of the line	50	0	0
For labour in preparing and erecting	15	0	0
For one mile of No. 6 galvanized iron wire, metallically jointed	19	0	0
For labour in erecting	7	0	0
For thirty insulators (including prepared pins)	9	0	0
Total per mile	£100	0	0

Making provision for a full supply of instruments, batteries, &c., necessary to carry on the business of the line after its completion, say, for *six* stations, (including the two terminal stations), the expense would be, viz.—

	£	s.	d.
For six complete sets of Morse's recording Telegraph	210	0	0
For local insulated wires, battery, and instrument stands	140	0	0
For six local batteries, and two main batteries, on Grove's plan	150	0	0
Total cost of apparatus, &c., to work the line	£500	0	0

The foregoing estimates are based upon the current prices of labour and materials, and all incidental expenses are intended to be covered at the rates above stated. The person making this offer, or tender, being willing to undertake and fulfil a contract for the whole work at the prices named; also to have the proposed line completed, and in full operation, between Hobart Town and Launceston within *six* months from the date of commencement.

The posts to be formed of round timber, each twenty-five feet in length, and not less than *five* inches in diameter at the smallest end, with the bark removed. The bases of the posts to be well charred and covered with hot coal tar for at least five feet of their lengths, and to be firmly imbedded perpendicularly in the earth at least four and a half feet: the tops of the posts to be well bound with hoop iron. The insulators to be made of strongly glazed earthenware, and the pins on which they are placed to be of well seasoned stringy bark wood, boiled in a preparation of resin and gum shellac. The wire to be of the best quality of number six, galvanized, weighing six hundred pounds to the mile.

The whole of the work to be done in a thorough and durable manner.

(Signed) S. B. M'Gowran, *Superintendent,*

Electric Telegraph, Melbourne.

A note was read from H. Hull, Esq., giving an account of a shoal of microscopic crustaceans in mud taken from the pond at Tolosa, and exhibiting some rough pencil drawings of the objects as observed through his microscope. The meeting considered that minute and carefully drawn up descriptions, with accurate figures, for comparison with those of Australian and British Entomostracans, are important desiderata.

The Secretary read the following Report upon the machinery used, and the means adopted, for raising the box of treasure sunk in the Yarra last year by the upsetting of a boat;—forwarded to this Society by Mr. Clarke, the Surveyor-General of Victoria.

Richmond, 14th January, 1854.

Sir,—I have the honour to forward, in accordance with your request, a Report respecting the proceedings adopted by me in constructing the apparatus, and conducting the operations, for the recovery of the specie from the Yarra Yarra in July last.

Although the apparatus I am about to describe answered the purpose for which it was intended admirably, yet the principle was such that prevents me from recommending its general use, owing to a deficiency of parts, thereby causing increased risk and responsibility to the person who has the superintendence of the operations.

In preparing for the construction, I had two objects in view: 1st, Economy; 2ndly, Despatch,—time being of great importance.

Having in my possession an air pump cylinder which I had previously made use of in England, it occurred to me I might employ it for the recovery of the gold;

and, after making a short calculation, I felt convinced it would answer the purpose with proper management and attention.

This was the cause why I constructed it in the way I did, making what I consider an imperfect piece of machinery.

The whole consisted of a crab, chain, gutta percha tube, and bell, with the necessary supports for its suspension.

The crab was single purchase, the power gained being equal to about 6 to 1.

The chain was half-inch, and capable of sustaining a working load of three and a half tons.

The air pump consisted of a single cylinder of 7 inches diameter and 14 stroke, and was worked in the same way as an ordinary fire engine, the piston being a common packed one, had two valves passing through it opening downwards, which were immediately closed by two spiral springs on the completion of the up-stroke, after the air had passed through them in its ascent, and filled the cylinder, the piston forcing the whole contained within through the passage in the bed-plate and valve on the outside, which opened upwards, and preventing any air from escaping back again that had previously passed through into the gutta percha tube leading to the Bell.

The Bell was composed entirely of wrought iron boiler plates, rivetted together and corked, as an ordinary boiler would be, the plates being 1-4th of an inch in thickness at the upper part, increasing in thickness to the bottom ; the lower plate being 3-8ths, having in addition to the plate a wrought iron flat hoop rivetted all round to stiffen the edge. There was also another loose hoop about 15 inches from the bottom of the Bell, (the diameter being about 16 inches greater) ; to this hoop eight large pieces of cast iron were attached, each weighing about 150lbs. The hoop and weights were then connected by suspension rods to a cross bar placed edgeways upon the top of the Bell ; to this bar two rods were also connected which supported it, and four others forming a pyramid, to the apex of which a single block was attached, by means of which we were enabled to raise or lower the Bell to any height or depth by the winch placed at the contrary end of the pontoon. You will perceive by the above arrangement the weights employed to sink it had no connection whatever with the Bell, causing no strain whatever upon the rivets, or plates, of which it was composed.

Not having complete apparatus I laboured under great difficulties, and ran a very great risk of endangering the lives of those parties at work in the Bell. Its deficiency consisted, first, in having but one air-pump, which rendered it impossible to secure a continuous current of air, and in case of any breakage or derangement of the parts, the supply would be entirely cut off.

Secondly, in the thinness of the metal of which the Bell was composed, being obliged to attach large masses of iron to the hoop, near the bottom, to keep it steady, and sink it ; and not being able to make any but an uneven surface, caused considerable risk, from its liability to become entangled with the stumps, and various other substances with which we were continually coming in contact, thereby causing the risk to be even greater in this case than the former.

I may observe, in conclusion, that the plan adopted in exploring the river was by traversing it backward and forwards, at equal distances of two yards, for a distance of seventy yards from point of starting. I also beg to remark the work was carried on during the night by means of flambeaux, or torch light: the traffic on the river prevented operations being carried on during the day, which caused delay and much greater risk than otherwise would have been in carrying out my arrangements.

Trusting the imperfect outline I have given of the system, construction, and operations relating to the lost specie may be intelligible to you,

I am, &c. &c.,

John Garner Johnson.

Lieutenant Smith read a short paper on the application of the several Codes of Signals, of which he presented models and coloured designs lately to the Society.

A paper by W. Swainson, Esq., F.R.S., on certain undescribed amphibious volutes on the shores of Tasmania, was read by the Secretary. Mr. Swainson found three species in Mr. Milligan's collection, and considering them as forming a group intermediate between *Melampus* and *Pedipes,* he has placed them in a distinct and separate family, which from their habits he has named *Crenobates:* the species are named—*C. cornea,* from Oyster Cove, where it abounds at certain seasons; *C. parva,* same locality, one specimen; *C. solida,* from Flinders' Island, where it is occasionally found dead in great numbers on the beach, protected by the small islands on its southern and western side.

Mr. Swainson's paper contained also descriptions of three species of *Rhodostoma* (Australian), found in Mr. Milligan's collection of exotic shells; and was illustrated with accurate drawings of each of the shells described.

After various discussions on the several objects and subjects brought under notice, and a particularly animated conversation on the comparative cost and economic value of the Electric Telegraph, in which the Colonial Secretary, Dr. Butler, Capt. Hawkins, the Secretary, and others took an active part, the thanks of the meeting having been voted, on the motion of Mr. G. W. Walker, for the valuable contributions and donations made, the Chairman rose, and the members soon after separated.

10th May, 1854.—Monthly meeting; His Excellency Sir W. T. Denison, President, in the chair.

The following members were present:—Drs. Agnew, Hall, M'Carthy, Smart, Colonel Last, Major Cotton, Captain Hawkins, R. E., Messrs. James Burnett, Francis Butler, W. T. N. Champ, Joseph Hone, Henry Hopkins, D. T. Kilburn, Alexander MacNaughtan, Thomas Moore, George Rolwegan, Chester Eardley-Wilmot.

Strangers:—Lord Alfred Churchill and Dr. Buck.

After a ballot, the following gentlemen were declared to be duly elected Fellows of the Society:—

Charles Toogood Downing, M. D., Francis Stanley Dobson, and F. G. Brock, of Hobart Town, Esquires.

The Secretary announced the receipt of the Journal (Part IV., vol. viii.) of the Agricultural and Horticultural Society of India from that Society.

Also of a copy of the "Tasmanian Almanack" for 1825, from Mr. E. Gresley, of H. M. Ordnance.

Also of a copy of the Hortus Kewensis, in 5 volumes, from Mr. Westcott, of Argyle-street.

The Secretary added to the collection of *Syngnathidæ* in the Museum, specimens of a *Hippocampus* from D'Entrecasteaux's Channel, which may probably prove to be a distinct and undescribed species.

Also a few specimens of a *Tetraodon,* from Oyster Cove, which is in all probability a new species; the individuals vary in length from the point of the beak to the tip of the tail from 1¼ to 1¾ inches, and the body, when inflated, forms a spheroid, is rough, with extremely fine prickles. The beak is sharp and projects slightly, and the tail, which is very slender, measures nearly one-third of the entire length of the fish.

Mr. Milligan also placed before the meeting a specimen of a felspathic rock, containing schorl and having a granitic structure, which forms the point of land south from Oyster Cove, where it sustains and protrudes through a long series of argillaceous sandstones, interstratified with which are thin beds of a finer deposit, in some of which *Serpulæ,* and in others forms resembling *Trilobite,* abound.

Mr. Milligan also submitted a series of Tasmanian *Haliotidæ,* illustrative of a paper on Australian Ear-shells, by Mr. Swainson, which was brought under the notice of the meeting.

His Excellency the President presented a copy of Maw and Company's Patterns of Encaustic Tiles. His Excellency also presented a printed pamphlet on "TRADE MUSEUMS, their Nature and Uses," by Edward Solley, Esq., F.R.S. &c., Secretary of the Society of Arts, London, together with printed circulars from the same gentleman intimating his appointment to the charge of forming a Museum of raw and manufactured animal products, and soliciting contributions, accompanied with descriptions of source and localities, mode of collection and preparation, &c.

A printed circular letter from the director of the Royal Gardens at Kew, and of the Museum for vegetable substances, lately formed there, requesting similar aid and information in respect of plants and their various products, was read.

His Excellency then read the following note, dated 2nd February, 1854, from Sir W. J. Hooker:—"Sir,—The Earl of Clarendon having with great difficulty procured from Morocco perfectly fresh seeds of the Argan-tree *(Argania sideroxylon),* and placed a quantity of them at my disposal, I deem it my duty to distribute them, and to send them especially to those colonies of our own where the climate is suited to their growth and vigour. The husks are greedily eaten by cattle; the nuts yield a valuable oil, and the wood is hard, and useful for many domestic purposes.

"I have the honor, &c. &c."

A quantity of seeds have been left at the Museum for distribution, and persons desirous of cultivating them, and disposed to furnish a report of their success or otherwise, may obtain a portion on application.

His Excellency laid upon the table a pamphlet by Professor Piazzi Smyth, "On Raising Water for the purposes of Irrigation in the Colonies."

Tables of Meteorological Observations made at Government House by Messrs. Hull and Dobson, for the three months ending 31st March last, were also laid before the meeting.

Sir William Denison then read a Report from Major Cotton, (embodying a brief Report from Mr. Sprent), upon the Trigonometrical Survey of Van Diemen's Land, now in progress. The original base line measured at Ralph's Bay extended to 20,181·635 feet, or nearly four miles; the line of verification which was subsequently measured at Norfolk Plains extended to 25745·7 feet; the length of this, computed from a series of 33 triangles, extending to a distance of more than 100 miles, being 25,746·0 feet, exhibits an approximation so close as to be scarcely credible, the difference being only about 3½ inches. His Excellency the President remarked that the correspondence was so remarkable as to have created in his mind, first, curiosity; and then, some doubt of the absolute accuracy of the calculations; and that to satisfy himself he had worked through the calculations and proved the accuracy of the results.

The observations at the main stations were taken by Mr. Sprent with a 12-inch altitude and azimuth instrument, and at the secondary stations with an 8-inch theodolite.

The rods used in the measurement of the base lines, 15 feet in length by 2 inches square, were made in 1849, in damp weather, of old Baltic fir, saturated with boiling oil, varnished, rolled in flannel, packed in saw-dust, in coffers 6 inches square, closed at the ends, but leaving room for the rods to expand. To the ends of the rods, which were supported centrically in the coffers by blocks of wood, were attached brass caps rising to the upper surface of the coffer, and bearing vernier scales, by which their lengths were determined to the 400th part of an inch, agreeable to the only standard measure then in the colony, a 4-feet steel measure divided into inches and fortieths. The rods have been measured from time to time since without exhibiting any appreciable difference. The original base line has been measured three times—once in 1849 and twice in 1851, and the length assumed is the mean of the two last, which differ only .85 feet from the first,—a discrepancy owing probably to the comparatively imperfect nature of the indicating scale, which at the time of the last measurements had been improved, so as to read with precision to the 5000th part of a foot. His Excellency the President observed that the colony already possessed upwards of thirty principal stations, whose relative position is absolutely determined within a few inches in any case, and that it is intended during the ensuing summer to extend the triangulation along the west coast, and there to measure one or two fresh lines of verification, probably in the neighbourhood of Port Davey or Macquarie Harbour.

The Reports were accompanied with a diagram showing the triangles between upwards of thirty principal stations, extending from Ralph's Bay to Norfolk Plains, and there were appended tables of extracts from Field Books, and an elaborate series of results from local observations and from the system of triangulation.

Mr. Moore, of New Norfolk, exhibited two of the sewing machines patented by the Lancashire Sewing Machine Company, and sundry fragments of cloth were rapidly stitched together in a neat and substantial fashion in the presence of the members, most of whom closely inspected the mechanism of the automaton, which is calculated to do the work of about twenty ordinary hands.

A general discussion on subjects before the meeting ensued, when the members separated into conversational groups; the various instruments and apparatus submitted in connection with papers read were minutely examined,—His Excellency the President, Lord Alfred Churchill, Mr. MacNaughtan, Mr. Champ, Mr. Kilburn, and others taking a prominent part.

About ten o'clock the thanks of the Society were voted for the donations and papers submitted, and the President having then left, the members separated soon after.

14th June, 1854.—Monthly meeting; His Excellency Sir W. T. Denison, President, in the chair.

The following members were present:—Drs. Agnew, Downing, Hall, Hoeltzel, Colonel Last, Capt. Hamilton, R. E., Capt. Stoney, Messrs. Barnard, A. Butler, F. Butler, R. Butler, W. Champ, Dobson, Henslowe, Hone, Hull, Kilburn, Lochner, R. E., Makeig, Matson, Moore, Moss, Perkins, Rolwegan, Tapfield, &c.

The following having been ballotted for were declared duly elected Fellows of the Society:—Charles Octavius Eardley-Wilmot, A.P.M., Sorell; Walter Davidson, of Riccarton; Charles James White, of Hobart Town, Esquires. Other candidates for membership were nominated.

The following donations were announced:—

To the Library.—By order of His Excellency Sir W. T. Denison, 1 quarto volume, (2nd) of Magnetical and Meteorological Observations taken at Toronto in 1843–4 and 5, and sent out by the British Government.

Also Transactions of the Royal Hawaiian Agricultural Society, vol. i. Part IV.

Journal of the Agricultural and Horticultural Society of India, vol viii. Part IV., from the Society at Calcutta.

From the Royal Institution of Great Britain:—

Annual Report for 1852.

Notices of Meetings from November 1852 to July 1853.

From the Geological Society of London:—

Annual Reports from 1851 and 1852, together with Fasciculi of Proceedings of the Society from April 1850 to July 1851.

From the Rev. T. J. Ewing, of New Town:—

Observations on the Dialects of the West of England, by James Jennings.

Treatises on the Lancashire Dialect, with Glossary.

Ditto on the Yorkshire Dialect, ditto.

Ditto on the Exmoor Language, ditto.

From Henry Tonkin, Esq.; a Roman Catholic Missal, published at Antwerp in 1614.

From Mr. Thomas Moore, of New Norfolk, a series of Geological Specimens, comprising Galena and associated minerals from Laxey Bay, Isle of Man. *Coking* Coal from the Lancashire coal-field. *Cannel* Coal from Wigan, Lancashire. Black Bituminous Shale from Clifton, Bolton-le-Moors. Also impressions of Plants, &c., enclosed in hard nodules of a tough clayey sandstone belonging to the Coal Measures, intersected by Railway Cuttings at Clifton, between Bolton and Manchester—amongst them are species of *Stigmaria, Lepidostrobus, Trigonocarpum, Calamites, Pecopteris, Neuropteris,* &c.; also from Mr. Moore a specimen of Bog-Oak from the "Red Moss," Bolton-le-Moors.

From Mr. R. C. Wood, of Singapore, a large collection (20 species) of elegant Corals obtained there.

From Mr. MacNaughtan, a sample of the Seam of Anthracite Coal recently intersected at a depth of 56 feet in the experimental borings carried on at Spring Bay, and which it is understood are now more than 100 feet down.

From Mr. Phineas Moss, specimen of Cork cut into thin slices by the circular saw for hat-making purposes.

From Mr. G. Fraser, Colonial Treasurer, a Skin of the *Cladorhynchus pectoralis,* "Banded Stilt" of Gould, one of seven recently shot near Ralph's Bay—a bird which, Mr. Fraser remarks, has been described by Gould as belonging to the Southern and Western Coast of Australia, and is not noticed as an inhabitant or visitor of Tasmania.

From Mr. Jeffery, of the Observatory, a Skin of the Black Cockatoo of Tasmania, *Calyptorhynchus xanthonotus,* GOULD.

A note read from Mr. W. H. Catlett, Secretary to the Australasian Botanical and Horticultural Society of Sydney, soliciting an interchange of Specimens.

A letter read from Mr. Mitchell, Secretary to the Zoological Society of London, acknowledging the receipt of "Papers and Proceedings" of this Society.

The Secretary reported that a "Ward's" case containing 51 plants, &c., has been furnished to Mr. Swainson, together with a packet containing 30 varieties of Seeds, on condition that the case is to be returned filled with indigenous plants of New Zealand.

The Secretary read a short paper by Alexander Cross, Esq., R.N., of Rochester, on the pointed-nose shark of the Pacific, *Oxyrhina gomphodon,* of which the formidable jaws, tail, and spine in the Museum were exhibited.

The Secretary submitted a note from Alexander Mac Naughtan, Esq., drawing attention to the evidence given by Professors Ansted, Brande, Anderson, and other eminent chemists and mineralogists, upon a trial reported in the *Witness* newspaper of 3rd August, 1853, in which the physical characters and chemical composition of a mineral deposit, which he supposes to be similar to the combustible schist from the Mersey River, used instead of coal, for the purpose of producing illuminating gas, are fully detailed. Various extracts were read.

A paper was then read by Thomas Moore, Esq., on the experiments which he has lately conducted with the view of testing the comparative value of the Mersey schist, and of the coals from Schouten Island and the Douglas River, for gas-making purposes, and the printed details were laid on the table; from which it appeared that a quantity equal to 2lbs. weight of each left of residuum as follows:—

Mersey combustible schist	25 ozs.
Schouten Island coal	26 ozs.
Douglas River coal	22 ozs.

Specimens of each were placed before the meeting and carefully examined—the first consisted of fragments of brownish shale and a soft, sooty, fine, pulverulent matter; the second consisted of hard, greyish-black angular fragments, such as had been introduced into the retort apparently little altered by heat; the third had fused into a compact and nearly solid mass of coke. The amount by weight, therefore, of gases actually yielded during the distillation must have been as follows:—

From the Mersey schist	21·9 per cent.
Schouten coal	19·06 „
Douglas River coal	31·25 „

Results not in accordance with the volumes observed to have entered the gasometer in the three cases respectively.

Mr. Moore observed that his apparatus, having been constructed for producing gas by the decomposition of refuse, fatty and oily matters, slowly entering a retort which ought certainly not to rise above a dull red heat, is not calculated fully to elicit the capacity of coal for gas-making, but he had considered that even approximate results might be of some use, and that he hoped soon to see the day when Hobart Town would be lighted with gas from Tasmanian coal, of which he could aver from his own observation there is great abundance, and of a quality calculated alike for steam purposes or for gas-making.

A long and animated discussion on this subject followed, in which His Excellency the President, Dr. Agnew, Captain Hawkins, the Secretary, and several other members bore a part.

Sir William Denison was of opinion that more precise experiments and an exact analysis was still a desideratum as respected these fuels, more especially the Mersey Schist.

Mr. Milligan reminded the meeting, that as the inflammable basis of this mineral, when examined by Mr. W. Archer and himself, with the aid of a microscope, had been determined to be a resin, it would probably be found to differ from that of "Torbane Hill," in Linlithgowshire, Scotland, descriptions of which had been quoted from the *Witness* newspaper, as it had been distinctly stated that in this latter no trace of organic matter could be discovered.

Mr. Barnard read the following paper by R. H. Bland, Esq., of Melbourne :—

On the Character, Habits, and Customs of the Aborigines of Western Australia:—

"Sketches and anecdotes illustrative of the habits and customs of the aborigines of Australia are interesting, particularly now that the race is rapidly disappearing, and the habits of the remainder materially altering, owing to their intercourse with their more civilized neighbours.

"The aborigines of Western Australia shortly after the settlement of that colony in 1829 showed themselves very hostile to the settlers, and in a few months a system of bush warfare commenced, which lasted for several years, causing much loss of life and great interruption to the settlement of the country.

"The leaders in this warfare on the side of the Blacks were two men named "Midgegaroo" and "Yagan," father and son, men of courage and determination, far above the rest of their tribe. The former was captured, and shot at the jail door, Perth: the latter, who, though extremely treacherous himself, placed the most implicit reliance on the word of the white man, was proclaimed an outlaw, and a reward offered for his apprehension, a circumstance of which he was perfectly aware. I regret to say he was afterwards shot by treachery, his head taken off, and sent to England, where it probably enriches the shelves of some Museum. The boy who shot him was in turn killed by the blacks immediately after while attempting to escape.

"The Murray tribe were very hostile to the whites, and were not reconciled to their presence until a considerable number were shot in an encounter with the police and soldiers who accompanied the Governor on a tour in that district. This discomfiture and loss completely broke the spirit of the tribe.

"The York tribe were also very troublesome, and took every opportunity of attacking any unarmed settlers that fell in their way: as might have been expected, the lives of many blacks were taken in retaliation. This system of retaliation continued until the murder by the blacks of a woman and child, under peculiarly revolting circumstances, induced the Government to use additional efforts to apprehend and bring the perpetrators to justice, when two of the principals were taken and convicted, and sentenced to be hung in chains upon the spot where the murder was committed,—a piece of well-timed severity which had a most salutary effect, as from that day to the present there is sufficient reason to believe that not one case of premeditated murder has been committed by the blacks in that or the neighbouring districts; a result partly dependent on circumstances that we were not aware of at the time,—namely, that the blacks of that colony have a dread of their remains lying unburied, and being of opinion that if their bodies are exposed as a prey to the birds and wild dogs, they can have no prospect of an existence in a future state; the extent of their belief in which, however, so far as I have been able to make out, amounts to little more than the notion of a transmigration of the souls of departed blacks into the bodies of white men whom they have most closely resembled in appearance or manners, and whom they named accordingly after those of their friends who had died. This belief, I think, arose from their being otherwise unable to account for our appearance amongst them, as when occasionally taunting them with the absurdity of the notion, they have with some warmth answered by asking, how could you have known the way to this country unless you had been here before?

"Religion, I may safely say, they have none. They believe in an evil spirit; and the *Boyala* men, or doctors, have considerable influence over them.

"They disbelieve altogether in natural deaths, that is death from natural causes. If a man tumbles out of a tree and breaks his neck, they think that his life has been charmed away by the *Boyala* men from another tribe, and the duty of avenging his death devolves upon his brother or nearest relative. This leads to constant feuds and numberless treacherous murders. Every attempt has been made by the Government through the Protectors to check the evils arising from this barbarous superstition, hitherto, however, with but partial success, as the obligation they feel under to avenge their relative's death is very strong. One man I recollect whose brother was killed, struggled hard against this feeling, which in the end, however, prevailed. He wasted away, said he could not sleep, and that his brother's spirit continued to haunt him wherever he went, and to upbraid him with cowardice for not avenging his death; an act which in the end he felt himself compelled to accomplish.

"The Government of Western Australia have latterly, I regret to say, resorted to hanging aborigines guilty of this offence. I much doubt the propriety of interfering to such an extent in quarrels purely *inter se*—it would seem to be a subject for the Missionary to deal with, not the hangman. Of the intelligence and aptitude of the aborigines for learning, I am favourably impressed; their powers of imitation enable them, with very little practice, to assist in all the ordinary occupations of a settler's life. At school they are quick at learning the rudiments of education, and will generally learn to read in a much shorter time than a white child of the same age. A curious circumstance occurred at Perth connected with education;—a labouring man married an aboriginal girl who had been educated at the Wesleyan mission establishment, and who after marriage taught her husband to read. It is much to be deplored that all the efforts hitherto made permanently to improve their condition have met with but little success. In Western Australia great exertions were made in this good cause by the Wesleyans, aided by the Local Government; but after a residence of a year or two at the institution, Perth, where they were well cared for, a large proportion of them died within a brief period of each other of some complaint of the lungs. Indeed, their predisposition to pulmonary complaints is rather surprising: very many die of influenza, and it is evident that they are more susceptible of these diseases now than formerly; a condition which may, I think, be partly accounted for from the fact that the bush blacks are worse clad now than before the country was settled. Formerly, every man had a good kangaroo-skin cloak: that garment has now given place to some cast-off clothes of the Europeans, or to an old blanket, confessedly insufficient to protect them against cold and wet. Their mode of life has also materially altered: instead of gaining a subsistence by the highly invigorating practice of hunting, as formerly, many live amongst the settlers; while others get a very precarious livelihood between begging and stealing, eating dead stock, &c."

His Excellency the President referred to the Secretary for information as to the religious belief and notions generally on spiritual matters of the aborigines of Van Diemen's Land.

Mr. Milligan said he had ascertained that the Tasmanian aborigines, previous to their intercourse with Europeans, distinctly entertained the idea of immortality as regarded the soul or spirit of man: their legends proved also their belief in a host of malevolent spirits and mischievous goblins, whose abodes were caverns and dark recesses of the dense forests, clefts in rocks on the mountain tops, &c., and that they considered one or two spirits to be of omnipotent energy; but that they do not seem to have invested even these last with attributes of benevolence, although they reposed unqualified trust in the tutelar agencies of the spirits of their departed friends and relations. To these guardian spirits they gave the generic name "Warrawah," an aboriginal term, like the Latin word *umbra*, signifying shade, shadow, ghost, or apparition. Mr. Milligan stated that the dead were variously disposed of by different tribes,—by some they were burnt,—by others placed in various attitudes in hollow trees and abandoned,—while by others dead bodies were thrown into holes made by the casual uprooting of large trees, and therein left, partially covered with rubbish, &c.

The Secretary laid before the meeting an elaborate analysis of the relation between Heat and the Constitution of Gases, by a resident in Melbourne, transmitted by the author to the Society.

The thanks of the meeting having been unanimously voted for the papers produced and the donations made to the Society, His Excellency the President left the chair about ten o'clock, and the members separated soon after.

12TH JULY, 1854.—Monthly meeting.

The members present were :—His Excellency Sir W. T. Denison, President, in the chair; Dr. Agnew, Dr. Butler, M.L.C., Dr. Hall, Dr. M'Carthy, Colonel Last, Lieutenant Lochner, R.E., Messrs. Champ, Hone, R. Butler, Gould, H. Hull, D. T. Kilburn, Mac Naughtan, T. Moore, G. Makeig, Moss, Rolwegan, Vautin, Whitcomb.

The following gentlemen having been ballotted for were declared duly elected Fellows of the Society :—Thomas Cruttenden, of Woodsden; Joseph Ward, of Fingal; Malcolm Laing Smith, of Flinder's Island, Esquires.

The Secretary announced the receipt of Three Parts of the Journal of the Royal

Geographical Society of London from the Rev. T. J. Ewing, of New Town, and read a note from Mr. Ewing promising a paper on the Birds of Tasmania for the August evening meeting.

Mr. Hugh Hull presented for the Library a "History of Van Diemen's Land from 1824 to 1835," printed by Henry Melville, Hobart Town.

A few geological specimens procured during the antarctic voyage of the *Erebus* and *Terror* were received from Mr. Payne, of Melville-street.

The Secretary read a note from Mr. Alderman Elliston transmitting ten Casts of Aborigines of Tasmania, taken in plaster of Paris by the late Mr. Duterreau.

A note was read from Mr. D. T. Kilburn presenting a Folding Stereoscope, the invention of Mr. E. Kilburn, of Regent-street, London, and patented by him in England and France.

Colonel Last presented from Lieut. Gayner, of Norfolk Island, the skins of a Bittern (*Botauris Australis*), and a Cuckoo (probably the female of *Eudynamis Flindersii*, LATH.), with a dried specimen of Scolopendra.

Mr. Rolwegan presented the *Staff* of Office (Hane) of a Chief of New Zealand.

A Fish (not named, preserved in spirits) was received from Marcus Aitkin, Esq., of Fingal. He had obtained it in a seine at the Scamander River, on the East Coast.

A note from Mrs. Walker, of Launceston, was read by the Secretary bringing under the notice of the meeting a *cranium* which had been forwarded to her, and alleged to have been found in the interior of New Holland. The lower jaw was missing, and there were no teeth in the much-worn alveoli of the upper maxilla. Having been examined by Drs. Agnew, Butler, and others, it was pronounced to be the skull of a Seal of the genus *Arctocephalus.*

The Secretary laid on the table a Report from the Superintendent at the Gardens of the despatch of a case of plants to Geelong per *Iron Tasmania.*

His Excellency the President read a note from Mr. Francis Cotton, of Kelvedon, Swanport, drawing attention to the unusual character of the season, as evidenced by the fact, that in the first week of this month the raspberry plants in his garden were covered with blossom and fruit in different stages of growth up to ripeness in several instances; that many of his roses were then in full blossom, and that the sweet briar hedges presented quite a gay appearance; Mr. Cotton observing, "nothing of the kind has occurred before in our experience, which extends over twenty-five years in this hemisphere."

Sir W. Denison added, that in Dr. Hampton's garden the pear trees had not only blossomed a second time, but produced a second crop of well-formed fruit.

Several members adduced similar recent instances of blossom on fruit trees, rose trees, &c.

The Secretary read a note from the Rev. R. L. King, of Sydney, transmitting a long, learned, and interesting paper upon Australian Entomostracans, illustrated with carefully-executed drawings of new species.

The Secretary drew the attention of the meeting to a small flat fish, about three inches in length, having a somewhat shield-like form of body, enclosed in fixed enamelled plates above and below, with a sauroid tail terminating in a filamentous point: the upper jaw is a continuation of the superior enamelled plate, the snout is in the form of a delicate flexible little trunk, a little behind which is the mouth on the under surface, the under jaws being apparently constituted for moving, when fresh, upon the upper fixed portion, with a slit between for gills. On either side, from a point corresponding to the upper quarters of a shield, a fin composed of soft tapering rays passes off, having much the aspect of the lateral processes characterizing the *Pterictkys* of the Devonian rocks in Scotland. This remarkable little animal was obtained recently from the stomach of a fish taken with hook and line at a depth of two or three fathoms in D'Entrecasteaux's Channel, opposite to Oyster Cove.

Mr. Mac Naughtan drew the attention of the meeting to a report in the *North British Daily Mail* newspaper of the proposed scheme for supplying Glasgow with water from Loch Katrine, a distance of about 60 miles, and the probability of the undertaking, upon which £20,000 had been expended, being abandoned, in consequence of the extreme purity of the water rendering it liable to become rapidly impregnated with lead from the piping used. The Secretary read the analysis by Professor Penny.

The thanks of the meeting having been unanimously voted for donations and papers, His Excellency left the chair soon after nine o'clock, and the members separated.

9TH AUGUST:—Monthly meeting; His Excellency Sir W. T. Denison, President, occupied the chair.

Amongst the members present were:—Dr. Agnew; Messrs. Barnard, Bisdee, Boot, Brown, Fraser, Mac Naughtan, and Dobson; Rev. Alexander Cairnduff; Captain Hawkins, R. E.; Messrs. Hone, Hall, Kilburn, Loch, Matson, Moss, Makeig, Lee, and Rolwegan.

Dr. Macnamara, late of Ross, and Mr. Deakin, of Murray-street, were elected Fellows of the Society. Other candidates were proposed preparatory to the next ballot.

The following presentations were made:—

To the Library,—From Mr. MacNaughtan, "The Electric Telegraph—its History and Progress," by Edmund Highton, C. E.

Report of the Celebrated Trial in the case of the *Torbane Mineral*, before the Lord Chief Justice General and a Special Jury.

From Mr. Deakin,—Coloured Map of the Seat of War in the North of Europe and the East.

From Mr. Rodd,—A Dutch work on the Transformations of Insects, dated 1774, and copiously illustrated with coloured plates of moths, butterflies, and caterpillars, &c., and the plants on which they are found.

From the Tasmanian Steam Navigation Company,—Design and Plan of the *City of Hobart* Steamer.

To the Museum, from Peter Fraser, Esq., M.L.C.—A specimen of Land Rail, *Gallinula crex*, shot by him in Scotland, and stuffed and mounted by himself.

From Mr. L'Estrange, a small collection of Sea Shells picked up by himself at Singapore, Penang, Sydney, and other places.

From Mr. Mac Naughtan, a large specimen of the Black Bituminous Schist, known as the Torbane Hill Mineral. Also a specimen of the combustible Schist from the Mersey River, exhibiting an imperfect impression on one side of a Bivalve Shell.

From Mr. Duncan Macpherson, a section of Timber from a large Gum Tree, displaying a solid centre of an inch to an inch and a half in diameter, closely embraced by the exterior concentric circles of ligneous matter, but standing out clearly and distinctly apart, with thick short branches projecting irregularly into the surrounding wood, conveying the idea of a tree within a tree. Also a fragment of Sand Stone from Sandy Bay, exhibiting in its substance numerous mammillary forms, cemented with ferruginous matter.

From Captain Smith, of the Coal Mines, Tasman's Peninsula, a collection of Ova-cells of the large *Fasciolaria* of these shores, each of which on being opened yield a number of minute shells of a white colour.

From Dr. Moore, of New Norfolk, specimens of Steatite from crevices in Greenstone obtained in that neighbourhood.

From Mr. J. L. Mac Laine specimens of Sandstone believed to belong to the carboniferous series, and represented to have been obtained in the immediate vicinity of coal upon the left bank of the Huon River, near Surveyor's Beach.

The attention of the meeting was called to a bunch of raspberries in various stages of advancement, from blossom to perfectly ripened fruit, sent to the meeting by Sir Henry Atkinson, from whose garden, at the upper end of Macquarie-street, they were taken. A note from Mr. H. Hull on the extreme mildness of the present winter, as exemplified by the ripening of these and other fruits, was read.

A communication from Mr. H. Hull was also read on a paragraph in the writings of Christian Franc. Paulinus, in the 9th century, wherein he states that certain trees in the Island Sombrero, in the East Indies, have large worms attached under-ground in place of roots, &c., and which Mr. Hull supposes to indicate the knowledge in that early period of some species of *Spheria*, or plant-caterpillar like that of New Zealand, or of Franklin's Village, Van Diemen's Land.

A letter was read from Mr. J. Hobbs, of H. M. Customs, Melbourne, addressed to Dr. Bedford, of this city, drawing attention to an article in the *United Service Journal* upon the character and virtues of a plant known by the name of Guaco, and said to be indigenous in the Caraccas, South America, and in some of the

West India Islands, the juice of which has been considered an antidote to the poison of serpents and venomous insects, and when administered in certain prescribed modes to secure immunity from their bites.

The Secretary reported receipt of a short paper by Mr. Hawkes, of Franklin Village, upon the *Sphœria Gunnii,* lately read at a meeting of members of the Society at Launceston.

The Secretary read a communication from the Rev. T. J. Ewing, of New Town, accompanying Part I. of a classified catalogue of the Birds of Tasmania, which Mr. Ewing has undertaken to complete forthwith for publication. The reverend gentleman has offered to place at the disposal of the Society for their library a copy of that portion of his stupendous collection of descriptions of species which embraces the Ornithology of Tasmania.

Tables of Meteorological Observations taken at Government House during the months of May, June, and July last, by Mr. F. Stanley Dobson, were laid before the meeting.

Tables of Meteorological Observations made daily at Norfolk Island, from 1st April, 1853, to 31st March, 1854 last, were also submitted to the meeting.

Mr. Mac Naughtan read a carefully-compiled statement of the characteristics and qualities of the Torbane Mineral, as compared with the ordinary coals of England and Scotland, with the cannel coal, and with the combustible schist from the Mersey River. The subject excited much interest, and led to a protracted discussion, in which many of the members present joined.

Mr. Phineas Moss then read an interesting paper "On the Science of Astronomy as known to the Ancient Jews," which was amply supported by quotations of the original Hebrew from the Scriptures, throughout which Mr. Moss showed there were numerous allusions and circumstances having reference to the subject from the time of Job (about 1400 years before the Christian era) downwards.

Conversation was kept up till after ten o'clock, when, upon a vote of thanks having been passed to the various persons who had made presentations and produced papers, His Excellency the President left the chair; and the meeting separated about half-past ten, to meet as usual on the second Wednesday of next month.

13TH SEPTEMBER, 1854.—Monthly meeting; J. W. Agnew, Esq., M.D., in the chair.

The following gentlemen were after a ballot declared to be duly elected:—

Rev. H. J. D'Emden, of Hobart Town.
George Bisdee, Esq., of Wood Spring.
Edward Bisdee, Esq., M.L.C., of Lovely Banks.
George Morgan, Esq., of Hobart Town.

The Secretary announced the receipt of three Treatises upon Australian and Tasmanian Plants from the author, Ferdinand Müller, M.D., Government Botanist for Victoria; forwarded through Andrew Clarke, Esq., Surveyor-General of that Province; Statistics of Van Diemen's Land, 1844 to 1853, from James Barnard, Esq., Government Printer. Also, from the Royal Society of London, Fasciculus No. 3 of Vol. 7 of Proceedings of the Society.

The Secretary laid before the meeting a letter from John Alexander Smith, Esq., Honorary Secretary to the Auckland Museum, with the annexed descriptive list of a series of auriferous minerals from the Kapunga Diggings, presented to the Society.

"List of Specimens sent from the *Auckland Museum*, New Zealand, 8th July, 1854, to the Secretary of the Royal Society of Van Diemen's Land, Hobart Town.

GOLD SERIES, NEW ZEALAND.	BOX A, No. 1.
From Coromandel Harbour, New Zealand. From Uiou Diggings.	No. 1.—Nugget; only four have been received by me; they were discovered in the clay marked (B, No. 3) about 10 feet below the surface.
From Uiou Diggings. This has been broken.	No. 2.—What are termed here Nuggets; the largest yet found was about the size of a hen's egg; they are found in the bed of the stream.
From Uiou Diggings.	No. 3.—Gold in Quartz; also termed a Nugget here.
	No. 4.—Gold Dust; in sand procured from washing earths, marked B, Nos. 1, 2, 3.
	B, No. 1.—Specimen of gold-bearing felspathic quartz, from Kapunga Diggings.
	B, No. 2.—Specimen of gold-bearing dark yellow clay, from Kapunga Diggings.
	* B, No. 3.—Specimen of gold-bearing white clay, mixed with leaves and small fibres of roots, &c., from Kapunga Diggings.
	C, 1—1 Specimen of Chalcedony from Coromandel.

* Gold Dust in iron sand is found in all these earths by washing.

From Uiou Diggings.

D, 1.—Six Geological specimens from Coromandel. Vicinity of gold diggings.

E, 1.—One specimen of earth found in vicinity of gold diggings.

F, 1 & 13.—Thirteen Specimens of quartz from the gold diggings of Coromandel Harbour, New Zealand.

The Uiou and Kapunga or Wynyard Diggings are both at Coromandel Harbour, and about ten miles distant from each other.

The Uiou is a small river, in the bed of which the gold is found, generally in the form of (A, No. 2), the surface being smooth and water-worn; dust is likewise found by washing.

The Kapunga are what are termed Dry Diggings, generally in the bend of a river; for facility of water an excavation is made; the clay marked B, 3 is then carried to the *Long Tom* and washed, when the produce is nuggets like A, No. 3, and gold dust in iron sand, like A, No. 4.

Z, 1.—Specimen of Iron Sand found in large quantities on the coast of New Zealand.

"JOHN ALEXANDER SMITH, *Hon. Sec.*,"

"Auckland Museum."

A specimen of native bread *(Mylitta Australis)* was received from Mr. Belbin.

A specimen of keyhole limpet, *Fissurella sp:* found at Sandy Bay, showing the animal with the shell attached, preserved in spirits, was received from Mr. H. Hull.

A few mineral specimens, and a packet of seeds, collected by Captain Berthon, in Australia, were received from that gentleman.

A small collection of Mauritius shells was received from Mr. F. S. Dobson, together with a specimen of *Diodon* from the same place.

A specimen of clay and shale, brought by Mr. Cockburn from Marlborough, part of the erupted matter reported some few months since in the newspapers as having been the work of a volcano or earthquake, was laid upon the table. Mr. Cockburn has visited the locality, and describes the phenomena as strictly those of a land-slip upon a surface having considerable inclination.

Dr. Downing presented from G. F. Euston, Esq., Colonial Assistant Surgeon of Norfolk Island, the skin of an Avocet, *Recurvirostra rubricollis,* Temm.

A specimen of musk duck, *Biziura Lobata,* Gould, was received from the Douglas River Coal Company's Establishment, East Coast. A collection of fine specimens of *Sphœria Gunnii,* obtained at Franklin Village, was received from Mr. W. K. Hawkes, part of which are intended for the Paris Exhibition.

Mr. Milligan added to the collection the cranium of a Seal—*Stenorhynchus leptonyx*, F. Cuv., obtained at Oyster Cove, D'Entrecasteaux Channel.

A sample of Oil obtained from the Mersey Mineral, by distillation, has been presented by Dr. Lee, with the following notes on the subject:—

(Copy from Note Book.)

"Mem. I.—*Concerning the* Mersey Shale, *from Mr. Mac Naughtan.*

Microscopic Structure.

By Reflected Light—(90 Diameters.)

Layers of more or less irregularly-circular discs of a resinous colour, *i.e.*, varying from a pale amber in the brightest light to a dull brownish orange in the shade; feebly translucent; arranged with considerable regularity on their flat surfaces, these surfaces often being indented on the centre, somewhat resembling the form of a human blood corpuscle, in some instances wrinkled as by pressure. The interstices between are interspersed with a quantity of whitish, apparently amorphous, matter, resembling in appearance white sugar, with a similar brightness of surface.

A very few rhomboidal plates, and some remains of prismatic crystals in a state of disintegration: these, however, were only observed in two out of thirty-seven specimens examined.

By Transmitted Light—(90 Diameters.)

Discs vary from ·013 to ·018 and ·019 of an inch in diameter. Some as large as ·02, semi-translucent, mostly marked with an irregular double line, apparently contained in their interior.

When ruptured, the outer coat appears thin, and at 580 diameters amorphous.

Mem. II.

Chemical Relations, &c. &c.

Colour—A dull uniform brown or deep buff.

Fracture—Earthy, in layers.

Specific Gravity—

Apparently wholly *insoluble* in alcohol and ether.

Inflammable—burns with a white flame, giving off a large quantity of smoke: form remains unchanged after combustion.

Residue varies from 67·9 to 71·3 per cent. in 7 specimens examined. Consists of silica and alumina. (Query. Any other metal—copper or iron?)

Destructive Distillation :—At a low temperature it yields—

(1) An oily matter.

(2) A tarry matter.

(3) Gives an acid reaction to the water in receiving-vessel.

At white heat gives off a large quantity of gas of a peculiarly phosphorescent odour.

(Query. Is acid reaction due to phosphorus?)

Gas on standing deposits a large quantity of a black tarry liquid matter, and some oily substance.

"RICHARD LEE."

The Secretary read an elaborate analysis of the combustible schist of the Mersey, made at the Andersonian University, Glasgow, by Professor Penny, accompanied with a table showing the proportions per cent. of volatile matters—fixed carbon, ash, sulphur, and water in various coals, analysed by Professor Penny.

A letter was read from J. Macquorn Rankine, Esq., F.R.S.S.L. & E., acknowledging his election into the Society and promising contributions.

The Secretary announced the receipt at the Gardens of a case of plants from Messrs. Low and Co., of Clapton, London,—all dead.

The following communication from the Rev. T. J. Ewing, of New Town, in reference to the Ornithology of Norfolk Island, was read:—

"*New Town Parsonage, 9th September,* 1854.

"MY DEAR SIR,—As the Settlement of Norfolk Island is so soon to be given up, I wish through you, as Secretary of the Royal Society, to endeavour to get the permission of His Excellency the Lieutenant-Governor to have a complete collection of the Birds of the Island formed before it is abandoned. The ornithology of that small spot is interesting on many accounts. Many of the birds originally described by Latham, and figured in Lambert's *Icones,* are supposed to have been brought from there. Several species, characterized by Gould as from Australia, are also attributed to Norfolk Island,—such as *Pachycephala xanthoprocta* and *Pachycephala longirostris.* The *Merula Nestor,* a fine thrush, described by Gould as having been collected by Sturt on the Murrumbidgee, is the *Turdus poliocephalus* of Latham, said by him, and no doubt truly, to be from Norfolk Island.

Most interesting would it be to know if the curious *Nestor productus,* or long-billed Phillip Island Parrot, is still in existence. Major Childs told me in England that the last of its race was tame in his garden when Commandant of the Island.

I have often had specimens of the *Platycercus Pennantii,* the Lowry Parrakeet of Port Phillip, brought from Norfolk Island. Does it breed there? If so, it must have escaped from confinement at first: there is also another lesser Green Parrakeet.

It is said that the common Pigeon has become naturalized there, and has resumed its original habit of breeding in the rocky cliffs surrounding the shores.

A beautiful native pigeon also breeds there.

Does more than one species of tropic bird *(Phaeton)* breed there? Very many sea birds are stated to do so, and it would be desirable to ascertain the fact.

The *Eudynamis Flindersii,* reported at a late meeting of the Royal Society, must have been carried out of its course in migrating. Perhaps the gentleman who shot it can inform us whether it arrived in flocks, or only in a single specimen.

The *Botaurus Australis* too was never before found so far to the eastward.

When the Island was first discovered, Mount Pitt was found to be frequented by thousands of Petrels, probably our mutton birds, *Puffinus brevicaudis.* Do they still frequent the Island?

I lately read that the captain of a whaler had seen on Lord Howe's Island a bird which he describes to be very like the *Notornis Oweni,* a gigantic Rail of New Zealand. If so, it is not unlikely that some representative of this order may be found at Norfolk Island. Does the *Lady Franklin* ever sight Lord Howe's Island either going or coming? What a treat it would be to Owen to send him one of those birds, whose bones have given him so much delight in describing. I must apologize for giving you so much trouble,

And remain, my dear Sir,

Yours very faithfully,

THOMAS J. EWING.

"Joseph Milligan, Esq.,
Secretary Royal Society
of Van Diemen's Land."

After some discussion, the thanks of the Society were voted for the communications and presentations received, and the meeting, which was rather thinly attended in consequence of the bad weather, broke up.

11TH OCTOBER, 1854.—Monthly meeting; the Rev. John Lillie, D.D., a Vice-President, in the chair.

Amongst the Fellows present were Drs. Agnew, Hall, and Lee; Capt. Stoney and Major Berthon; Messrs. Champ, Hone, Kilburn, Perkins, Barnard, Moss, Propsting, &c.

After a ballot, J. E. Calder and Thomas Hewitt of Hobart Town, Esquires, were declared to be duly elected Fellows of the Society.

The presentations were:—By the Rev. T. J. Ewing, of New Town, Two Parts of the "Bulletin de la Société de Geographie."

By Mrs. Tapfield, of Macquarie-street, a manuscript volume containing the characters used to express fifty-four different oriental and other languages, &c., ancient and modern.

From Dr. Knight, of Auckland, New Zealand, through His Excellency Sir Wm. T. Denison,—Named Specimens of forty-two species of Mosses of New Zealand.

The Secretary read Dr. Knight's letter, in which further contributions are promised and exchanges solicited with the Society and individual members.

From Miss Denison was received two fine specimens of *Voluta fusiformis,* one of the most elegant and showy of Tasmanian shells.

Mr. Moses presented two good specimens of *Nautilus Pompilius.*

From the Rev. Mr. Tanner, of Port Phillip, was received (through Mr. Walch) a packet containing about twenty species of seeds of Australian plants, collected by him at and near Wide Bay, New South Wales.

The Secretary read a note from Mr. Thomas Moore intimating his intention of making a collection of specimens of the coal and associated beds in the Lancashire coal-fields, England, for the Royal Society's Museum, in order to institute exact comparisons with the products of equivalent strata in this colony.

Mr. Milligan also read a note from Sir William Denison transmitting a list of Tasmanian and Australian plants asked for in the way of exchange by Messrs. Veitch, of Chelsea.

Mr. Tapfield, of Macquarie-street, presented a few fine specimens of agate, cut and polished, and said to be from Germany.

From Mr. William Lyons was received a lizard, in spirits, resembling *Cyclodus Casuarinæ,* obtained by him on the side of the road to Mount Wellington, by the Springs, about a mile beyond the Cascades.

Mr. Propsting presented a stuffed specimen of one of the smaller species of the *Napu* section of the *Moschidæ,* or Musk-deer tribe, which was brought from India by Major Coombe.

From Mr. Belbin was received the skin of the elegant Australian Honey-eater, *Entomyza cyanotis,* shot by him at Port Phillip.

Mr. G. A. Makeig submitted for examination a sample of arenaceous clay from his farm near the "Flower Pot," D'Entrecasteaux's Channel, coloured with the minute green fungus which has so often led to a supposition of the existence of copper in our clay formations.

From Capt. M. L. Smith was received a hand specimen of a calcareous stratum deposited on granite. The Secretary remarked that upon Flinder's Island, and some of the neighbouring islands, this bed of chalk is found of a thickness varying from a few inches to many feet; in some places a few feet only above the level of the sea,—while in others it occurs (still, however, only as a crust over granite) at an elevation of three or four hundred feet: and besides being met with on the Islands, that it exists also at Cape Grim and at other points along the coast, passing occasionally into a coherent and rather hard marl, and into a marly breccia, and that it may be presumed to have been deposited immediately before the last considerable upheaval of these islands.

From the Reverend J. Fereday, of George Town, was received a packet of seeds of the *Alyxia buxifolia,* the shrubby tree from which the scented wood of the north coast of Tasmania is procured.

From Mr. Calder was received a series of specimens of the beds passed through by him in sinking a forty-feet hole in the richest part of the *old* Eureka line; with a fragment of quartz from the Great (134lb.) Nugget-hole at Canadian Gulley; and specimens of slate from Golden Point, Ballaarat.

Mr. Milligan placed before the meeting a paling thickly covered with barnacles, *Pentelasmis,* sp.? picked up on the sea coast, near the Douglas Piver.

From Mr. Calder was also received a spirit preparation of the small Flying Squirrel, *Acrobates pygmæus,* (Desm.) of Victoria.

An elaborate paper on Tasmanian Statistics for the decennial period ending 31st December, 1853, was read by Mr. Barnard.

Conversations followed, in which most of the members present took part.

It was then moved by Mr. Hone, and seconded by Dr. Agnew, and carried,—"That the thanks of the meeting are due to Mr. Barnard for his able and valuable paper on Statistics, and to the other persons who have made communications and presentations to the Society."

The reverend chairman rose, and the meeting broke up by half-past nine o'clock.

8th November, 1854.—Monthly evening meeting; Joseph Hone, Esq., in the chair.

The following gentlemen were, after a ballot, declared to be duly elected Fellows of the Society: Major Bradshaw, Dr. Atkinson, P.M.O., of Hobart Town; John Sinclair, M.L.C., of Launceston; and Anthony R. Truro, of Campbell Town, Esquires.

The presentations made to the Library were:—By the Rev. T. J. Ewing, of New Town;—"Elements of Physio-philosophy, by Lawrenz Oken, M.D.;" also 2 vols. of the *Bulletin de la Société de Geographie,* and "Westgarth's Commercial and Statistical Report of the Colony of Port Phillip for 1844."

First Report of the Adelaide Philosophical Society from the Secretary, from whom a letter has been received seeking an interchange of communications, and co-operation with the Royal Society in the pursuit and working out of their respective objects and views.

From Ferdinand Müller, Esq., Government Botanist of Victoria, his Second General Report on the Vegetation of the Colony, dated the 5th October last.

From the Rev. W. B. Clarke, F.G.S., &c., Sydney, a Council Paper relative to Gold Discoveries in Australia; another on Sir R. I. Murchison's claim to the same; also Reports Nos. 9 and 10, by the Rev. W. B. Clarke, to the Colonial Secretary, on the Geology of the Clarence District and adjoining regions, and of the basin of the Condamine River, respectively.

Mr. Boot forwarded to the Museum a piece of polished Purbeck stone which formed part of the foundation of the "Old London Bridge," immediately under the "Ladye Chapel," the first stone of which was laid in 1176.

A note was read from Mr. Groom, of Harefield, transmitting one of the largest "Sheep Balls" which has been met with, measuring thirteen inches round. It is well known that these balls consist of a succession of layers of imperfectly digested vegetable fibre. Whether the action by which this matter is accumulated is due to functional disorder, or to the fact of the animal eating plants insusceptible of perfect digestion by a healthy stomach, remains yet to be proved: this to the stock-owner, however, appears to be of small moment, as it seems to interfere but little with the health and condition of the animal affected. Mr. Groom says of this particular ball, "it was taken out of a *fat* sheep four years old: there were many others in the sheep, but this was the largest. As far as I have seen, they do not appear to be injurious."

A letter was read from Mr. Thomas Flude in reference to a sample of Coal taken from the out-crop of a seam exposed by a road party in cutting for repairs near Green Ponds. Mr. Flude says, "the present appearances appear to indicate an obvious dip to the N.E., and running under the hill on the eastern portion of the proposed township of Shepton Montacute, on the top of Constitution Hill, and close to the main line of road; the cutting all above shows a quantity of free-stone, and large iron-stone pebbles mixed with gravel of a bright red and seams of very stiff clay." A sample of the coal was submitted to the meeting, having been forwarded by the Director-General of Roads, by order of His Excellency Sir William Denison.

Mr. F. S. Dobson submitted to the meeting Three Tables of Meteorological Observations taken at Government House by him, in conjunction with Mr. Hull, for August, September, and October last. Mr. Dobson also submitted a Table showing the specific gravity of twenty-five timber trees of Tasmania, ascertained by himself, and read a short but interesting paper upon the subject.

Mr. Milligan read a letter from J. Barnard Davis, Esq., of Shelton, Staffordshire, enclosing a proof of the first plate of his forthcoming Ethnological work, entitled "Crania Britannica," and soliciting contributions from members of the Society and others of skulls of the Aboriginal races of Tasmania, New Zealand, Australia, &c., together with specimens of the hair of the "full blood natives" of these countries for microscopic purposes. The Secretary stated that he would have much pleasure in forwarding to Mr. Davis any contribution of this nature entrusted to him for the purpose, and observed that researches such as Mr. Davis was engaged in were becoming of daily greater importance, in consequence of the rapid disappearance of the aboriginal races under the influence of civilization.

After discussions on subjects before the meeting, it was moved by Dr. Agnew, seconded by Mr. Barnard, and carried,—

"That the thanks of the meeting are due to the various parties who have sent donations and papers."

The following resolution was then moved by Mr. Kilburn, seconded by Mr. Mess, and carried unanimously, "That it is the opinion of this meeting, that an expression of the estimation in which His Excellency Sir William Denison, the President, now about to retire, is held by the Society is required, and that the Secretary do accordingly take steps to bring the subject under the notice of the Council, with a view to the preparation of an appropriate Address to be laid before a Special General Meeting of the Fellows convened for this purpose, and for appointing a deputation to wait upon His Excellency with the same."

The chairman rose, and the meeting broke up at half-past nine.

13TH DECEMBER, 1854.—Monthly meeting; the chair was occupied by Joseph Hone, Esq., senior member of the Council.

Upon a ballot taking place, the following gentlemen were declared duly elected Fellows:—

The Rev. John Allen Manton and Arthur Gardiner, Esq., both of Hobart Town.

A message was received from His Excellency the President excusing his non-attendance.

The following donations were announced:—

From the Royal Geographical Society, a Catalogue of their Library, corrected to May 1851, with addenda to May 1853.

From Dr. Shaw, Address of the Right Honourable the Earl of Ellesmere, K. G., D. C. L., &c., at the Anniversary of the Royal Geographical Society, held on 22nd May last.

From the Royal Society of London, Fasciculus No. 6, Vol. 7, of their Proceedings, forwarded through His Excellency Sir William Denison.

From D. T. Kilburn, Esq., a short History of the Tower of London, by Joseph Wheeler, and a Guide to the Crystal Palace and Park at Sydenham, by Samuel Philips.

For the Museum the following contributions were reported:—

From Mrs. Champ, a fine specimen of a Cowrie, *Cyprea talpa.*

From Arthur Smith, Esq., of Syndal, near Ross, a recent mammilated concretion of arenaceous particles cemented with Silex having somewhat the form of Coral; being portion of a thin bed intersected about ten or twelve feet down in digging a well near his residence.

From the collection of the late Captain Addison, presented by his widow, two Chinese Umbrellas, the barrel of a Chinese Gun bored in stone, closely fitted round with slips of bamboo strongly hooped together, having the touch-hole at the extremity of the breech, captured at the taking of Chusan;—a small Battle Axe and three Clubs of the Fegees;—the Staff of a Baton of a New Zealander, ornamented with carved work;—a similar Staff, having fixed upon it the head of a European tomahawk;—an Adze of the axe stone of New

Zealand, strongly secured by lashings to the handle, upon the European model of an adze;—an Australian aboriginal Shield;—two elaborately carved Boxes with lids;—two Slings and a Waistbelt from some of the Tropical Pacific Islands; and a native's Cloak from New Zealand.

From Mr. John Roberts, a specimen of Coal from the sinking now being carried on at Spring Bay, on Mr. Vickery's estate.

From Mr. H. Hull, specimen of the Kino of the Eucalyptus.

From Mr. Charles Seal, five skins of Tasmanian Snakes, and two Walrus Teeth, obtained from the Esquimaux, Behring's Straits, fashioned and used by them instead of tire-irons for their sleighs.

The Secretary added to the collection fifteen prepared samples of Woods, duplicates of specimens sent last year to the London Society of Arts.

From His Excellency Sir William Denison was received a small Table made of the various woods indigenous to Norfolk Island.

Mr. Moss took occasion to observe that the views lately advanced by him in a paper read before the Society, as to the knowledge of astronomy possessed by the ancient Jews, were corroborated by a statement which he pointed out in a recent copy of a periodical devoted to the literature and concerns of the Jews.

The Secretary read a letter from Dr. Storey, of Swanport, enclosing a communication from Mr. George French Angas, of the Australian Museum, Sydney, proposing exchanges of objects in natural history with this Society.

After some conversation the Secretary read the names of the Members of Council who retire in rotation at the close of the year, namely:—

Sir John Lewes Pedder,	Joseph Hone, Esq.,
Rev. John Lillie, D.D.,	Joseph Allport, Esq.,

and stated that the Council had thought fit to propose these gentlemen for re-election, in conformity with Rule XXXII.

Mr. Moss inquired whether any steps had been taken by the Council in the matter of an Address to His Excellency the President on his retirement?

The Secretary stated that an Address had been prepared, and would be submitted to a Special General Meeting of the Fellows, to be summoned on such day and hour as might now be determined upon.

When it was moved by Mr. Matson, seconded by Mr. Kilburn, and carried unanimously, "that a Special General Meeting of the Fellows of the Society be invited to attend at the Museum for this purpose on Wednesday next, the 20th instant, at four o'clock."

The thanks of the meeting having been then voted for the various donations, Mr. Hone left the chair, and the meeting broke up.

H. AND C. BEST, PRINTERS,
DAILY COURIER OFFICE, COLLINS STREET,
TASMANIA.

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H. & C. Best, Printers, Daily Courier Office, Collins-street, Hobart Town.

PAPERS AND PROCEEDINGS

OF

THE ROYAL SOCIETY

OF

TASMANIA.

VOL. III. PART II.

1859.

TASMANIA:

BY

WALCH AND SONS, HOBART TOWN; AND BY OTHER BOOKSELLERS.

Price—Three Shillings and Sixpence.

XV.—*On Norfolk Island, its Character and Productions.* *By* Charles Toogood Downing, *Esq.*, M.D. [*Read 8th August*, 1855.]

It was intimated at a recent meeting of this Society, that as Norfolk Island is about to pass into the hands of new occupants, it would be desirable to have some record of its natural history and resources. In accordance with the wishes of the members, I have drawn up a short paper on the subject, though with considerable diffidence, in the hope only that fresh facts will be elicited in the after discussion. The sources from whence my information has been drawn have been the histories of the early and later navigators—Cook, Anson, Hunter, Keppel; the narratives of those who have visited or resided at the place; and all those records, correspondences, and reports to which I could obtain access otherwise. As far as possible, I have verified the accounts of others by my own personal observation and experience during three visits to and short residences on the island. Still, this essay, should only be regarded as a *resumé*—as little more than a collection and arrangement of scattered facts, drawn up in the simple and terse style most suitable to this Society. To many gentlemen, some of whom are present, I am indebted for valuable suggestions and information, and am more especially under great obligations to Dr. Nixon, Bishop of Tasmania, for lending the beautiful drawings, (now submitted), taken by himself, and which will aid much in illustrating the subject.

Norfolk Island, discovered by Captain Cook in 1774, is a small spot of land in the Pacific Ocean, south latitude 29° 2′, east longitude 168° 1′. From the capital of Tasmania, of which it is a dependency, it is 1200 miles distant, and about 900 from the port of Sydney. With it are associated Phillip and Nepean Islands on the southern side, and the Bird Islands, or Rocks, seven or eight in number, on the northern shore. The variation of the needle is 11°·00, E.

The group is isolated, not only from its distant position, but its inaccessibility. There is no secure harbour, and the surf beats so heavily on the coral reefs and igneous rocks with which the coast is guarded, that often for weeks together no landing can be effected. A moderate depth of water extends some miles from the shore, the bottom consisting of banks of coral sand mixed with shells,* and affording, although exposed, anchorage; but nearer in, and especially between the islands, the ground is hard and rocky, rendering the holding insecure and fouling frequent. The insecurity from this source is much increased by the force of the current, which often runs at the rate of 2½ or 3 knots an hour between the islands.

The general tides are regular and usually equal, flowing by the shore six hours each way. They make, however, two hours sooner on the Norfolk Island coast than in the stream, or over towards Phillip Island.† The flood runs to the S.W. by S., the ebb to the N.E. by N. The rise is from 5 to 7 feet, and the flow, at full and change, 7¾ hours. Commonly speaking, the tides on this coast will carry a ship clear of danger, not into it. The only exceptions are with respect to the Bambora Rocks at the S.W. extremity of Norfolk Island, and a low point almost corresponding to them, projecting from the S. W. point of Nepean Island.‡ On both these the tides set

* Cook's Voyages, 148. † Burney's Report.

‡ Keppel's Voyage, vol. ii. p. 244.

almost directly, and as they are respectively at the east and west extremities of the bay in which the Settlement is placed, and not more than three miles and a half apart, they add much to the danger. On these Bambora Rocks the *Sirius* was wrecked from this cause in 1791.

Norfolk Island, of an irregular quadrangular form, is about seven miles in length from east to west, by four in breadth from north to south. From the survey taken by Major Burney, the Commanding Royal Engineer of New South Wales, in 1840, we learn that the superficial extent of the island, usually reckoned at 14,000, is 8960 acres;* of this, 1080 acres were then cleared for agriculture, and about 1000 were pasturage. The relative proportions of these have since varied, and rather more land has been brought into cultivation.

The average height of the island is from 300 to 400 feet above the level of the surrounding ocean, although the land is generally higher on the northern side. In this direction lofty perpendicular cliffs bound the shore, and Mount Pitt, with its double summit, rises to an elevation of 1050 feet above the level of the sea. From hence the surface has a gradual declension towards the south, and terminates in a level flat, but little above high watermark, on which the Settlement is placed. The surface is so irregular that, in the language of a sailor,† if correctly laid down in a plan, with all the hills and valleys accurately represented, Norfolk Island would very much resemble the waves of the sea in a gale of wind; for it is composed wholly of long, narrow, and very steep ridges of hills with deep gullies, which are as narrow at the bottom as the hills are at the top.

The soil of the island is very uniform, consisting of a

* Correspondence respecting Convict Discipline, 1846.

† Capt. Hunter's Voyage, 1791.

red, porous, ferruginous earth, originating in the decomposition of volcanic rocks (Wackè*) of ancient date, which occur in seams of various shades of colour like true strata, and pass insensibly into basalt; of which, sometimes columnar, the cliffs on the northern shore are formed. This friable earth alternates with white concretionary marl, both studded with boulders of porphyritic rock, gradually disintegrating. This is evident by their outer layers crumbling into dust under the finger, but gradually becoming denser towards the centre, where their texture is as hard and crystalline as granite. Pumice is found abundantly on the coast. In fact, the whole geological character of the island is indicative of volcanic agency. The low flat on the southern shore, previously alluded to, about a mile in extent from east to west, and a quarter broad, is alone of aqueous origin. It consists of coarse marine limestone, or calcareous grit of recent deposit, and is usually employed for building purposes, but yields on burning lime of great purity. Near this is also obtained sandstone, or calcareous grit of fine quality, from which dripstones and other porous vessels are manufactured.

The only metal found on the island is iron, in the mineral forms of red and yellow ochre. A chalybeate spring has been noticed at Orange Vale.

Phillip Island is about five miles distant from the Settlement. It is $1\frac{1}{4}$ mile long, $\frac{3}{4}$ths of a mile broad, the general elevation being greater than that of Norfolk Island, and averaging 800 or 900 feet above the level of the sea. In physical structure the two islands are identical, Phillip Island consisting of porphyritic rocks more or less disintegrated, and a small quantity of calcareous grit, known as the Sloop Rock, on the shore.

* Topographical and Medical Reports, 1849-50.

Nepean, situated within the former, is about 400 yards from the beach of Norfolk Island. It is a rugged, rocky islet, a quarter of a mile long, and of a horse-shoe form, open to the east. Formed entirely of marine limestone, it rises about 50 feet above the level of the sea, and serves as a habitation to birds, and to them alone.

Rocks, chiefly basaltic, which are separated from the northern coast of Norfolk Island by rapid currents, and worn into caverns by their waves, constitute the Bird Islands.

The briefest history is alone necessary. When first discovered, Norfolk Island was uninhabited. No human foot had previously touched its shores. Colonized from Sydney, in the hope of making it a granary, and subsequently abandoned, it has, chiefly on account of its isolated position and its inaccessibility, been used for many years past as a penal station.

From the cessation of transportation to these colonies, Norfolk Island is now once more deserted, and will shortly be given up to the Pitcairners, a patriarchal people, numbering about 200, descended from the mutineers of the *Bounty*. These particulars, which are of course well known, are adduced merely to show that sufficient time and opportunity have been afforded for observation as to the capabilities of Norfolk and the adjacent islands for the habitation of man, and what have hitherto been made of them. Nepean and Phillip Islands have never been inhabited, except for brief periods by runaway convicts.

The Settlement is situated, as I previously intimated, at the south side of the island, on a level flat of limestone. It consists of the Government-house, convict and military barracks, commissariat stores, a large lumber yard, gaol and hospital, with the private dwellings of the officials.

About a mile distant on the western side is the agricultural station of Longridge, containing extensive farm buildings; and at the back of the island, or northern face, the long since abandoned hamlet of Cascades: excellent roads lead from one to the other of these places.

The landing from boats is effected at the northern or southern side of the island, according to the direction and force of the wind. At Sydney Bay a small jetty has been constructed, with a flag-staff, in order to notify to mariners the condition of the water. Notwithstanding all precautions, accidents are of frequent occurrence. At the Cascades, so named from small streams of water falling over the basaltic cliffs on the shore, the sea is generally smooth when the wind is from the southward, so that landing can be easily effected on some rocks that project into the water. Anson's Bay is now deemed impracticable.

Norfolk Island is abundantly supplied with water of excellent quality. The streams are small and insignificant, but fountains will rise from the rock in every direction, and collecting, run as brooklets down the vallies. The rain which falls during the year is moderate in quantity. Sometimes, as might be expected in a country so near the Tropics, it falls abundantly. Yet, however heavy or long-continued the shower, no water accumulates, as the drainage is thoroughly accomplished by means of the deep gullies which radiate in all directions from the high land towards the sea. Vegetation is hence most luxuriant. Rain falls at all periods of the year, but chiefly during the winter. Fogs and mists are unknown. But few days occur in the course of the year in which the sky is not more or less clouded, and the horizon rarely presents that clear defined outline so common in the Australian Colonies.* In the

* Top. & Med. Report, 1847–49.

summer seasons the prevailing winds are generally dry and from the eastward. In the winter months they come chiefly from the opposite quarter, accompanied by clouds and showers. The few heavy gales are from the south. But the wind most dreaded is that from the north, which comes loaded with heat and moisture, and exercises a relaxing and baneful influence upon the human frame. The average duration of these winds is two or three days, and they usually occur three or four times in the month.

The temperature of the island may be considered both moderate and equable. The highest reading of the thermometer during the year 1847 was 87° Farenheit, the lowest 49° ; the mean annual temperature deduced from four daily observations, including the lowest at night and the highest by day, was 68½° ; the mean difference between the extremes of day and night 17°. In the year 1850, the highest reading of the thermometer in the shade out of doors was 85°, the lowest 51°, showing an annual range of 34°. The mean monthly temperatures during the same year were as follow :—

	°
January	74
February	74½
March	73
April	70
May	65½
June	63
July	62
September	64½
October	65
November	70½
December	72½

These figures indicate an extreme of mean monthly range for the year of $12\frac{1}{2}$; less by $1\frac{1}{2}$ than that of 1849; with an annual mean of 68°,—exactly the same as that of the previous twelve months.

The *Climate* of Norfolk Island, although somewhat relaxing, is considered salubrious. The chief diseases to which residents are subject, as gathered from the medical reports of many years, result from the prevailing heat and moisture, often producing debility and relaxation of the mucous membranes. Few escape without some symptoms of this on their first arrival. Dysentery, of a type intermediate between Tropical and European, is rather common, and may be attributed, in addition to the causes previously mentioned, to the inordinate use of lemons, guavas, and other wild fruit. It is in a measure endemic in the island. Opthalmia, chiefly conjunctival, prevails almost epidemically during the months of August, September, and October,* the exciting cause being atmospheric. Bronchitis again prevails during the winter months. The same may be said of the many rheumatic cases that occur, and which are almost all muscular; such as pleurodynia, lumbago, &c., the articular form being of very rare occurrence. Such are the ordinary ailments of the place; but it is by no means free from other occasional visitations. The scarlet fever, for instance, made its appearance on the island, without apparent propagation, at the time it prevailed as an awful scourge in Tasmania.

The soil of Norfolk Island is of exuberant fertility, so that the rewards of industry may be obtained without its exertion. Forest trees grow in great abundance, and beneath them a rich growth of underwood. This appears to have been the case at the time of its discovery, for

* Annual Med. Report, 1850.

Captain Cook remarked that the ground was so thick with shrubs and plants for about two hundred yards from the shore, that there was great difficulty in penetrating further inland.* This great navigator noticed the striking similarity in natural productions between this group and New Zealand. This was doubtless the case at the time he paid his visit: but since then, so many things have been introduced, so many plants have been cultivated, abandoned or suffered to grow wild, that it is no easy matter to determine at the present day which are and which are not indigenous. It will be well perhaps to describe the nature and economical uses of the more remarkable of these productions.

The most striking objects that meet the eye on nearing the land are the lofty tops of the Norfolk Island Pine, the *Araucaria excelsa* of botanists. This, one of the most elegant of the conifers, towers high above the surrounding forest, or takes its position singly or in clumps on the very verge of the ocean. It thus forms a characteristic feature in the landscape. In height, it may formerly have ranged from 150 to 200 feet, but of late years few trees of this latter elevation have escaped the axe. This pine, compared by some to those of Caledonia and New Zealand, resembles the Norway Spruce, although the tiers of its branches are more distant and regular. The timber is not of good quality, as it soon rots when exposed to the weather, and fearful ravages are made in it by the teredo or auger-worm, when exposed to its action. The bullock-fences of the island require renewal every two or three years. When employed for building purposes, such as flooring in the interior of houses, it is more durable. The knot of this pine is compact, hard, and fine in grain, and, from its translucency and rich dark tint, is admirably adapted to hollow

* Voyages, fol. edit., vol. 2., p. 148.

turnery. Beautiful specimens of this work, executed in this wood, were sent from Tasmania to the Paris Exhibition. These pine-knots, when defective, serve another very useful purpose. They make excellent fuel, and, on account of the rich hydro-carbons with which they are charged, burn with the brightness and persistence of the best English coal.

For economical purposes, the iron-wood, *Notelœa longifolia*,* or *Olea Apetala*,† is the most important and valuable of the indigenous timber-trees of Norfolk Island. It yields a fine, close-grained wood, very hard and durable. This is chiefly employed in wheelwright's work, but may be used with advantage by the cabinet-maker, as some specimens are remarkably well veined.

Among the many ornamental woods obtained from this ocean isle should be enumerated the rose-wood, believed to be a species of acacia, the beech, (so called), the maple, *Acer Dobinea* (?), the hop-wood, obtained from the *Dordonia orientalis*,‡ the hard yellow-wood, from the *Blackburnia pinnata*, the white-wood, and the cherry-tree,—a species of *Exocarpus*; the bark of this latter, rich in tannin, has been used in making leather.

Pursuing our investigation of the vegetable kingdom, we come to what is locally called the White Oak, the *Hibiscus*, or *Lagunea Patersonii*. It is perhaps the largest plant known to exist, belonging to the *Malvaceæ*, or Mallow Tribe. Attaining sometimes an elevation of sixty or eighty feet, and displaying a profusion of large pink flowers with leaves of whitish green, it would form an elegant addition to the shrubbery. In an economic point of view it is valueless, except for firewood.

* Keppel, vol. ii., 282.

† Tasmanian Contributions to the Paris Exhibition, p. 43.

‡ Query—*Dodonea*, sp.:—Ed.

The Cabbage-tree, *Areca*, or *Seaforthia sapida*, was noticed by Cook, and has been since well described by one who visited the island.* It is a handsome palm, with a trunk about twenty feet in height and from one and a half to two feet in circumference, with annular scars, left by the fallen leaves. The fronds form a princely crest at the top of this elegant column. They are pectinate, and are sometimes nineteen feet in length. They vary from nine to fifteen in number. The apex of the trunk is inclosed in the sheathing bases of the leaf-stalks, along with the flower-buds and young leaves. When the leaves fall, double-compressed sheaths are discovered, pointed at the upper extremity, which split open indiscriminately on the upper or under side, and fall off, leaving a branched spadix, or flower-stem, which is of ivory whiteness, and attached by a broad base to the trunk. The flowers are produced upon this spadix. They are very small, and are succeeded by round seeds, red externally, but white, and as hard as horn within. As the seeds advance towards maturity, the spadix becomes green. The young unfolded leaves of this cabbage-tree rise perpendicularly in the centre of the crest. In this state they are used for making brooms. Those still unprotected, and remaining inclosed within the sheaths of the older leaves, form a white mass as thick as a man's arm. This is eaten raw, boiled or pickled. In a raw state it tastes like a nut, and boiled it resembles artichoke bottoms. The seeds furnish food for the Wood-quest.

The *Freycinetia Baueriana*, or Norfolk Island Grass-tree, belongs to the tribe of *Pandaneæ*, or Screw Pines. Its stem, an inch and a half in diameter, and marked by rings as the former, lies on the ground, or, winding round the trunks of trees, climbs like ivy to their summit. The

* Backhouse, p. 264.

branches are crowned with crests of broad, sedge-like leaves. From the centre of these arise masses of red, pulpy fruit, four inches in length and as much in circumference. While in flower the centre leaves are scarlet, which adds to the splendid appearance of the plant.

In the open, grassy valleys, two or three species of tree-fern, the *Alsophila excelsa*, and *Cyathea medullaris*, exhibit with *Maranta elegans*, their rich crests among the surrounding verdure. They often measure forty or fifty feet in height, and have fronds of great length and magnificence. From the centre of the trunk a black wood is extracted, and used by cabinet-makers for stringing.

The Norfolk Island Bread-fruit differs much from that grown at Tahiti or the West Indies. It is the *Charlwoodia Australis*. Attaining twenty feet in height, it branches from within a few feet from the ground, and forms several heads with flag-like leaves, and long-branched spikes of greenish star flowers. These are succeeded by small purple berries, the food of parrots.

The native Spice-plant, by many thought to be the pimento, is the *Piper Psittacorum*, or *Ava* of the South Sea Islands. It yields fruit of a yellow colour and long cylindrical form, which has an aromatic taste, and may be employed as a pickle or preserve.

The Blood-tree yields on tapping a fluid of a bright red colour. This has been used as medicine as an astringent, but is more generally employed as a marking ink, as the stain on linen is indelible.

The Cotton-plant was once cultivated by Captain Maconochie with advantage. It is now wild, and overruns every part of the island to such an extent as to render the Bush almost impracticable.

The *Phormium tenax*, or New Zealand flax, has always grown abundantly on the cliffs of the northern coast, and on the steep declivities of the hills inland. It is a large, handsome plant, with sedge-like leaves. It has not lately been cultivated for economical purposes. We are assured,* however, that two New Zealanders were once introduced to teach the people how to prepare it, but their process was so tedious that the scheme was abandoned.

The chief medicinal plants growing wild are the *Datura stramonium, Ricinus communis,* and the *Solanum nigrum.* This latter is a fine, ornamental shrub, the berries of which, reported poisonous in England, have been cooked and eaten here with impunity.

Many climbers of great luxuriance and beauty are seen winding round the trunks of fern and forest trees, or hanging in graceful festoons from stem to stem. The slender Jasmine, *Jasminum gracilis,* at home, a delicate hot-house plant, is one of the most distinguished of this group. Its twisted stems, of considerable thickness, may often be seen hanging like ropes from the lower branches of the pine, or white-oak, while its flowers cluster in the top. The rosy-pink petals of the *Ipomœa pendula,* greatly resembling those of the Convolvulus Major, and the purple and green pea-flowers of the *Wistaria,* deserve especial notice. Two species of passion-flower also grow in the Bush, and attract much attention.

Reserving for description presently the vegetable productions submitted to cultivation, I will now allude to the Animal Kingdom.

The Fauna of Norfolk Island is most insignificant. No quadruped of any size is, I believe, indigenous, and the only wild ones of the present day are cats, rats, and mice. On

* Backhouse, p. 256.

Phillip Island, however, hogs, goats, and rabbits are to be found.

A greater number and variety of the feathered tribes inhabit this lonely group, or visit it during the breeding season. The guinea-fowl was observed by the early navigators, but has now become quite extinct. There are three kinds of Parrot on Norfolk Island. The small crimson and blue Lory, the *Psittacus Pennantii,* one green with a red ring round the base of the beak, and another. These birds are easily entrapped. A dingy-plumaged Kingfisher, bold and fierce, is very common, and passes under the name of the Norfolker. The domestic pigeon has been naturalized, and breeds abundantly among the cliffs. Its numbers would be troublesome but for the ravages of the wild cat. A large and handsome species of pigeon, called the Wood-quest, with bronzed head and breast, is met with occasionally round the base of Mount Pitt, but has hitherto resisted all efforts at domestication. In addition, there is a variety of the blackbird, (so called), a robin, with a white head and scarlet breast, guava birds, white-eyes, and fan-tails. These last-named small birds are met with in the gullies, and are so tame as to perch upon the finger or a stick if held towards them. One specimen of the Avocet, the *Recurvirostra rubricollis,* was shot upon the island about a year and a half since, and sent up to this Society by Dr. Hueston; as well as a male and female spoon-bill, the head and feet of which are now laid upon the table.

Ocean-birds in great abundance surround the shore. Formerly, their head-quarters were at Mount Pitt, but since Norfolk Island has been inhabited, they have removed to the smaller isles. Nepean swarms with gannets and mutton-birds, while boatswain or tropic-birds and sea-swallows inhabit the rocks to the north.

No snake or other reptile, harmless or venomous, is found on Norfolk Island. It is free also from lizards and centipedes, both of which are to be found on a certain small portion of Phillip Island. The honey-bee has been naturalized, and often hives out in the Bush.

Fish in great variety and profusion are caught among the rocks, or on the soundings for miles around. The shark is not generally large, although a few of enormous dimensions have been noticed. There are two species of cod, one black, rising to 200lbs.,—the other brown, of about 17lbs.* The shoals yield king-fish, trevaley, salmon, snapper, groper, skip-jack, and trumpeter—all so called. Gar-fish are also driven within the reefs by their numerous enemies. All these fish, though dry, are palatable and take salt well. The turtle is occasionally seen upon the coast, more especially off Anson's Bay, where it deposits its eggs. The greater part of the land has, however, of late years been washed away, so that the visit of these animals is of rare occurrence.

In consequence of the heaviness of the surf, the greater number of things thrown upon the shore of these islands are damaged or destroyed. Still, moderately good collections of shells and corals have been made, which present, however, no very peculiar features.

The animals required for the food of man have thriven well on Norfolk Island. From enquiries at the Commissariat, I find that about the year 1846 there were 800 head of cattle, 6000 to 7000 Leicester sheep, and 500 pigs. The stock left when I was last at the Settlement amounted to about 3000 or 4000 Leicester sheep and 700 cattle, chiefly of the Devon and Hereford breed. The greater number of these have been sold for conveyance to New Zealand, it is

* Keppel, vol. 2, p. 245.

true, but it is understood that sufficient will be left to maintain the stock for the new residents.

Whilst a convict station, upwards of 1200 acres have been brought under cultivation for agricultural purposes. The chief produce has been rye, oats, and Indian corn. The soil and climate are not adapted to the growth of wheat; several times it has been tried unsuccessfully. The crops were most uncertain, chiefly owing to rust and smut. The fungi of these diseases were speedily developed, and proved destructive by their rapid dissemination. The farm operations have always been effected by manual labour; yet that it has not been unproductive is shown by the returns for three consecutive years, obtained from the Commissariat-office. There were harvested in

1845.......	425,365 ℔s.	of maize, or about	8507 bushels.
1846........	421,790 ℔s.	ditto	8435 bushels.
1847.... ...	711,296 ℔s.	ditto	14,225 bushels.

There were two large gardens belonging to the Government: one at the Cascades, the other at a lovely spot called Orange Vale. In these, as well as in the private grounds of the civil and military officers, the variety and luxuriance of produce were extreme, the chief labour arising from the necessity of constant weeding. At the dinner table of some of the residents I have observed seven or eight different kinds of vegetable obtained the same day from their gardens. It may be well to enumerate some of the things cultivated, in order to show the capabilities of the island in this respect.

The Coffee-plant thrives well, and yields berries of small size and good flavour,

The common or round potato is cultivated, but not with success, although four crops are produced yearly from the same soil. There is a great tendency to run to stalk, from rapidity of growth, and the tubers are generally small and watery.

The Sweet Potato, or *Buck,* as it is called, the large tuberous root of the *Batatas edulis,* a plant of the convolvulus tribe, is the chief garden esculent. It yields good crops twice a year, and may be eaten roasted, boiled, or fried in slices.

The Arrow-root is very extensively and successfully cultivated in Norfolk Island. The starch is separated in the usual manner, in the months of September and October, and is found to be of superior quality.

Cayenne pepper, manufactured from pods of the capsicum grown in these gardens, has a quality and flavour equal to any that can be obtained. It is in much demand.

The Sugar-cane is seen in many places growing luxuriantly, but quite neglected. The first settlers introduced the plant, and made rum of its juice. Under the subsequent regime this distillation was forbidden, and hence the cane became valueless.

Garden fruits, though varied and abundant, are not always of good quality. The banana, strawberry, and grape grow freely, and may be cultivated to advantage. Raspberries grow vigorously, but do not fruit. The apple also fails, chiefly through blight. There are inferior qualities of pineapple, fig, olive, pomegranate, almond, quince, melon, and peach. The loquat, originally derived from Japan by the way of Batavia, is rather plentiful during the season; as well as the passion-fruit. Orange and citron plants, introduced from Sydney, are now just beginning to bear; but it is considered doubtful whether the walnut and mulberry trees, brought by Mrs. Maconochie, will ever yield fruit.

Wild fruits are abundant in the Bush; limes and lemons may be gathered all the year round. The apple-fruited guava is everywhere plentiful, as well as the *Physalis edulis,* or Cape gooseberry. A few orange trees may also be met with. There is a tradition that the fruit of this tree was once so abundant, and offered so much sustenance to absconders, that the then Commandant, (Major Morrisett), ordered them to be extirpated. Upon careful enquiry I find this statement incorrect. Oranges never were abundant. An attempt was once made to destroy the wild guava and lemon trees, but their very abundance at the present day proves that the effort was abortive.

It may be concluded from the preceding observations, that Norfolk Island offers every facility to the settlement and welfare of a limited community. The chief want is that of a harbour. But this might be obviated readily at a place called Ball's Bay, a mile or two eastward of the Settlement. A profitable fisherymight there be established. Many more tropical or semi-tropical plants, such as the real bread-fruit, cocoa-nut, yam, and mango, might be introduced; while the proper cultivation of those already there would yield surplus supplies for exportation. Coffee, maize, sugar, cotton, arrow-root, castor-oil, and cayenne have hitherto yielded well, even with forced unwilling labour, and manual industry. Much more may, therefore, reasonably be expected from steady perseverance, aided by all the appliances of modern husbandry. It must not be forgotten, however, that the very prolificness of the soil offers great temptations to indolence; and that, unless this vice be steadily resisted, the most virtuous people will rapidly, both socially and morally, degenerate.

XII.—*Hobart Town considered with regard to its Defence.* *By* Aug. Fred. Smith, *Esq., Lieut.* 99*th Regt.* [*Read* 14*th December,* 1853.]

The defences of a town may be divided into two parts: the works forming the basis and passive part of the defence,—and the men and guns, which are the active part.

The men and guns are, I consider, our first care.

Were an Act passed for raising a Colonial Militia, any consideration of this part of the subject would be needless: but in the absence of a Legislative enactment an Artillery Company might in the meantime be formed, in the manner I am about to submit.

In the first instance, a body of gentlemen volunteers might be formed, who would assemble once or twice a week for exercise in artillery, under the guidance and instruction of an experienced and competent officer in the army, to be selected by themselves, subject to the approval of the officer in command of the garrison, or of the Governor of the Colony. They should then obtain leave to practise on one of the present Batteries, or, if possible, in one of their own construction, in some convenient place; making use of such guns as could be spared from the Ordnance Stores, or borrowed from merchant ships, chandlers, or the vessels in port, for the purpose of learning and perfecting themselves in the exercise. They should twice in the week hold meetings in the afternoon, when the main part of their other business has been concluded, and at each such meeting a lecture, or instructions in some form, should be delivered by the officer appointed. When these gentlemen volunteers shall have perfected themselves in the science and practice of gunnery, so as to fit them for giving instructions to others, there might then be raised a general artillery corps of well-disposed citizens; the first body acting afterwards as instructors and officers in their turn, under the general superintendence and guidance of the officer before mentioned: and they should meet as often as their several avocations would allow.

The uniform worn ought to be of the plainest and most economical description, and found by the members themselves.

To further the general views, and cover incidental expenses, money should be raised by a general subscription of the inhabitants. The expenses would consist of ammunition for practice, side-arms, (*i.e.*, sponges and rammers, port-fire-sticks, handspikes, &c. &c.), and of the hire of a room for meeting in for the delivery of lectures, and other purposes.

The funds would be disbursed under the control of a Managing Committee, who would appoint a Secretary and Treasurer, and frame such laws and regulations as are requisite for the successful study and prosecution of military science and exercises, and for the government of a well-regulated Society.

Thus would be formed the nucleus of an effective Company of Artillery, which might be increased to any extent warranted by circumstances. If other force, as infantry, were required to be raised, the same method might be employed. Artillery is generally the chief difficulty, and is therefore dwelt upon in detail.

There are at present in the Ordnance Stores, in addition to the ten guns (32-pounders,) on the Battery, fourteen 32-pounders complete, making a total of twenty-four of these powerful guns, which are considered the best for distant ranges against shipping, &c. This would give us three batteries of eight guns each, or four of six guns. In addition to these are two small mortars and two light six-pounders (field pieces); there are also other iron guns, most of which are condemned, but they might at any rate be used to instruct beginners in practice, and as models, should it be found requisite, to cast guns here.

The next questions are, what are the best situations as sites for defensive works, then what style of works should be constructed on those sites?

Beginning at the Harbour we find three good situations, viz.;—The place overlooking the present Battery, now occupied by the shipping signal-staff—that point in the Domain commonly called "Macquarie Point"*—and Kangaroo Bluff: on the first two of these, batteries, and on the third a closed work, should be formed. (*Vide* Plate I.) By glancing at the plan it will be seen how works placed in these situations mutually support and defend each other.

Lower down the River we have Sandy Bay Point, a good situation for a fourth battery. I submit that a battery upon this point, having as a citadel of retreat a substantial closed work constructed on a convenient spur of Mount Nelson, so as to command the Brown's River Road, would form the best disposition of works here.

Just below Kangaroo Bluff is a low sandy point, upon which a martello might be erected, or a similar work, to prevent the enemy landing in the bay below.

Thus far have we traced works down the River, and I presume that any erected further down would come more

* Since this Paper was read, Batteries mounting heavy guns have been constructed on both these commanding sites.—Ed.

appropriately to be discussed under the head of coast defences. We must now consider the reverse or rear of the Town.

This ought to be defended by detached works, which ought also to be closed works, unless indeed their rear should fall upon any building which could be used as a citadel of retreat, and thereby the means of a prolonged defence secured. Commencing at the end of Mount Nelson Range, near the termination of Davey-street, a strong work should be erected there to command the road which comes from the River Huon, and Procter's Road from Brown's River: this should be the first of a line of detached works (*vide* Plate I.), extending thence through the valley to Knocklofty, and along the top of the Knocklofty Range, and then down the ridge which leads from its northern extremity to the hill in the Government Domain. A few small works within a proper distance of each other should be disposed along the water's edge, so as to close the line up to the battery at Macquarie Point.

If any exterior defences were required in the direction of the Launceston Road, to check an attack from that direction, a line of works on the ridge of Mount Wellington, beyond New Town, would be necessary.

Thus far have I endeavoured, with the help of my plan, to show the ground to be occupied. I now come to make a few extracts from standard military authors, relating to the construction of such works as have been considered advisable to employ.

The Block-house is the style of field-work to be erected; and, after showing various modes of constructing it, I would ask why should not a block-house (with a little additional labour) be made a permanent work?

The Royal Military College Course (p. 225) thus defines block-houses. "A Block-house to resist musketry should be composed of trees squared, so that the parts in contact may be at least 6 inches thick, that being the depth to which a musket-ball penetrates in fir. In order to resist artillery, two rows of similar trees are placed vertically in the ground, with an interval of from 3 to 6 feet wide, which is filled with earth well rammed.

" The tiers or logs should be 11 or 12 feet long, so that they may be planted at least 3 feet in the ground, and allow the interior of the block-house to be 8 or 9 feet high; it should also be from 18 to 24 feet in the interior.

" The earth used to render the covering shell-proof may be formed like a small parapet, and from this an additional fire of musketry may be obtained. I would here suggest that a small pivot gun, say a 3-pounder, might be used from this parapet, the pivot being stepped into the centre-prop of the block-house." (*Vide* Plate III., fig. 1., the dotted lines.) The text goes on to say, " The access to this upper parapet is through a trap door in the roof. To prevent the block-house from being set fire to, a ditch should be dug round it, leaving a basin of 8 or 10 feet; and on this the earth is piled up against the wood as high as the loopholes.

" These works are sometimes constructed in the form of cross, when the flanking fire thus obtained renders them more powerful. Sometimes they have an upper story, the angles of which project over the lower story: the foot of the lower walls may thus be defended by the fire from above."

Captain Macauley (page 149) says, " A block-house may be constructed of less timber, by placing the upright timbers 6 or 8 feet apart against the interior slope, and covering them with a capsill." (*Vide* Plate III., fig. k.)

Captain Straith (page 377) thus describes American block-houses:—" The Americans build their block-houses like ordinary log habitations, of thick horizontal trunks of trees roughly squared; and several of these works disposed like bastions at the angles of an area, in such order as flank each other, and connected by a stockade, as a curtain loopholed for musketry, form no despicable strength." He speaks also of their being strengthened against Artillery by interior traverses of earth.

Block-houses are, I would submit, the closed works to be used,—as at Sandy Bay Point (or rather above it), one of the American build, in rear of the Town,—as at the top of Davey-street, &c.; others of a simple kind, varying in strength, with the value of the position or its liability to attack.

The materials are at hand, and the inhabitants used to the construction of timbered edifices,—substantial reasons for their adoption.

But in case it should be thought advisable to erect at certain points Martello Towers, I append a description (and drawing, Plate IV., fig. *n.*) of one which may prove useful.

The R. M. College text-book says, they are " buildings of masonry, generally circular, (Plate IV., figs. *n o p*), from 20 to 140 feet diameter and from 30 to 50 feet high: sometimes they stand alone, and at others they are surrounded with a ditch and simple glacis. They generally consist of two stories, of which the upper one is shell proof, and is pierced with embrasures and loopholes; the lower one is used as a store. The roof is surrounded by a parapet, and a gun on a traversing platform is placed thereon for the purpose of firing in every direction."

The batteries near the sea-shore, as at Macquarie Point, Battery Point, &c., may be constructed somewhat similar to the work in Plate II., fig. *a.*; their faces are traced, of course, at right angles to the intended line of fire; or should this be impracticable, then the embrasures must be traced obliquely. Their parapets must be 18 feet thick at least, 15 feet being the penetration of a 24-pounder ball into earth.

In conclusion, I would remark that my suggestions would be,—at Sandy Bay a simple Battery of two faces, one up and another down the river,—on the side and near the top of Mount Nelson, an American block-house,—and in rear of the town smaller block-houses of simpler construction, joined where necessary by curtains of abattis, troups de loup, entanglement, or fortified hedges or walls,—at Battery and Macquarie Points, (Plate II.) simple but well-defined batteries,—at Kangaroo Bluff another American block-house armed with artillery,—and at the little Point below a smaller block-house, armed with a swivel on the roof, to command the Bay, &c., beyond it.

I have, on the plates, copied diagrams from the best authorities; the survey of the neighbourhood (Plate I.,) and a few of the diagrams, are my own.

To fortify the place by detached works of a permanent nature might be too expensive to be at once carried out; still, the spots I have indicated might at any rate be *reserved* for purposes of defence, and the works I have described might be traced and picketed off, to be constructed when necessary, if only as a line of field works. Many of my readers are probably far more conversant with the matter in hand than I am;—let such, I would say, remember that a humble though earnest follower of the arts of which they are masters has offered his ideas for them to enlarge and improve upon, and that in doing so a hope of being instrumental in good alone has actuated him.

APPENDIX.

EXPLANATION OF THE PLATES.

PLATE I.—Represents the Town and its neighbourhood, surrounded by works varying according to circumstances.

The red figures denote the different works.

An American block-house.

+ One in form of a cross or smaller.

Λ Batteries or other continuous lines of parapet.

O Martello towers or block-house in lieu thereof.

Lines of fortified hedge loop-holed walls, &c. &c.

Plate II., fig. *a*, of which fig. *b* is a section, is a battery of one face with returns. The parapet of the battery is 18 feet, to resist a 24-pounder; but that of the return is only 12 feet. Fig. *c* is the elevation of a loop-holed wall. Fig. *d* are sections of different cases. Fig. *e* a tarnhouse over a window. Fig. *f* shows five cases of fortifying hedges.

Plate III., fig. *g*, is the plan of a cruciform musketry block-house. Fig. *h* is its section and elevation. Fig. *i* is the section of a block-house to resist artillery, having its bomb-proof formed into a parapet. The dotted lines show how a swivel gun may here be used. Fig. *k* is Capt. Macauley's economical block-house, and fig. *l* the plan, and fig. *m* the elevation of an American block-house.

Plate IV., figs. *n o p*, are respectively the section, plan, and elevation of a Martello Tower. Fig. *q* is a two-storied dwelling, house fortified, and fig. *r* a single story cottage, with verandah in like condition.

TO FORTIFY A HOUSE.

Barricade doors and windows, loophole barricades, walls and partitions, and the upper floors, so as to be able to fire down through them; cut away the staircases, keeping up the communication by ladders. Place vessels of water in each room to extinguish fires. Remove thatched or wooden roofs adjoining the house. Sink ditches opposite the doors and windows, and place obstacles in front of them, give a flanking defence where it is required over a window, (Plate II., fig. *e*), or at an angle of the house. Lastly, if there is time, loop-hole the garden walls, and remove any thing that may afford cover for the enemy within musket range.

(Manuscript note to R. M. College Course.)

XIII.—*On the Science of Astronomy amongst the Ancient Jews.* *By* Mr. Phineas Moss.

Trusting that the subject may not be thought entirely out of place in the Transactions of the Royal Society of Tasmania, or altogether uninteresting to its members, I have ventured to throw together a few brief notices of the Science of Astronomy as known amongst the ancient Jews, taking encouragement from the circumstance, that as a lineal descendant of that people I may possess readier access to their records than a stranger could have. At the same time I experience some diffidence, from the feeling that the time and attention of the Society might be claimed for matters of higher importance and of greater practical utility.

The earliest notice we meet with of the stars and of the constellations in the Zodiac is by Job, who, according to Hebrew chronology, lived in the year of the world 2362, or about 1400 years before the Christian era,—contemporary with, or at least very few years antecedent to, Moses. In chap. ix. verse 9 of Job, the words *ousai ush k'sil v'cheemo* occur, in reference to Arcturus, a star of the first magnitude in Bootes,—Orion, a brilliant constellation,—and Pleiades, a group in the neck or shoulder of Taurus.

Again, in the 31st and 32nd verses of the 38th chapter, Job mentions them in connection with Nazzareth, a Hebrew word, which literally means Zodiacal constellation, and might have been rendered by the well understood term signs. In the Vulgate it is given in the expression "duodecim signis." The Hebrew words *hauskaushyr mauadownous kemo*—in the 31st verse translated "canst thou bind the sweet influence of Pleiades," might with greater propriety be read thus,—*canst thou restrain the subtle influence*, that is, *the attractive force*, of the Pleiades—the word influence being understood as a directive or impulsive power, such as the attraction of gravitation. Job appears in this to convey his knowledge of our whole Astral system revolving round that group,—or rather one of the stars therein. The profound researches of the modern German Astronomer and Geometrician Mædler having established as a fact the hypothesis that our system does certainly revolve round Alcyone, a star of the third magnitude in the Pleiades, a sufficiently convincing proof that the Heavens had been carefully observed, and the movements and revolutions of the celestial bodies consecutively noticed in the remotest ages.

It is evident that Job was well aware that the globe of the earth was suspended in space, for in speaking of the Divine architect, in chap. xxvi., verse 7, he uses the words

Toulai airetz ol b'lemo, which in the English Bible are rendered, "he hangeth the earth upon nothing," literally, he suspendeth the earth in a vacuum, the Hebrew word *B'lemo,* meaning in English *Space.* In Genesis, chap. vii., verse 11, where the deluge, which, according to Jewish chronologists, occurred Anno Mundi 1654, (the present year (1854) being reckoned by them 5614 of the creation), is described as covering the face of the earth, it is spoken of as having begun on the seventh day of the second month.

I shall only adduce one or two more instances, from the numerous references made in the Bible to astronomical facts, in proof of the antiquity of the science amongst the Jewish people.

The commemoration of the deliverance from Egypt (or *Mitzroyim,* so termed in Hebrew from the name of its founder, Mizraim, the son of Ham), was ordered to be kept in the first full moon after the vernal equinox, when the sun had entered the Zodiacal sign Aries, on or from the first day of the lunar month in which the occurrence took place, (termed in Hebrew *Neesan),* from which the Jewish ecclesiastical year began, and by which all their festivals were regulated.

Before concluding I will give the Hebrew names of the months, with the corresponding periods of their connection with the Zodiacal signs, merely observing that the rules for compiling the yearly calendar at present in use amongst the Jews are chiefly from the direction of the learned Maimonides, who flourished about the year 1150 of the present era, and, following the system adopted by some sages who preceded him, divided the hour into 1080 parts, so as to facilitate their calculations of time, this number being divisible without remainder by any of the units except seven.

The Jewish year, from the earliest time, is what may be termed luni solar: that is, the months being lunar, their calculations were all made in reference to the lunar cycle—the cycle containing 235 lunations, which were divided into twelve years of twelve months, and seven (termed embolismic) years of thirteen months; every nineteenth year, therefore, they came to the same date in the solar or common year. That their months for the earliest time have been lunar is likewise shown in the 1st Book of Kings, chap. vi., verse 38, where the words are: *Oovaushono oauchoss esri l'yoriauch Bul hoo auchoudesh haushmenee:* "and in the eleventh year in the month of Bul, which is the eighth month." In the Hebrew text the two words thus translated "month" vary, the first being derived from *yoriauch*, moon, and the last from *choudesh*, new, or innovation.

The celebrated mathematician Meton of Athens, who flourished 432 years before the Christian Era (in the reign of the king Zedekiah), made a similar division of time; but the first mention of the calendar is by the learned philosopher Rab Judah, surnamed the Prince, in the Mishna written by him about 140 years before the present era, and in which he speaks of embolismic years.

It is recorded of Rab Samuel, an astronomer of Babylon about the same period, who was well acquainted with the science as known in his day, that the paths of the Heavens were as familiar to him as the streets of Nahardea, where he resided; he calculated the solar year to consist of 365 days and 6 hours,—the same as the Julian, which is incorrect. Pope Gregory in 1582 altered it by deducting from October 10 days, making that month in the same year to consist of 21 days only; and in order to prevent the occurrence of discrepancies in future, he then ordered every fourth, instead of every centenary, year to be Bissextile.

Cotemporary with Rab Samuel was Rab Ada, born in Babylon in the 188th year of the common era, and who wrote a century at least before the convocation of the Council of Nice: his calculations are still in use by the Jews; he computed the solar year to consist of,—

	Days.	*Hours.*	*Minutes.*	*Seconds.*
	365	5	55	$25\frac{25}{57}$
The lunar year from one conjunction to the other	29	12	44	$3\frac{1}{3}$
And the lunar cycle of nineteen years	6939	16	33	$3\frac{1}{3}$

From this calculation in 353 C.Æ., about 170 years afterwards, Rabbi Hillel formed the tables for the calendars now in use amongst the Jews. The difference between the Hebrew year according to Rabbi Ada, and the same number according to the Gregorian system, in four centuries will be about one and three quarters of a day, or exactly 1 day, 17 hours, 29 minutes, $35\frac{25}{57}$ seconds less. This will occur in the year 2000 of the Christian Era, 5760 of the Jews, and 146 years from the present time.

I have omitted to notice that the astronomer Rabbi Samuel calculated the precise time of the commencement of the *T'koofous* about 243 years before the current era; and it is certain that a knowledge of the Heavens, as far as they could be viewed without the telescope, was familiar to the learned Jews at a remote period, references being made to each of the Zodiacal constellations or signs in succession in the ritual composed about the 10th or 11th century, a copy of which I possess, and which is still in use in their places of worship in various parts of the earth.

At the commencement of the vernal and autumnal equinoxes, each month with the Hebrew name is mentioned separately therein, with reference to the sign of the Zodiac in which the sun is at the time, commencing with Tishri in the months of September and October. They are as follows :—

Hebrew Month.		Hebrew Sign.	Sign.	English Month.
Esauneem or	*Tishri*	*M'auzneem*	Libra	Sept. and Oct.
Bul or	*Cheshvan*	*Ekrauv*	Scorpio	Oct. and Nov.
	Kisluv	*Kayshess*	Sagittarius	Nov. and Dec.
	Tivess	*G'dee*	Capricornus	Dec. and Jan.
	Sh'vaut	*D'lee*	Aquarius	Jan. and Feb.
	Odur	*Dogim*	Pisces	Feb. and March.
Ovio or	*Nees'n*	*T'lee*	Aries	March and April.
	Ear	*Shoor*	Taurus	April and May.
	Sivin	*Tioumim*	Gemini	May and June.
	Tomuz	*Sort'n*	Cancer	June and July.
	Auv	*Aureoh*	Leo	July and Aug.
	Elul	*B'soolah*	Virgo	Aug. and Sept.

In conclusion, I cannot but observe how much a critical knowledge of the Hebrew language might be made subservient to scientific and literary researches; as not only the names included therein, but even the very words composing the language, appear to have been originally framed on strictly philosophical principles. I will adduce two or three instances :—The word in Hebrew applied to the Terrestrial Globe (our earth) is *airetz,* three letters derived from the simple root *Rutz,* consisting of only two signifying literally a running or rapid motion, proving, as far as analogy of language can prove, that in the most remote period of human history the Jews possessed such a degree of acquaintance with the science of astronomy, as to be in possession of the fact that the earth revolved round her axis most rapidly, independent of her movements in her orbit. At an early period of history, it is said by Job, chap. xxvi., verse 7, as already cited, *Toulai airetz ol b'lemo,* that the earth hangeth on nothing,—or rather, as it ought to have been rendered, *in* a *vacuum*—the word *B'lemo* signifying literally *space.* Again, there are three words in the Hebrew language incorrectly rendered in English by a single word, namely, Sun: one is *shaimesh*, the orb or body of that luminary; the other *chaumo*, its heat, the last *Tsaur*, its light; whilst there are two for the moon, one *yoriauch*, signifying the orb, the other *L'vono*, her pale or white light; but there is not any implying her heat; the word *choudesh* is sometimes given in English as the moon, but this literally signifies new, in reference to her change only. Thus the knowledge of Philosophy amongst the Jews appears to have been coeval with their very existence as a people; and the instances I have brought to your notice are but a drop in the ocean of similar cases occurring in the language.

XIV.—*On Two Alpine Eurybiæ of the Australian Continent.* *By* Dr. Ferdinand Mueller, *Government Botanist of Victoria, &c.*

The present splendid elaboration of the Tasmanian Flora by Dr. Joseph Hooker, together with the light thrown by this laborious and learned botanist on the vegetation of New Zealand and the Antarctic Islands, render the knowledge of the *Alpine Flora* of these Islands, which was formerly but so scantily investigated, now nearly complete.

In three successive seasons I attempted to ascertain the analogies and the differences of the alp-plants of the Australian continent compared with those of the adjacent Islands, and in the transactions of the Philosophical Society of the colony of Victoria I explicated those forms which seemed new, whilst I pointed in my annual reports to those identical with species of Van Diemen's Land or New Zealand, or of both conjointly.

With a view of completing gradually those fragmentary notes, I beg to transmit to the Royal Society of Tasmania, accompanied with specimens, the definitions of two fine Eurybiæ peculiar to the Australian alps, being under the impression that the plants comprehended in this interesting genus are particularly valuable to the botanists of Tasmania, since the Eurybiæ-species are so beautifully developed in that Island.

Eurybia megalophylla ; Ferd. Mueller, gen. rep. p. 14, absq. diagn.

E. foliis oppositis coriaceis petiolatis planis oblongis ovatisve intigerrimis obtusiusculis basi rotundatis, supra nitentibus glabris reticulato-venosis, subtus cum petiolis ramulisque tomento alampro velutino fulvescente obductis; capitulis subcorymboso-paniculatis; pedunculis elongatis ; involucri obconico hemisphærico, squamis inferioribus laxis remotiusculis oblongis obtusis dorso dense tomentosis, intimis acutis glabrescentibus; ligulis suboctonis; acheniis angulatis striatis ætate glabratis; pappi setis scabris biseriatis, exterioribus inæqualibus brevioribus, interioribus apice barbellatis.

In clivis scopulosis minime humidis alpium Australiæ.

Frutex pulcher pluripedalis oligocladus, ramis strictis. Folia utplurimum 2—3 un. interdum ultra 4 un. longa, in var. oblongifolia 6—9 un. lata, in var. ovatifolia duplo latiora, sursum per gradus angustata, juvenilia supra tomentosa. Petioli semipollicares et longiores. Pedunculi oppositi et alterni, inferiores sæpe ad 4 un. longi, nudi vel superne folio unico bracteisve pluribus parvis instructi, basi folio minori suffulti. Involucri squamæ interiores 3 un., exteriores 2 un. longæ, margine vix scariosæ. Flores radii albi vel rosei, lamina oblonga circiter 4 un. metiente. Flores disci circiter 3 un. longi, ad trientem longitudinis quinquefidi. Antheræ semiemergentes, styli ramis superatæ, basi sagittatæ. Styli rami papillosi, dorso convexi. Achenia glandulæ annulari insidentia, juvenilia parve villosula, matura glabrata fusca sulcata $1\frac{1}{2}$ un. longa, basi attenuata. Pappus albidus fulvescens, setis interioribus 3 un. longis.

In systema prope *Eurybiam chrysophyllam* inserenda.

Floret fine veris et initio æstatis.

Eurybia alpicola; Ferd. Mueller, secund. gen. rep. absq. diagn.

E. foliis oppositis breviter petiolatis crassocoriaceis lanceolato-vel angusto-oblongis elongatis integerrimis margine leniter recurvis in basin et apicem sensim angustatis acutiusculis, supra glabris nitentibus subtile reticulato venosis, subtus cum petiolis ramulisque tomento tenui sericeo albido obductis; capitulis subcorymboso-paniculatis; pedunculis elongatis, involucri campanulati squamis exterioribus ovato-lanceolatis sericeis, interioribus lanceolato-linearibus acutis, margine atro-purpureis, dorso glabrescentibus; ligulis subsenis, acheniis subcompressis glabris striatis; pappi setis scabriusculis biseriatis, exterioribus brevioribus inæqualibus, interioribus apice incrassatis.

In alpibus et montibus subalpinis Australiæ serus fontes et torrentes; e. g. Gibbo-Range, Cobboras Mountains, Limestone River, Freestone River, Berrima, Pinchmountains, alibique.

Frutex speciosus 5—8 pedalis strictus. Folia pleraque 3—4 un. longa, interdum semipedalia, 3—6 un. raro ad 1 un. lata, juvenilia supra parve tomentosa. Petioli vix ultra

3 un. longi. Paniculæ fragrantis polycephalæ rami alterni et oppositi graciles teretes incani, inferiores pluripollicares, superiores gradatim abbreviati, fere semper nudi, ad basin folio bracteali minori suffulti. Involucri squamæ interiores 2½ un., exteriores vix 1 un. longæ, illæ margine scariosæ ciliolatæ acutiusculæ. Flores radiales albi, lamina angusto-lanceolata ad tres lineas metiente. Flores disci pene 3 un. longi, ad trientem longitudinis quinquefidi. Antheræ breviter exsertæ, styli ramis demum superatæ. Stylorum rami linearis obtusiusculi, dorso convexi, sursum densius papillosi. Achenia jam primo initio glabra, canofulva, circiter 1½ un. longa, basi attenuata glandulæ annulari, insidentia. Setæ pappi albidæ, interiores 2½ un. longæ.

B. —— *rhodochæta ;*

Foliis lanceolatis, pedunculis abbreviatis, involucris angustioribus, squamis intimis densius sericeis, ligulis subternis, pappi setis roseis.

In tractu Cobboras Mountains.

Species bene limitata, aliis notis ad *Eurybiam megalophyllam*, aliis autem ad *E. argophyllam* approximans.

Floret æstate.

Botanic Gardens, Melbourne,
January 1857.

XV.—*On Australian and Tasmanian Umbelliferous Plants. By* Dr. Ferdinand Mueller, *Government Botanist of Victoria.*

Of the numerous paradoxical plants which characterize the Flora of Australia to such a great extent, those of the Umbelliferæ are not the least interesting; and I beg to review briefly on this occasion the various members of this order, which, through the exertions of many a naturalist, became successively known from Australia and Van Diemen's Land.

In Labillardière's *Novæ Hollandiæ Plantarum Specimen*, (published in 1804), we meet with the first account of the curious genus *Actinotus*. He describes and figures also *Daucus brachiatus* Sieber, (under the name *Scandix glochidiata)*, *Apium prostratum* (the native celery), *Eryngium vesiculosum*, and three species of *Trachymene* as *Azorellas*, to which genus, indeed, they are closely allied. In 1805 a second species of *Actinotus* from New South Wales was defined by Sir James Smith with the original one, under the name of *Eriocalia*, but it was reduced to the older genus of Labillardière by the illustrious Robt. Brown, in his appendix to Capt. Flinders' voyage (1814). To Rudge we owe in a paper issued by the Linnean Society of London, (1811), the proper definitions of the genera *Trachymene* and *Xanthosia*, and Sprengel, Sieber, and De Candolle added to the former genus, Cavanilles having previously referred one species to *Azorella*. Achilles Richard added (in 1820) to our knowledge of these plants various species of *Hydrocotyle*, principally supplied by Robt. Brown; and Allan Cunningham characterized in Field's Geographical Memoirs of New South Wales (1825), his *Eryngium ovinum.* The invaluable *Prodromus* of De Candolle brings in the fourth volume (published in 1830) important additions; the genera *Dimetopia* and *Astrotricha* are here for the first time distinguished, and new species are added to *Hydrocotyle, Trachymene, Xanthosia* and *Eryngium;* and *Helosciadium leptophyllum* is shown to be an Australian plant; Sir William Hooker having previously given in the *Botanical Magazine,* (t. 2875), publicity to two species of De Candolle's genus *Didiscus.* From the collections of Bauer, Cunningham and Baron Huegel, new contributions were made to the Australian *Umbelliferæ* by the labours of Bentham, incorporated in the *Enumeratio Plantarum Novæ Hollandiæ Austro-occidentalis* of Huegel (1837), by which the genera *Hydrocotyle, Didiscus, Trachymene, Leucolæna* or *Xanthosia, Astrotricha* and *Actinotus* became augmented. The Australian species of *Caldasia (Caldasia eriopoda* of De Candolle's *Prodromus)* a plant which exhibits the most extraordinary varieties, changed its preoccupied generic name into *Oreomyrrhis* in Endlicher's celebrated *Genera Plantarum* (1840); *Pentapeltis,* previously (1857) published as *Leucolæna* by Hooker, and afterwards elevatedby Bunge to generic rank, forms here a sub-genus; whilst *Cesatia,* a genus seemingly near to *Didiscus,* received its characteristics by the same author in the annals of the Vienna Museum. In the important work, edited 1845 by Lehmann, on the Plants of Preiss from Western Australia, a work so replete with novelties, Bunge made us acquainted not only with new *Hydrocotyles, Trachymenes,* and *Xanthosias,* and with two *Eryngiums,* perhaps also new, but he discriminates also the genera *Schænolæna* and *Platysace,* and unites *Pritzelia* of Walper to *Dimetopia.* Mr. Ronald Gunn's and Dr. Milligan's zealous investigations of the Tasmanian Flora enabled Dr. Joseph Hooker to elucidate with his usual skill the new genera *Hemiphues, Diplaspis* and *Microsciadium* in the sixth volume of the London Journal of Botany (1847), together with new Tasmanian *Hydrocotyles;* the same famous Botanist having introduced *Didiscus humilis* and *Xanthosia dissecta* into the *Icones Plantarum* a while before; and in his admirable Flora of New Zealand he identifies the Australian *Orantzia* with an American species.

In the year 1847 we find proved in Schlechtendal's *Linnæa* the existence of the European *Sium angustifolium* in Australia, from specimens sent by Dr. Behr; and we observe nearly simultaneously an account of a new *Dimetopia* by Bunge in Schlechtendal's and Mohl's *Botanische Zeitung;* two other species of that genus are noted by the same acute botanist the year before in an index of plants cultivated in the Botanic Garden of Dorpat. The next contributions are chiefly from the West Australian collections, prepared by the venerable Drummond, which offered to Turczaninow the opportunity of enriching the system of umbelliferous plants with additional species of *Hydrocotyle, Didiscus,* (referred by him to *Dimetopia), Trachymene, Xanthosia* and *Platysace,* the diagnostics of which appeared in the 22nd volume of the *Bulletin de la Societé Imperiale des Naturel de Moscou,* and are reprinted by Walpers in his useful *Annal. Botan. System.,* a periodical which we regret seeing discontinued after the death of its laborious and ill-supported author, and which was formerly the principal source of information to botanists abroad and to travellers who had no direct access to numerous botanical works, for which the *Repertorium* and the *Annales* of Walpers formed a valuable substitute. In the 1st volume of the latter, (issued 1849), we observe the genus *Microsiadium* inserted as *Oschatzia,* since the Hookerian appellation was pre-employed by Boissier for the distinction of a new oriental umbellate.

During the botanical exploration of the colonies of South Australia and Victoria, (from 1847 till 1855), it fell to the share of the author of this memoir to disclose new forms of *Hydrocotyle, Didiscus,* and *Dimetopia,* to point out the range of the Tasmanian genera *Dichopetalum, Oschatzia* and *Diplaspis,* as far as the alps of the Australian continent; and also the occurrence here of *Pozoa, Seseli* and *Aciphylla,* the latter combinable with *Gingidium,* both established simultaneously in Forster's *Characteres Generum Plantarum* as early as 1775. Definitions of the last mentioned species are partly given in the 25th volume of the *Linnæa,* and partly in the Transactions of the Philosophical Society of Victoria, or of those of the Victorian Institute. Dr. Joseph Hooker refers the genus *Pozoopsis* of the *Icones plantarum,* as a second species, to *Diplaspis,* in his *Flora of Tasmania,* and states the approximate number of Australian *Umbelliferæ* as 120, from which remark it appears that several plants of this order continued undescribed, although existing in herbaria; and, indeed, several unknown to botanists are mentioned in the works of travellers. Thus, Allan Cunningham speaks of a North-west Australian *Azorella* in the appendix to King's *Inter-tropical Survey of Australia* as being "remarkable for its gigantic herbaceous growth."

The last expedition through the intra-tropical zone of this country, so ably conducted by Mr. Augustus Gregory, has but furnished a limited number of plants belonging to *umbellatæ;* yet, perhaps, even more than might have been expected from the known geographical distribution of this order. As new, I may mention a *Hydrocotyle,* two *Eryngia,* four *Didisci,* and a genus which may be distinguished (as

Platycarpidium) from *Astrotricha* in deciduous petals, from *Trachymene* in flat and smooth carpels, from *Platysace,* as far as the immature state of the fruit permits me to judge, by the want of vittæ, and from *Didiscus* and most of the allied genera by a tall shrubby habit, so unusual in this order, and, finally, in a paniculate disposition of its umbels, of which the greater number, notwithstanding their being hermaphroditical, remain perfectly sterile.

Besides the description of the new *Eryngia,* I beg to submit an enumeration of all the species of *Didiscus* with which we are at present acquainted. Those of the sub-genus *Hemicarpus* have been considered formerly by the author of this treatise as constituents of a new genus, and are described as such in Hooker's *Kew Garden Miscellany* of this year. Observing, however, on a re-examination of all the material now at my command, that one of the mericarps, sometimes in several species of *Didiscus,* and often in *Didiscus pilosus,* remains undeveloped,—I prefer now to reduce *Hemicarpus* to this genus.

Thus another is added to already numerous instances to prove how much often the best characteristics, which are adopted in botanical science for the division of species into groups, fluctuate. Nature, which created but species, steps with an easy pace over the arbitrary generic limits within which we narrow and unite for the facilitation of study every complixity of closely allied forms. We will ever, therefore, remain at variance in opinion what limits to assign to genera, but we ought by useful research to arrive at last at one and the same result as to the true precincts of species.

Eryngium plantagineum.

Erect, glabrous; stems furrowed, the lower part leafless, the upper part paniculate; radical leaves long or lanceolate-linear, entire or with remote thorny teeth or with narrow segments; leaves of the stem pinnatifid, with linear segments; flower-heads cylindrical, on long peduncles, terminal, crowned by simple paleæ; leaflets of the involucre linear, mucronate, reflexed, scarcely of the length of the flower-head, as well as the paleæ undivided; paleæ linear-subulate, but little longer than the flowers; papulæ of the fruit blunt.

On the fertile basaltic downs around Peak Range.—Ferd. Mueller.

Amongst Australian species nearest approaching to *E. angustifolium* (D. C. *Prodr.* iv. p. 95); but nearer allied yet to the South American *E. coronatum* (Hook. and Arn. Bot. Misc., iii. 350).

Eryngium expansum.

Procumbent, glabrous; stems streaked; radical leaves rhomboid-cuneate, deeply toothed; stem-leaves broad-rhomboid, deep-trifid; their lobes broad-cuneate, incised-dentated; flower-heads small, nearly globose, axillary and terminal, on very short peduncles or sessile; leaflets of the involucre longer than the flower-heads, linear-subulate, as well as the paleæ undivided; papulæ of the fruit acutely pointed.

On the banks of the Dawson and Burnett Rivers.—Ferd. Mueller.

Similar to *E. vesiculosum* (Labill. Nov. Holl. Specim., i. p. 73).

Didiscus. D. C.

SECT. I. *Teleiocarpus;* Ferd. Mueller. Both mericarps fertile or one rarely undeveloped.

1. *Didiscus cœruleus;* Hook. Bot. Mag., t. 2875. Western Australia.
2. *Didiscus pilosus;* Benth. in Hueg. *Enum. Plant. Nov. Holl. Austro-occid.*, p. 54. Port Phillip.

Ferd. Bauer; Tasmania, Gunn; Gipps' Land, Ferd. Mueller; Mooni River, tributary of the Barwan, Sir Th. Mitchell.

B. parviflorus; Ferd. Mueller. Myall Lake, New South Wales, C. Moore.

3. *Didiscus albiflorus;* Cand. Prodr., iv., p. 72. Port Jackson.

4. *Didiscus procumbens;* Ferd. Mueller. Stems slender, prostrate; all leaves 3 or 5 parted, scantily hispidulous, segments bifid or trifid: their divisions rhomboid or ovate-lanceolate, deeply dentated; leaflets of the involucre imperfectly laciniated, glabrous, of equal length with the smooth capillar pedicels; teeth of the calyx triangular, blunt; petals white; mericarps minutely tuberculated.

   Rare on the Brisbane River; W. Hill; Ferd. Mueller.

   Easily to be distinguished from the preceding species in its flaccid, procumbent, distinctly striated stems, in nearly uniform leaves, broader leaflets of the involucre, and in blunt but not subulate teeth of the calyx.

5. *Didiscus humilis;* J. Hooker in *Icones Plantarum, t.* 304.

   Sub-alpine localities of Van Diemen's Land; Backhouse, Gunn, Milligan, Lawrence, Stuart. Australian alps in humid grassy vallies at an elevation between 4000 and 6000 ft.—Ferd. Mueller.

Sect. II. *Hemicarpus;* Ferd. Mueller. One mericarp fertile, the other always undeveloped. (*Dimetopia*, sect. *Anisocarpæa*, Turczaninow in *Bulletin de la Societé des Naturel de Moscou*, xxii., part ii., p. 29. *Hemicarpus*, n. g., Ferd. Mueller in Hooker's *Kew Garden Miscellany*, 1857, fasc. i.)

6. *Didiscus setulosus;* Ferd. Mueller. *Hemicarpus didiscoides;* Ferd. Mueller, L. C. On barren plains and ridges of Arnhem's Land; Ferd. Mueller.
7. *Didiscus anisocarpus;* Ferd. Mueller. *Dimetopia anisocarpa;* Turcz., L. C. Western Australia; Drummond.
8. *Didiscus glandulosus;* Ferd. Mueller. Annual, glandulously pubescent; radical leaves dissected; lower stem-leaves 3-parted, upper ones trifid, divisions lanceolate or ovate-cuneate, in front deeply toothed or jagged; leaflets of the involucre from 13 to 20, linear-setaceous, fringed, of the length of the pedicels; petals white; fertile mericarp roundish-ovate, with a narrow keel, sterile one with two short subulate teeth.

   On the sandy banks of the Nicholson River, (Gulf of Carpentaria), and on Newcastle Range; Ferd. Mueller.

   B. leiocarpus. Nearly glabrous, segments of the leaves more numerous and narrower, fertile mericarp without tubercles.

   On the Burdekin River; Ferd. Mueller.
9. *Didiscus villosus;* Ferd. Mueller. *Hemicarpus villosus;* Ferd. Mueller, L. C. Sandstone table-land at the head of Sturt's Creek, N. W. Australia; Ferd. Mueller.
10. *Didiscus grandis;* Ferd. Mueller. *Dimetopia grandis;* Turczaninow, L.C. Western Australia; Drummond.
11. *Didiscus glaucifolius;* Ferd. Mueller, in Schlechtendal's *Linnæa*, xxv., p. 395. Rocky declivities of Elder's Range, near Lake Torrens, very rare. Ferd. Mueller.

VOCABULARY OF DIALECTS OF ABORIGINAL TRIBES OF TASMANIA,

BY JOSEPH MILLIGAN, F.L.S., ETC.

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay and the South of Tasmania.*	*North West and Western Tribes.*
Abscess	Lieemena	Limeté	Wallamalé
Absent	Malumbo	Taggara	Wakannara
Abstain	Miengpa	Parrawé	Wannabea Tongh
Abstract (to deduct)	Nuna-mara		
Accompany	Tawé		Tawêlea Mepoilea
Acid (taste)	No-Wieack	Noilee	'Gdulla
Acrid (taste)	Peooniack	Mené wuttá *or* mené ruggara	
Add to or put	Proloné	Poggona nee Wughta	Poilabea
Across (to put or place)	Prolon-unyeré	Wuggara Tungalé	Tienenable poingh
Adult man	Puggana Minyenna	Pallawah	Pahlea
Adult woman	Lowalla Minyenna	Nienaté *and* Lowanna	Noallea
Afraid	Tianna Coithyack	Tiennawillé	Camballeté
Afternoon	Kaawutto	Nunto-né	Kaoonyleah
Aged, (literally rotten boned)	Tinna-trioaratick	Naggataboyé	'Gnee-mucklé
Agile	Menakarowa	Narra warraggara	
Ah !	Ah !	Mile-ne !	
Air	Oimunnia	Rialannah	
Albatross	Pookanah	Tarremah	
Altogether	Nuntyemtick	Mabbylé	
Aloft	Muyanato	Crougana Wughata	
Amatory (rakish)	Rinnyowalinya	Lingana looa renowa	
Anger	Miengconnenechana	Poiné moonalané	
Angle (crooked like the elbow)	Wien-powenya	Wiena *and* Wienenna	
Ankle	Munnaghana	Munna-wana	
Anoint	Yennemee	Ruggara	
Another	Tabboucack	Neggana	
Answer (to)	Ouneeprapé	Oghnemipé *and* Oghnerapé	
Ant, large blue	Pugganeiptietta		
Ant, small black, strong smelling	Ouiteitana	Moyberry	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay and the South of Tasmania.*	*North West and Western Tribes.*
Ant, largest black, venomous	Tietta	Tité	
Ant, red body, black head and tail	Nowateita	Lalla *and* Loattera	
Ant-eater, (*Echidna setosa*)	Mungyenna *or* Moynea	Munnyé *or* Meemmah	
Apparition	Wurra-wena, Krottomientoneack	Ria-wurrawa	
Aquiline (Roman nosed)	Muunna puggawinya	Maitingulé	
Arm	Wu'hnna	Wu'hnna	
Ashamed	Leiemtonnyack	Lienuté	
Aha! you are sulky all of a sudden	Annyah! Teborah!	Keetrelbea-noomena, peniggomaree!	
Ashes	Tontaiyenna	Toiberry	Roughtuly né
Ask	Ongheewammena	Oghnamilcé	Onabeamabbelé
Asleep	Tugganick	Longhana	Nenarongabea
Awake (to open the eyes)	Cranny-mongtheé		
Ditto	Wennymongtheé	Nunneoine-roidukaté	
Awake him, rouse him	Lientiapé		Illetiapé
Ay (yes)	Narramuna	Narrawa	Narra baro
Azure (sky)	Noorbiack	Warra-né	Loaranneleah
Awake (rouse ye, get up)	Lientable, tagga muna!	Nawaté, pegrate, wergho!	Takkawugh né
Babe	Cottruluttyé	Puggata riela	Rikenté
Bachelor	Pugganara mittyé	Lowatimy	Paponnewatté
Back (the)	Me-inghana	Talinah	Teerannelee-leah
Backward	Lenere	Talire	Kelabatecorah
Bad (no good)	Noweiack	Noile	Ee-ayngh-la-leah
Bald-coot (*Porphyrio melanotus*)	Leah-tyenna	Tipunah	
Bandy-legged	Lackaniampaoick	Rentroueté	
Bandicoot, (*Parameles obesula*)	Tiennah *or* Tienyenah	Tenghanah *or* Tenna, *or* Leningah	Lugoileah Mungoinah leah
Bark (of a tree)	Poora, poora-nah	Warra	Poora leah
Barren (woman)	Kaeeto Kekrabonah	Lowa puggatimy	Lopiteneeba
Ditto, ditto.	Nangemoona	Loakennamalé	
Baskets	Tughbranah	Trenah	Tillé
Bat	Peounyenna *or* Pughwennah	Lérinah *or* Lueekah	
Battle	Miemyenganah	Mialungana	Mungymeni leah
Beard	Comena purennah	Cowinné	Comené-waggelé

English.	Tribes from Oyster Bay to Pitwater.	Tribes about Mount Royal, Brune Island, Recherche Bay and the South of Tasmania.	North West and Western Tribes.
Beardless	Comena-ranyah	Cow-in-timy	Cominerah leah
Beat (to strike)	Legganegulumpté	Lugguna	Menghboibee raté
Beau (coxcomb)	Pugganatereetyé	Pallowah-tutté	Papponné tughte-leah
Beauty (fine-looking woman)	Lowanna-elapthatyé	Nîre-lowa	Noa noughanoatte
Ditto, ditto	Lowanna-eleebanaleah	Loa-minery	
Bark of tree (flapping)	Poorakunnah	Lowarinnakunna	
Bed (sleeping-place in the bush)	Oortrackeomee	Orragurra wurina	
Ditto	Noonameena	Orragurra nemony	
Before	Mealtetriangulebeah	Prungee	
Behind	Mealtitta lerrentitta	Talina	
Belch (to)	Luonna-kunna	Loona kanna	
Belly	Tree-érina	Lomate	
Big (large)	Teeunna	Papla	
Bill (birds)	Meunna	Peegra	
Bird	Puggunyenna	Punna	
Bite	Ralkwomma	Rebkarranah	
Bitter	Laieeriack	Poina noily	
Blandfordia nobilis	*None in the District.*	Reminé	
Black	Mawback *or* Mawbanna	Loaparte	
Blood (my)	Warrgata meena	Coccah	
Blossom	Maleetyé	Nannee Purillabenannee	
Blow-fly	Mongana	Monganah	
Blow (with the mouth forcibly)	Loyuné	Loinganah	
Boil (*Furunculus*)	Lieemena	Lieematah	
Bosom (woman's)	Paruggana	Parugganah	
Bosom (man's)	Puggamenyera	Parrungyenah *or* liatimy	
Boy (small child)	Malangyenna	Puggatah Paw-awé	
Boy (large ditto)	Cotty-mellityé	Poilahmaneenah	
Bread	Pannaboo	Pannaboo-na	
Bread (give me some)	Tienna miapé pannaboona	Tiengana má pannaboo	Tunghmbibé tungaringalea
Breast (chest)	Meryanna	Toorinah	
Brook	Manenge-keetanna	Wayatinah	
Broom (a besom)	Perruttyé	Beroieah	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay and the South of Tasmania.*	*North West and Western Tribes.*
Brother (little)	Nietta mena *or* nietárrana	Piembucki	
Brother (big)	Puggana Tuantittyah	Peegennah	
Brow (forehead)	Rogoona	Roi-runnah	
Brushwood	Weena-keetyenna	Looranah	
Burn (hurt by fire)	Punna meena	Wuggatah	
Bury (to)	Parrawé peangluntapoo	Pomanneneluko	
Buttock	Liengana	Nunnah	
By and bye	Piyeré	Gunnyem waubberaboo	
Buzz (like a fly; also name of fly)	Mongana	Monganah	
Come along, I want you	Talpyawadyno Tuyena-cunnamee	Tattawattah onganeena	{ Tunnakah makunnah talmatieraleh
Call	Rounie	Ronnypalpee	
Canoe (Cattamâran)	Mallanna	Nunganah	Nunghuna
Carcass	Miackbourack	Miepoiyenah	
Cat (large native)	Luyenna	Luyenna	Lunna *or* Laboibé
Cat (small native)	Pringreenyeh	Lapuggana	Labaggyna *or* Naboineenélé
Catarrh	Teachrymena	Manah	Teachreena
Catarrh	Teaknonyak	Tekalieny	Teeakunny
Ditto with *Dyspnœa*	Takkaruttye	Mannah larree	Poorannacalle
Caterpillar (small)	Rianna	Peenga	
Cavern	Lielle wolingana	Poatina	
Caul	Roongreena	Meena *or* Loarinah	Mena Lowallina *or* Kuttamoïleh
Cease (to)	Myeemarah	Parrawé	
Charcoal	Maweena	Loarra	
Chase (to)	Rhinyetto	Lerypoontabee	
Chirrup (to)	Tetyenna	Telita	
Chin	Comnienna	Wahba	
Chine (backbone)	Myingana-tenena	Turarunna	
Chiton (sea shell)	Puggamoona	Taroona	
Cider from Eucalyptus	Way-a-linah	Way-a-linah	
Circle	Lowamachana	Riawunna	
Claw (talon)	Kurluggana	Kuluggana	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal. Brune Island, Recherche Bay and the South of Tasmania.*	*North West and Western. Tribes.*
Clay	Pannogana Malittyé	Pappalye Mallee	
Clean	Pannyealeebna	Mallea	
Climb (to)	Kronyé	Kroanna	
Clutch (to)	Tiackboorack	Tigyola	
Cobbler's Awl (a bird)	Ya-warramakunnya	Memma	
Cold	Tunack	Mallané	
Come (to)	Talpeyawadeno	Tutta watta	
Ditto	Tallya-lea		
Conflux (crowd)	Tirranganna menya	Palabamabbylé	
Conflagration	Kawaloochta	Loiny *or* Una paroina	
Conversation (a great talking)	Rhineowa mungonagunea poggana [karné	Poyara kunna nuemena	
Ditto	Karnyalimenya	Karnamoonalané	
Ditto	Karnalirya	Karnalaré	
Cord (a small rope)	Metakeetana	Mité	
Corpse (a dead carcase)	Myack boorrack	Moyé *or* mungyé	
Correct	Onnyneealeebyé	Nirabe	
Cough	Tachareetya	Mannaladdy	
Coxcomb (a fine-looking fellow)	Puggana tareetya	Pallawah tutty	
Ditto	Puggatimy pena	Pallawahpamary	
Cockatoo, white	Weeanoobryna *or* Oiynoobryna	'nghara *or* Oorah	
Cockatoo, black	Menuggana *or* Menokanna	'nghay rumna *or* Nearipah	
Crab (largest)	Wugherapunganah		
Crazy (cranky)	Tagantyenna *or* Muggana Puggoon-yack	Tannatea	Wayenoeele *or* Poietanaté *or* Konga-tune *or* Kongatueele
Crevice or fissure in rocks	Liellowullingana	Riengeena	
Creek	Manenya keetanna	Liapota	
Cross	Oeilupoonia urapoonie	Poiré tungaba	
Crow	Lietenna *or* Lieetah	Taw wereiny *or* Linah	
Cry (weep)	Naoutagh bourack	Moi-luggata	
Ditto	Tagara toomiack	Tarra toone	
Cut (to)	Logoone	Toagarah	
Cape Portland (language)	Tebrycunna		
Creak (from friction of limbs of trees)	Temeta kunna	Retakunna	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay, and the South of Tasmania.*	*North West and Western Tribes.*
Dance	Rianna riacunha	Rialangana	
Dark	Taggremapack	Nune meene lareaboo	
Daughter	Neantyména	Loggatalé meena	
Daylight	Taggre marannyé	Luggaranialé	
Dead	Mientung bourrack *and* merack bour-[rack	Moyé	
Deaf	Guallengatick guanghata	Wayeebedé	
Deep (water)	Loa Maggalangta	Kellatie	
Demon	Mienginya	Ria warrawah noilé	Pawtening-eelylé
Demur (grumble)	Kokoleeny konqua		
Den (of wild animals)	Lienwollingena	Riengena Poatina	
Depict (draw a design in charcoal)	Macooloona	Pallapoirena	
Deplore (to lament as at an Irish [wake	Tagrunah kamuluggana	Moaluggata Kannaproie	
Desire (to)	Oonacragniack	Poykokarra	
Desist (to)	Parrawureigunepa	Parawuree	
Devil (*Dasyurus ursinus*)	Poirinnah	Tarrabah	
Dine (to)	Pooloogoorack	Tuggara nowe	
Dirt (mud of a whitish colour)	Panogana maleetya	Mannana Mallyé	
Dirt (mud dried)	Pengana rutta	Mannana rullé	
Dirt	Pengana	Mannana	
Dirty	Mawpack	Mawpa	
Displease (to make angry)	Lieneghi miawero *or* Kukunna poi-[puggeapa	Poinawallé	
Dispute (to)	Rinnea guannettya	Kanna Moonalané	
Distant	Manlumbéra	Kantoggana webbery	
Dive (to)	Toné lunto	Togana Lea-lutah	
Diversion (sport, play)	Leenyallé	Luggara Riawé	
Dizzy	Mongtantiack	Nubretanyté	
Dog	Kaeeta	Panoiné	
Dove (wild pigeon)	Mongalonerya	Moatah	
Draw (to pull)	Ko-ulopu	Menghana	
Dream	Neacha puggaroameo	Neaggara	
Drink	Lougholee	Nugara	
Drop (water)	Liemkaneack	Mikany	
Drown	Tong bourrak	Tong Poyeré	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay, and the South of Tasmania.*	*North West and Western Tribes.*
Drowsy	Tugganéménuiack	Nueenédy	
Dry	Rongoiulong bourrack	Karnaroide	
Ditto	Roungeack		
Duck (gender not distinguished)	Wiekennya	Woaroiré	
Dug	Paroogualla	Paruggana	
Dull (stupid dolt)	Koullangtaratta	Poyetannyté	
Dumb	Manemmenéna	Menawély	
Dung (excrement)	Tiamena	Tiena	
Dusk	Kaoota	Panubratoné	
Dust	Pughrenna		
Dwarf	Wughwerra paeetya	Nuggatapawé	
Dysentery or Diarrhœa	Tiaquénnyé	Tiamabbylé	
East Bay Neck	Lueenalangta	Lueenalanghta	
Eagle Hawk Neck	Teeralinnick	Teralinna	
Eagle	Gooalanghta	Weelaty	
Eagle's nest	Lieemunetta	Lieewughta	
Ear	Mungenna	Wayee	
Early (in the morning at twilight)	Tuggamarannye	Nunawenapoyla	
Earth (mould)	Pengana	Mannena	
Earthquake	Wughyranniack	Munna Potrunne	
Earthworm	Lollah	Lollara	
Eat heartily	Telbeteleebea		
Eat (to)	Tughlee	Tughrah	
Ditto	Tuggana	Tuggranah	
Eagle (Osprey)	Tortyennah	Neathkah	
,, (Wedge-tail)	Kuynah	Korunah	
Echo	Kukanna wurrawina	Kannamayété	
Eel	Léngomenya	Língowenah	
Effluvia	Mebreac	Poiñé noilé	
Egg	Liena punna	Pateenah	
Elbow	Wieninnah	Wayeninnah	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay, and the South of Tasmania.*	*North West and Western Tribes.*
Elf *or* fairy (fond of children and dances in the hills, after the fashion of Scotch Fairies)	Nang-inya	Nungheenah *or* noilowanah	
Eloquent (talkative)	Munkannára walah	Kannamoonalané	
Ember (red hot)	Toneetea	Weealuttah	
Embowel (to dis)-	Parrawé tiakrangana	Parratibe	
Embrace (Platonic)	Talwattawa	Tallawatta	Moilatená
	Rugana wurranaree		
	Ramuna reluganee		
Emmet (small ant)	Ouyeteita	Lallah	
Emu (bird)	Punnamoonta	'ngunannah	
Encampment	Lena wughta rotaleebana	Line rotali	
Enfeeble (to)	Miengotick	Mungawelé	
Ditto	Mienkomyack		
Enough (sufficient)	Miemerémelé	Narramoiewa	
Entrails	Regana Tianna *or* Tiakrangana	Poiné	
Evening	Kaoota	Kawootah	
Exchange	Tientewatera nenté *or* Tiangtete- [wemyna	Tayenebé *or* Tayene nyelutera	
Excrement	Tiamena	Tiannah	
Expectorate	Teagarea kraganeack	Manna méredé	
Extinguish	Parlieré	Patingunabé	
Exudation	Wialina *or* Wallenah *or* Wallamen- [ula	Wialiné	
Exuvia (skin of a snake)	Lierkanapoona *or* Lierkapoona	Liergrapoinena	
Eye	Mongténa	Nubré *or* Nubrenah	
Eyebrow	Lyeninna poorinna	Leeininné	
Eyelash	Mongtalinna	Nubré tongany	
Eyelid	Moygta genna	Nubre wurrine	
Eyry	Malanna meena	Linenah	
Falmouth and George's River	Kunawra Kunna		
Face	Niengheta	Noienenah	
Face (fine)	Niengheta elapthatea	Neiena niré	
Facetious	Poigneagana	Pené *or* Penamabbelé	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay and the South of Tasmania.*	*North West and Western Tribes.*
Faint	Mongtaniack	Nubretannété	
Fairy	Murrumbuckannya *or* Nanginnya	Murrumbukannya	
Falsehood	Maneentayana	Laninga noilé	
Fang (canine tooth)	Wugherinna Rugotoleebana	Payee rotylé *or* Coorina	
Far	Tongoomela	Lomawpa	
Ditto	Lewatenoo *or* Nangummora	Tomalah	
Fat	Niennameena	Pangana wayedeé	
Fat man	Poonamena moonta	Pallawah proina	
Fat woman	Nienna langhta	Lowa proina	
Father	Noonalmeena	Nanghabee *or* Nanghamee	
Feast	Tuggely pettaleebea	Tuggety proibee	
Feather	Puggerinna	Lowinné	
Feces	Tianana	Tianah	
Feeble	Tuggemboonah	'ngattai	
Feel (to pinch)	Wughanne	Winghanee	
Fern	Lawitta-brutea	Tughanah	
Fern-tree	Nowarracomminea	Lapoinya	
Fetch (to bring)	Kunnywattera	Kanna watta	
Fetch (a spirit)	Preolenna		
Fever	Miempeooniack	Mie luggrata	
Few	Luowa	Potalughyé	
Fiend	Winnya Wainettea *or* mienginnya	Winneluaghabaru	
Fight	Miamengana	Moymengana	
Filth	Lenymebryé	Liné poine noilé	
Fin (of a fish)	Wunha	Purgha lamarina	
Finger	Ri-ena	Rye-na	Reeleah
Fire	Tonna	'ngune'	Winnaleah
Fire-tail (*Estrelda bella*)	Lyenapontendiah	Lyekah *or* Layngana	
Fire in the bush grass	Kawurrinna	Lienah	
Firm (not rotten)	Weerutta	Weerullé	
Firmament (sky)	Warratinna	Warrangalé Loruuna	
Fish (a)	Mungunna	Peeggana	
Fish (cray)	Nunnya	Nubé	Nubyna

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay and the South of Tasmania.*	*North West and Western Tribes.*
Fist	Ree-trierrena	Ree-mutha	
Five	Pugganna	Marah	
Flambeau	Poorena Maneggana	Leewurré	
Flank	Poolominna	Poolumta *and* Tiawalé	
Flea	Lowangerimena	Noné	
Flay	Relbooee trawmea	Lergara Leawarina	
Fleet (swift)	Wurrangata poonalareetyé	Loongana	
Flesh (meat)	Wiangata	Palammena	
Fling	Peawé	Pákara	
Flint	Trowutta	Mungara	
Ditto (black)		Mora trona	
Float (to)	Lia ruoluttea	Puggata *or* Rannyana	
Flog	Luggana Poogarané	Lunghana	Lanné
Flounder (flat fish)	Lerunna	'ngupota-metee	
Flow (as water)	Lia tarightea	Lia teruttena	
Fleece (or fur of animals)	Pooeerinna	Longwinny	
Fly (like a bird)	Koomeela	Coaggara	
Fly (insect)	Mongana	Monga	
Foam (froth)	Kukamena-mena	Lia láratame	
Fog	Mainentayana	Warratie	Pulangalé
Foolish (or fool)	Mungana paonyack	Noilee	Louneeaté
Foot	Luggana	Lugganah	Lugh
Foot (right)	Luggana eleebana	Lugga worina	Malleearé
Foot (left)	Luggana aoota	Lugga Oangta	oolatyneealé
Footmark of black man	Puggalugganna	Pallowa lugganah	Pah lug
Footmark of white man	Ria luggana	Reea lugganah	Matyena lugh
Ford of a river	Teeatta kannawa	Penghana	
Forehead	Raoonah *or* Rogounim Lienya	Roee Roeerunna	Rioona
Forest ground	Teeatta kannamarranah	Wayraparattee	Pallanyneené
Forget	Poeenabah	Wannabayooerack	Lyinneragoo
Four	Pagunta	Wullyawa	
Fragrant (smell)	Noya leebana	Poiné niré	Polimganoanaté
Freestone	Boatta *or* potha mulleetyé	Potta mallya	Poningalee

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay and the South of Tasmania.*	*North West and Western Tribes.*
Fresh water	Liena eleebana	Liéniré	Lié nonghaté
Friend	Kaeetagooanamenah	Lapoile lu nagreenah moolanah	Mateté loguattame
Frigid (cold)	Tunnack	Mallané	'Ptunarra
Fright	Tian-cottiack	Tianawilly	Micumoolaka
Frog	Rallah	Tattounepuyna	Lora
Frost	Parattah	Oorattai	Oolrah
Frost (hoar)	Parattiana	Oorattai	
Fuel	Wielurena	Ooeena *or* Winna	Ooee
Full (after a meal)	Riawaeeack	Ma teelaty	Mapilriagunara
Full (a vessel filled)	Rueeleetipla	Kanna	Yeackanara
Fun (sport)	Riawena	Luggara	Riawé
Fundament	Leieena	Loié Loiningé	
Fur of animals	Pooerinna	Longwinny	Waggelé
Fury	Leenangunnyé *or* koananietya	Liapooneranah	Neenubru-latai
Gale	Ralanghta	Rallana proiena	Loweeny Rulloi leah *or* Loweeny loileah
Gannet (*Sula Australis*)	Rooganah	Rahra	
Gape	Grannacunna	Granna canaibee	'ngana kankapea oolralabeah capueeleah
Ghost	Wurrawana	Riawarawapah	Teeananga winné
Girl	Lowana keetanna *or* Kottomalletye	Longatylé	Noamoloibee
Glutton	Lemyouterittya	Pamoonalantutte	Tuggattapeeatto
Good person	Kekanna elangoonya	Niree	Kanna noangaté
Go	Tawé	Tawkáwbee	Tawé
Goods (things)	Noona meena	Ooraimabilé	Noonamoy
Goose (Cape Barren) *Cereopsis Nov. Holl.*	Weienterootya *or* Wientalootya	*None*	*None*
Gosling	Kaeeta boena		
Grandmother	Lowan kareimena	Ooaimena *or* Wyemena	Neenambee
Grass	Rouninna	Nemoné	Probluah
Great bellied (with child)	Lowallaomnena	Puggata Lowatta lutta	Lomalleé
Green (thing)	Norabeetya	Nobeetya mallya	Mallabeabu

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay and the South of Tasmania.*	*North West and Western Tribes.*
Greeting (a)	Yah! Tahwattywa!	Yah! Nun'oyné	Yah!
Grin (to make faces)	Monapaooniack paoreetye	Moyetungali	Boabenneetea
Grinder (back tooth)	Wuggarinna Ryana	Payelughana	Yennaloigh
Gristle	Comyenna	Wéyalé	Péngai
Groin	Mungalarrina	Tramina	Tarrané
Ground	Pvengana	Mannina	Nattie
Grow (as a tree, child)	Myallanga bourack	Mangapoieré	Mallacka
Growl	Nannéaquanhe	Nunnaquannapeiere	Dyekka namenera
Grub	Menia *or* Mungwenya	Larraminnia	Langwé
Gull (*Larus Pacificus*)	Lueeteianna	Lieppetah *or* 'ngawah	Payngh
Gulp (to)	Tongwamma	Tongané	Tonnabea
Gum (wattle tree)	Munganna	Reeatta	Reeattawee
Gum tree (Eucalyptus)	Lottah	Moonah	Loyké
Gums (of the mouth)	'ngenna	Carena	Kattamoy
Gun (musket)	Leryna *or* le langta	Pawleena	Rullé
Gunpowder	Lerytiana	Pawleenatiana	Lughtoy
Glow-worm, or phosphoresence	Pugganga lewa *or* Monghtamena	Payaleena	
Haliotis (ear shell)	Yawarrenah	Netepah	
H. tuberculata		Lorokukka	
H. glabra	Magranyah		
Hen (native)	Mienteroonyé	Riacooné	Reeakallingalle
Hold your tongue, be patient, bye and bye	My-elbeerkamma *or* Mealkammah	Kanna moona lané mentakuntiby *or* Konnyab	Wannabee *or* kannebo
Hail	Pratteratta	Turélai	
Hair	Poinglyenna	Poieté longwinne	
Ditto, (matted with ochre)	Poinghana	Poina	
Halo (round the moon)	Weetaboona	Panoggata	
Halt (limp on leg)	Ungunniack	'nganee	
Ham or Hough	Pryenna	Tabba	
Hamstring (the)	Metta	Tapmita	
Hand	Riena	Reemutta	
Harlot	Pugganatingana *or* meneteruttye	Patingana	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay, and the South of Tasmania.*	*North West and Western Tribes.*
Hastily (quickly)	Lemya *or* tuggana	Cothé	
Hawk (*Ieracidea*)	Nierrina	Pengana	
Ditto small (*Astur approximans*)	Nowarra nenah	Toeenah	
Heron (Egret) white (*Herodias syrmatophorus*)	Yennenah		
Heron (blue crane) (*Ardea Nov. Holland.*)		Lūnga nūa wah	
Head	Oolumpta	Poiete	
Head-ache	Oongena liack	Poiete merede *and* poingata	
Heal	Raick bourrack	Niré	
Heap (to make a)	Prolmy nunty menta	Teeaté	
Hear (to)	Toienook boorack	Wáyee	
Heart	Teeackana warrana	Teggana	
Heat	Peooniack	Lughrah	
Heave (to pant)	Tengoonyack	Teggalughrata	
Heavy	Miemooatick	Moorah	
Heel	Tokana *or* Toggana	Tokana	
Help	Nelumie	Lagrah	
Hide (to conceal kangaroo)	Lyeemena kamei	Muggrah	
Hide one's self	Mur kamiah	Muggrah	
Hill (little one)	Poimena	Layeté paawé	
Hill (mountain)	Poimena tyenkanganarrah Tineare [warrah	Layeté proigh	
Hit	Menny	Merrhé	Lanné
Hither and thither	Pughawee nyawee	Tackra, tungalé, tungalé	
Hoar-frost	Tyeebertia crackana	Warattai	
Hoarse	Lonypeack	Lounabeeadé	
Hole (like wombat burrow)	Lowa lengana	'ngeanah	
Honey-sucker (*Meliphaga Australasiana*)	Liapatyenna	Tarrerikah	
Hot	Peooniack	Lughrata	
House or Hut	Lenna *or* Leprena	Line	Lebrinā *or* Leebra
Howl (in distress like a dog)	Tuggermacarna *or* Myluggana	Cockata	
Humid (wet, damp)	Malleeack	Layekah	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay, and the South of Tasmania.*	*North West and Western Tribes.*
Hunger	Meeoongyneack	Teecotte	
Husband	Puggan neena	Pah-neena	
Hurt (with spear)	Mayannee rayeree	Roaddah	
Hurt (with waddie)	Payalee	Loipune	
Ice	Paratta	Rullai ungaratiné	Ralloileah
Iguana (lizard)	Lyennah	Toorah	
Ill (sick)	Crackanaeeack	Meredé *and* merydyneh	Monaganurrah
Imp	Winya waumetya	Ria warappé noilé	
Impatient	Telwangatea leah	Kannamoonalanné	
Inactive (indolent)	Meallee tonerragetta	Rannah moorinah	
Indolent (lazy)	Mimooneka nentaca nepoony	Rannah moorinah	
Infant	Malangenna	Puggetta	
Ditto, female		Lowa luggata	
Infant, newly born	Cotruoluttye	Puggata Riale	Lapoitale *or* Lapoitendaylé
Inform (to tell)	Oana	Oanganah	
Ditto, (tell me)	Oana mia	Ongana meena	
Instant (quick)	Krottee	Koatté	
Instep	Lugga poola mena	Lugga umené	
Intimidate	Tiencootyé	Tienweálé	
Intersect	Unginnapuee	Poany puerê	
Intestines	Tiacrakena	Lomatina	
Invigorate	Neingtera teroontee		
Jawbone	Yangena	Wahba *and* wabranna	Ninenna leah
Jealous	Pachabrea-longhe	Mahrewealai *and* poinéwealai	
Jerk	Co-ulé	Cokura	
Juice of a plant, red	Miangatentyé	Miengaleena	
Ditto white	Tuggara maleetyé	Taramena	
Jump	Wughallee	Warrakara	
Juvenile	Croatta meleetyé		
Kangaroo (forester)	Newittyé	Tarrana	Tarraleah
Ditto (brush)	Ooaleetya Ree-enna *or* Lyenna	Lazzakah *or* Lenah	Kuleah

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay, and the South of Tasmania.*	*North West and Western Tribes.*
Kangaroo, joe, (young)	Tumnanna	Rarryna	Piaclummé
Kangaroo rat	Nienyennah	Koonah	
Keep	Tialapué	Tiagarra	
Kill (deprive of life)	Mienémiento	Lungana	
Kingfisher (*Alcyone Diemenensis*)	Teepookana	Tūrrah	
Kiss, to	Miewallé	Moee Miré	
Knee	Mienna	Ranga	Rawinna leah
Kneel	Meallé mianaberré	Leetarangah	Wannabya raminnaerybee
Knuckle	Reekateninna	Ria puggana	Releenulah leah
Lad	Puggannaereebana	Pa-ga-talina	
Lake (lagoon)	Miena, mena	Lia mena	
Lame	Playwarrungana	Luggamutti *or* Raggamuttah	
Lance (wooden spear)	Perenna *or* Prenna	Pena	
Large (big)	Pawpela	Proina nughabah	
Last (to walk last in file)	Loente wamla	Mituggara murawamena	
Laugh	Poeenyeggana	Pœnghana	Peninna
Lax (Diarrhœa)	Tiacroinnamena	Tia noileh	
Lazy (see Indolent)	Mienoyack	Ruété	Rudanah
Leaf	Poruttyé	Proié	Parocheboina
Leafless	Poruttye-mayeck *and* paruye noye-[maeck	Paroytimena	Parochyateemena
Lean	Tughenapoonyack	'Ngattai	'ngatta
Leap (see Jump)	Wughalleh	Wurragara	
Leech	Pyenna	Pangah	Liawena
Left hand	Riena-aoota	'Ngotta	Oottamutta
Leg, left	Leoonyana	Luggunagoota	Luggrangootta
Leg, right	Leoonya cleebana	Warrina niré	Luggra-niré
Lick (with the tongue)	Neungulee	Nugra mainre	
Lie (falsehood)	{ Manengtyangha { Tyangamoneeny rapparé	Linughé noilé	
Light of a fire	Tonna kayinna		Unamayna
Lightning	Poimettyé	Poimataleena	Rayeepoinse

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay and the South of Tasmania.*	*North West and Western Tribes.*
Limp (see Lame) right foot	Wughnna eleebana		
Ditto, left foot	Playwughrena	Raggamuttah	
Limpet	Wattah	Tangah	
Lips	Mounah	Moyé	
Little Birds	Wurramatyenna		
Lizard	Preeatenna *or* Priettah	Runnawenah *or* Pryaminna	
Load	Mangeluhwa	Munghe mabbely	
Lobster, freshwater	Tayatea	Tay-a-teh	
Locust (V. D. L)	Ganammenyé	Ganemmanga	
Log (wood)	Wyee langhta	Weea proingha	
Long	Rogoteleebana	Rotuli	
Long way	Murramanattya Onamarumpto	Noina muttaina *or* Maantah	Rowé leah
Look (to gaze)	Reliquamma	Lutubreneme	
Loud (to speak)	Kuggana langhta	Kanné proine waggaba	
Low	Lunta	Pranako	
Magpie	Poirenyenna	Reninna	Curraillylé
Maim	Mennanwee		
Man (black)	Pugganna *or* Weiba	Pallawah *or* Wiebah	Pah-leah *or* Pahlyekka
Ditto (white)	Rianna	Ludowinné	Namma
Many (a great number)	Luawah	Mabbolah	
Marrow	Moomelinah	Lebrana	
Me	Mina	Meenah *or* Manah	
Menstruate	Teebra wanghatamena		
Midday (or noon)	Tooggy malangta	Toina wunna	
Milk (of Aboriginal woman)	Proogwallah	Prooga neannah	
Milt of fish	Lowalinnamelah	Perina	
Mirth	Leenealé	Penamoonalane	
Mischief	Puoynoback	Tannate	
Mole-cricket	Nawywemena		
Moon	Wiggetena	Weetah	Weenah leah
Moonlight	Wiggetapoona	Weetapoona	Weenapooleah
Moss	Lagowunnah		

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay and the South of Tasmania.*	*North West and Western Tribes.*
Mother	Neingmenna	Neeminah	Neena Moygh
Moth	Commeneana		
Mountain Duck (*Anas punctata*)	Lonna mutta	Opah	
Mouse	Terangaté Munuggana	Pugganarottah	Ptoarah leah
Mouth	Kakannina	Kaneinah	Kapoughy leah
Mud, sediment	Kokerea Kokeleetyé	Manannywayleh	
Murmur	Mannyaquanee	Kanaroiluggata	
Mushroom	Neatyranna	Neáranna	
Musk Duck (*Biziura lobata*)	Tenghyenna	Rangawah	
Mutton Bird (sooty Petrel)	Yolla	Yolla	
Mutton fish, smooth, (*Haliotis*)	Magrannyah	Lorokukka	
Mutton fish (rough)	Yawarrenah	Netepa	
Mussel (shell-fish)	Paragauna	Teeoonah	
Nail (finger)	Tonye *or* Pounyé	Ryeetonyé	Wante leah
Nail (toe)	Peyerrena	Lugga-tonnyé	Perrarunne
Native Hen	Miengterawinnya	Tiabunna	
Native Cat, large (*Dasyurus maculatus*)	Pungeranyah		
Ditto, Small (*D. viverrinus*)	Luyennah	Roonah	
Navel	Mienanuggana	Tunoh *or* Lughi	
Nautilus shell (*Argonaut*)	Wietatenana *or* Wietenah	Weettah *or* Wibalengah	Weena runnah
Near	Malumnyella	Réné	
Neck	Pilowettah	Lorainah	
Nettle	Miatowunnameena	Miny	
Nest (birds)	Malunna	Liné	
Nest (little birds)		Puné Liné	
Never	Noye myack *or* Noeeack	Timeh *or* Timy	
New (not old)	Croatte	Boilé	
Night	Tagrummena	Nuné	Dayna leah
Nip (to pinch)	Reloyé Tonyeré	Rédeekatah	
Nipple	Prugga poyeenta	Pruggapogenna	
No	Parra garah	Timeh *or* Timy *or* Pothyack	Mallya leah
Noise	Kukanna wallamonyack	Kanna	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal. Brune Island, Recherche Bay and the South of Tasmania.*	*North West and Western. Tribes.*
Nose	Mununa	Muye *or* Muggenah	Muanoigh
Now (at this time)	Croattee		
Ochre (red)	Ballawinné	Ballawinnó	
One	Marrawah *or* Mara	Marrawah *or* Merah	
Opossum, black, (*Phalangista fuliginos*)	Neoolangta *or* Nualangtamabbena	Tonytah *or* Toarkalé	Temytah Temyta Malughlee
Ditto, ringtailed (*Ph. Cookii*)	Tawpenale *or* Tarripnyenna	Pawtella *or* Nangoonah	Pawtelluna Nuckelah
Opossum mouse, (*Ph. nana*)	Logongyenna *or* Lowoyenna	Leena *or* Namtapah	Paponolearah
Orphan	Kollyenna	Wah-witteh	
Outside	Tulenteena	Pratty-toh	
Owl, large, (*Strix Castanops*)	Trycenna *or* Terrinnyah	Kokatah *or* Rrukah	Tayaleah
Owl, small, (*Athene Boobook*)	Laoona *or* Luggana nienyah	Wawtronyte *or* Taurah *or* Tannah	Kokannaleah
Ore of Iron, Iron Glance, (used by the Aborigines as a black paint)	Latta	Lattawinné	
Oyster	Looganah	Ledderakak	
Pain	Crackanycack	Mayrude	
Palm of the hand	Rielowolingana	Reea-rarra	
Parrot (Co. green)	Cruggana	Cruddah	
Ditto (Rosehill)	Pruggana		
Parrakeet (swift)	Welleetya	Wellya	
Parrakeet (musk)	Walya noattyé	Marraryka	
Ditto (*Euphema chrysostome*)	Munganauenah	Kenganūowah	
Paw	Lugganteena	Togga-né	
Peak (a hill)	Poymalangta	Letteené	
Pelican	Treeontalalangta *or* Troountah	Toyné *or* Lazz'leah	
Platypus (*Ornithorhynchus paradoxus*)	Ongyennah	Oonah	
Penguin (*Spheniseus minor*)	Tomenyenna	Teng-wynne *or* 'ngawaredekah	
Perspire	Regleetya	Laywurroy	
Periwinkle (sea shell)	Winnya	Rannah	
Pet (pettish)	Lowabereelonga	Poyneh	
Pewit wattled, (*Lobivanellus lobatus*)	Tarranyena		
Pigeon (bronze-winged)	Mooaloonya *or* Poogharottya	Mootah *or* Lappa	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay and the South of Tasmania.*	*North West and Western Tribes.*
Place (a)	Lenna	Lineh	
Place, this		Linépoynena	
Plant	Mellangbourack		
Play	Lyanelé	Luggarrah	
Point of spear	Poyeenta	Poyeenna	
Pool *or* Lagoon	Mienameena	Kannah	
Porcupine	Mungyenna	Mungyé	Mungynna Kanagale
Porpoise	Minga-oinyah	Poyrennah *or* Wenoonyah	
Pregnant	Lowalloomanyenea	Lomatilutta	
Prickly	Mona-meenee	Moynéna	
Punk	Wullugbetye	Rarra	
Pebble, rolled quartz	Kughaweenya	Tramutta	
Penis	Lubra, Mattah-prenna	Leena *or* Leenai	
Pubes (*mons veneris*)	Maga	Magana *or* Megah	
Quaff (drink)	Lowelly	Nugarah	
Quail (*Coturnix pectoralis*)	Terranguatta	Téna Terrangutta *or* Teewah	Tena Teewarrah
Quiet	Coamnyena	Maytee Pangrutta *or* Maytee Kantimbeh	
Rage	Neoongyack	Leecoté	
Rail (*Rallus pectoralis*)	Ria lurinah	Neekah	
Rain	Pokana *or* Pogana	Porrah	Moka
Rain (heavy)	Progga-langhta	Porra	
Rainbow	Weeytena	Wayatih	
Rascal	Nowettye-eleebana	Pawee	
Rat	Lyinganena	Tooarrana	
Ditto water or musk (*Hydromis chrysogaster*)	Renah	Moinah	
Ditto, long-tailed	Lūnganenah	Lūringah	
Ditto, long bandicoot nose	Tarrangha munukana	Wierah	
Ray (Stingaree)	Leranna	Piremé *or* Lourah	
Red	Tendyagh or Tentya	Koka	
Red-bill	Lutyenna	Tikah	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay, and the South of Tasmania.*	*North West and Western Tribes.*
Red-breast, Robin	Pughynyena	Tenganeowah	
Repair	Trulee	Peruggareh	
Respire	Tyackanoyack	Taykalyngana	
Retch (to vomit)	Nutyack	Nukatah	
Rib	Tolameena	Tené	
Rise	Takumuna	Peggaruggarua	
Ripe	Crang-boorack *or* Punelong boorack	Pegarah	
River (little)	Menaee Keetannah	Lia-pootah	
Rock (large)	Lonah *or* Loelanghta	Loynee Broyee	
Rod (small)	Weenah Keetannah	Weea Pawee	
Roll (to)		Wangana weepootah	
Rollers or breakers on sea-beach	Lyeltya	Pannaminna	
Roe of fish	Leena bunna		
Root (tree)	Remeenyé	Monalughana *or* Pughweady	
Rotten wood	Tréoratick	Tawnah	
Rough	Payralyack	Rullé	
Round like a ball	Mieawiack	Mattah	
Row (a long one)	Raondeleeboa	Reekara	
Rub (rub in fat)	Munganneemoee	Ruggarra	
Ruddy cheeks	Miypooeetanyack	Koka	
Ditto	Mientendyack		
Run	René	Legara	
Run together	René nunempté	Loongana	
Rush		Roba	
Ringlets (corkscrews, with red ochre)	Pow-ing-arooteleebana	Poeena	Poenghana
Salt on the rocks by the sea-side	Lienowittye		
Ditto	Liopackanapoona		
Sand	Mungara mena	'nguna	
Sand-lark (*Hiaticula ruficapilla*)	Tetaranyena	Ruwah	
Sap	Miangatentya *or* Miangmalleetya		
Ditto (milk white)	Poorwallena		
Scab	Loryomena *or* Loirmena	Lowide	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay and the South of Tasmania.*	*North West and Western Tribes.*
Scales (of fish)	Poerinna	Lowinna	Nangennamoi
Scar	Trugatepoona	Mungerapoona	Toolengennaleah
Scarify	Lowooné	Towatté	
Scent	Mebryack	Poanoilé	
Scratch	Larré	Larré	
Sea (ocean)	Lienna wuttya *and* lialeetea	Panamuna	Leah lé
Sea-horse (*Hippocampus*)	Layanunea	Poolta	
Seal (*Phoca*), on sandy beach	Naweetya		
Ditto, black on rocks	Pienrenya	Wayanna	
Ditto, white-bellied	Prematagomoneetya		
See (to behold)	Mongtone	Nubratoné	
Serious (sad gaze)	Relgany-quonga	Manatta rulla	
Serpent (black snake)	Loiena *or* Lounabe *or* Loyganah	Loina *or* Lūthgah	Rau-anah *or* Rounah *or* Rawannah *or* Pallawaa-royanah *or* Roallabeah
Ditto (diamond ditto)	Preawintamettya	Pawerak	
Sexual intercourse	Loanga metea *or* Poangha metea		
Sexual organs—			
Male, *penis*	Matta-prenna *or* Lubra	Leena *or* Leenai	
,, *scrotum*	Mattah	Matta	
Female, *mons veneris*	Mahgana	Magana *or* Megah	
,, *vagina*	Teebra poynghta	Teebra poyngta	
Shallow	Waylearack	Roheté	
Shadow	Wurrawina Tietta	Maydena	Belanyleah
Shag, cormorant black, (*Phalacrocorax corboides*)	Pooragana, Poorakanna, *or* Moorah	Cabarrarick *or* Moorah	
Ditto white-breasted ditto (*P. leucogaster*)	Moogana	Moorak *or* Moorah	
Shark	'ngūnna	Meningha	
Sharp (like a knife)	Lyetta	Nenah	
Shave, to, (with flint)	Poyngha runnyale	Poynghaté ranayalé	
She-oak tree	Luggana-brenna	Luh-be	
Ship	Lotomalangta loomena	Luné poina makkaba	Loallybé
Shore	Malompto	Loccota	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal. Brune Island, Recherche Bay and the South of Tasmania.*	*North West and Western. Tribes.*
Shore (sandy beach)	Koynaratingana		
Go ashore		Tawé loccoto	
Shoulder	Puggarenna *or* Tolunah	Parangana *or* Paranghé	
Under ditto (arm-pit)	Luranah	Kawdah	Kawallah
Shout (yell)	Kukanna wurrarenna	Palla-kanna	
Shrike (magpie) (*Gymnorhina organicum*)	Toongyenna		
Ditto black (magpie) *Strepera fuliginosa*	Poierrenyenna	Reninna	
Shower (of rain)	Pokanna kuanna	Tungatinah	
Shrub	Tarra coonee	Tarrara manné	
Sick	Micrackanyach	Miméredé	
Ditto	Miycracknatareetya		
Side (the)	Lietelinna	Taynna	
On one side, aside	Mebbya		Mawbya
Sinew (kangaroo)	Metah (met-ah)	Mitah	
Sing (to hiss or fizz in the fire)	Lyenny	Lyenné	
Sing a song	Lyenny riacunna		
Sink	Tomla, tome, boorka		
Sit down	Mealpugha *or* craekena	Cracka-nekah	
Sister	Nowantareena		
Skeleton (bones of)	Terynah	Terannah	
Skin	Tarra Meenya		
Ditto of kangaroo	Trameeneah	Leewuré	
Skull	Pruggamoogena	Poetarunnah	
Sky (cloud in)	Mienteina	Warrena *and* Warrentenna	
Sleep	Lonny	Longana	Nunabeah
Sleep (very sound)			Nunabeah temaruleeto
Smile	Pughoneoree	Panapawaweabé	
Smoke	Progoona *or* prooana	Poodah	
Smooth	Panninya	Temlih	
Snail		Mengana	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay, and the South of Tasmania.*	*North West and Western Tribes.*
Sneeze	Lonughutta	Lonolarré	Lialarragonnah
Snore	Teakanarra loneah	Roggara	
Snow	Paratta *or* Parattianah	Turrana	Rienalbughy
Sole (of foot)	Lugyenna	Lugga-lunnah	
Song	Riacunnah	Luna-riabé	Riacannah
Soon	Leemya	Kothé	
Son	Malangena	Puggatah	
Sour	No-wiyack	Noile	
Spaniel (dog)	Kaeeta *or* Mookra	Mookrah	
Spark	Tonypeprinna	Powitté	Pughweenyna weimyale
Ditto, fire	Tonna	'Nguné	Lopah *or* Lobah *or* Patrolla
Spawn (of frogs)	Manughana	Manunghana	
Spear (wood)	Perenna	Pe-na	Pœna, Pilhah
Spew (to)	Nuka	Nukara	Nugrynna
Speak	Pueellakanny	Poeerakunnabeh	Pooracannabeh
Spider	Tangana	Waytanga	
Spine	Myinguna terrena	Tuherarunnah	
Spirit of the dead	Wurrawena	Warrawah	
Ditto, of evil—the devil	Mieng-inya	Namma *or* Namneboorak *or* Rigga-[ropa	Comptena
Ditto, of great creative power	Tiggana Marrabona		
Spit	Tyackaree-meena	Kamena meena	Kaimonamoee
Sport (play)	Riawena	Riawé	Riawé wayboree
Spring (wattle-blossom-season)	Pewenya paeena	Luggarato pawê	Lughra-pawee
Squall	Ralangta	Rallana proee	Raali-poyngnah
Stamp (with the foot	Taoontekapé	Taoontekapé	
Stand (stand up)	Tackamuna	Cracka-wughata	Pegrette wergho
Star	Teahbrana	Romtenah	Rhomdunna *or* Miabeemenah
Starlight	Teahbertyacrackna	Oarattih	
Shooting star	Puggareetya	Pachareah	
Steal	Maneena langatick	Maneena layawé	
Step (foot-step)	Luggana marah	Luggacanna	
Stomach	Teenah	Teena	Teenah
Stone	Loantennina	Loinah, Louna *or* Loiné	Noanyalé

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay, and the South of Tasmania.*	*North West and Western Tribes.*
Stoop	Puggana narratyack	Puggana Narrangbé	
Stop	Poyeeré	Kuneeamé	
Straight	Ungoyeleebana	Tunghabé	
Strike	Luggana golumpté	Lunghana	Lanné
Strong	Oyngteratta *or* Relbeah	Rulla, Rullanih	Ramana-rulé *or* Relbeack
Stump of a tree	Pomya kunnah	Ortawenah	Weealynghana
Stupid	Koa-langatick	Oyélarraboo	Wayeelarraboo *or* Puggytomoorah
Suck	Molé	Mokrá prugh	
Sullen	Lowattobeolo kakannené *or* Monna Perinna *or* Lowaperee longha	Poininna *or* Keetrelbya	
Summer	Wingytellangta	Lughoratoh	
Sun	Pugganoobranah *or* Pukkanebrenah	Panuberé *or* Pallanubranah	Panubryna *or* Tonah-lea
Sunrise	Puggalena parrack boorack	Panubré roeelapoerack	
Sunset	Wietytongmena	Panubra tongoieerah	
Suspiration (sigh)	Teangonyack	Takoné	
Survivor	Lugga poerannea		
Swallow (a bird)	Waylelimna	Papalawe	
Swallow (act of deglution)	Tonyquamma	Tonganah	
Swan	Kélangunya *or* Robeegana	Pugherittah	Koorkah *or* Puble
Sweat (to perspire)	Malleeack Regleetya *or* Regooleetya *or* Regleepoona	Leghromena *or* Lee-wurra-moina	
Swell	Lienyack	Lineh	
Swim	Puggely	Pughrah	
Swiftly	Oaranghaté	Rangaré	
Switch (a)	Tarra koona	Tarraweenah	Tarrawinné
Tail	Manna poona	Pugghnah	
Take	Nunné	Nunnabeh	
Talk	Pueelcanné	Poieta kannabeh	
Ditto (too much speaking)	Kukanna liéreah *or* Mealpealkamma	Kukanna moonalané	Kunraré *or* Kunmoonera
Tall	Takkaro deleeaban righ-eleebana	Rotulih	
Talon	Kuluggana	Kubluggana	
Tame	Riaputheggana	Tiagrapoineena	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay and the South of Tasmania.*	*North West and Western Tribes.*
Tarantula (large spider)	Ne-ungalangta	Temmatah	
Taste	Wughné	Weené	
Teal	Ryennatiabrootea	Weahwanghrutah	
Tear (a)	Tagarrena	Tarragatté	
Teat		Pruggana	
Testes	Matta	Matta	
There	Nekah	Nekaleh	
Thigh	Nungunna	Tughrah	
Thirsty	Rukaunaroonyack	Kukannaroieté	
Throw	Miengy	Menghana	
Throw *or* put away	Parrawé		
Thrush, spotted	Noyennah	Moneerah	
Ditto, dense forest	Lemarrcootya	Peggarah	
Thumb	Rianaoonta	Ryanaootta	
Thumb-nail	Tonyé	Toiena	
Thunder	Poimettya	Papatonguné	Nowam *or* Noamma
Tick (parasitic insect)	Loangaritea	Prammanah	
Tide (low water)		Payawé	
,, (high water)			
Tie (a knot)	Kukannaboee	Pilangootah	
Tide	Luggatick	Lughruttah	
Tiger, V.D.L., (*Thylacinus cynocephalus*)	Lagūnta	Ka-nunnah *or* Laoonana	Loarinnah
Timber (large)	Wielangta	Wee-a-proinah	
Ditto (small)	Wiena	Weeapawé	
Tired	Pryennemkoottiack	Kakara Wayalé	
Toad *or* frog	Leawinnawah *or* Rallah	Talleh	
Toe	Mengha		
Toothless	Wugherinna noimyak	Payeatimy	
Tooth	Wughrinna	Pay-ee-a *or* Pa-yana	Yennaleah
Tongue	Kayena	Menné *or* Mayna *or* Maynenah	Tullah
Top	Tulendeena	Wughata	
Topaz (crystal)	Tendeagh	Mughra mallee	
Tor (a peaked hill)	Poymallyetta	Layatinnah	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay and the South of Tasmania.*	*North West and Western Tribes.*
Torch	Poorena moneggana	Leewuré	
Touch	Neungpa	Winganah	
Touch-wood (rotten wood)	Weitree ouratta	Weeawanghrattta	
Tough	Lughteeac	Rulli	
Track (footmark)	Puggataghana *and* Tughanaloumeno	Luggaboiné	
Trample (to)	Teentiah	Teeantıbe	
Transfix (to)	Myenny-pingaterreluteo	Nenaoïteté	
Travel	Tackamoona	Tackramoonena	
Tree (gum tree)	Loatta	Lotté *or* Loté	
Ditto (Blackwood)	Rialimné		
Tree (fall of a)	Poengboorack	Moona pungana	
Tremble	Mienintyak	Tieneweléh	
Trickle	Kukkamena meena	Truggara	
Triton (sea shell)	Tullah	Tunah	
True	'Ngonyneealeebya	Nghana kanna nire	
Try (to)	Wughneé	Weené	
Tug (to, at a rope or line)	Koyule	Kottubé	
Tumble	Mientonka	Moonapangana	
Turn (to)	Wughannamee	Miewangana	
Tusk (canine tooth)	Wuggerinna rotaleebana	Payee, á rotylé	
Twig	Loatta keetana	Weea wunna	Wee winna
Twins	Maiynabyeck	Meinna-na	
Twilight	Teggrymony Keetana narra long-boorack	Nun-to-neenah	
Twirl (twist)	Wughannemoe	Oaghra	
Twitch (pluck)	Kolé	Ko-kra	
Two	Pia wah	Pooalih	
Typha, Bullrush, a native marsh plant, roots yield arrowroot	Plinemlena	Poi-erinna	
Ugly	Nowatty nieealbana	Noailee nuggabah	
Urine	Mūngana	Munghate munghabeh	
Uxorious	Lowa puggelannyé		

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay, and the South of Tasmania.*	*North West and Western Tribes.*
Vale *or* Valley	Ma-ra comenya	Mara-way-lee	
Vanish	Poyena potattyack	Tienbugh	
Vassal (serf)	Pueetoggana mena	Potaigroee nara-na	
Venemous	Ree punneré nunghapa	Nunghboorack nungabah	
Venom	Mana mena	Kamona moina	
Vent	Loa lingana	'ngeenah	
Vertex (crown of head)	Toganee	Togari	
Volute large (*V. mamilla*)	Mebryna	Poirah	
„ long (*V. fusiformis*)	Krayarena	Moorleah	
Wade	Moimenniac	Mowerrenah	
Waddie, a truncheon-like weapon used as a missile in war and hunting	Lergah *or* Lughrana	Lughrana	
Wake	Lientiack	Weeny	Luttibeah
Wail, to lament	Tegryma kannunya	Moeluggrana	
Waist	Pooalminna	Pooariumena	
Wait	Myelpoyeré	Krattabé	
Walk	Tahlpooneré	Tawtaboorana	Tabbelté
Wallabee (*Halmaturus Billardieri*)	Lukangana *or* Rakanguna	Taranna *or* Tarra	Noguoyleah *or* Tanah
War	Rennamoimenya	Moi mengan mabeli	
War (skirmish, one or two killed)	Marana	Moeemutté	
War (battle, all killed but one or two)	Moeelughawa	Moeemabbylé	
Warm	Peoonyack	Lughreto	
Warratah (*Telopea truncata*)	Kiuntah		
Wart	Kréman-poona	Ta winné	
Wash (to)	Nonelmoi	Nunu gra	
Water (fresh)	Liena *or* Lin'-Eleebana	Liawenee	Lia winne *and* Lileah
„ (cold)	Lietinna	Liawenee	
„ (warm)	Liena peoonya *or* Liena peoonyack	Lialughrana	
„ (salt)	Lia noattyé		

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay, and the South of Tasmania.*	*North West and Western Tribes.*
Water-pitcher (made of the thick leaves of the large kelp)	Moirunah	Moirunah *or* Moirah	Kourah
Wattle bird	Toorittya		
,, smaller	Leewurenyenna		
Wattle-tree	'Nghearetta	Manna	
,, sea-side (*Acacia maritima*)	Boobyallah	Boobyallah	
Wave	Legleetya mengena	Leaturi *or* Pannamena	
Weak	Koomyenna	Mia wayleh	
Weed	Pannabon bruttyé	Tallarattai	
Weep	Tagarramena	Tarra wayleh	
Well (spring)	Loy-ulena	'Ngyena	
Wet (rainy)	May-niack	Lay-ka	Mokah *or* Mogga *or* Moggana
Whale	Mitawennya	Parrabah	
What? what's that?	Telingha? Tebya?	Pallawaleh? *or* Anneah	Tarraginna?
When and where	'gnamela Mayleh?	Wabbara?	
Whisper, speak low, let nobody hear	Kukkanna lenagangpa *or* nunté pateinuyra *or* Kukana punyepara	Poeta Kanna pawayee bah	Onabeah dayaleah
Whistle	Purra Kanna	Munnakanna	Plubeah
White	Malleetyé	Mallee *or* Malluah	Mungyanghgarrah
Whiz (like a ball, &c.)	'Ngona Kunna	Payngunnana *or* Poyngunna Kunna	Nangoinuleah
Whore, fornicatrix		Panubré Mabbylé	
Wherry (sea-shell)		Leeka	
Widow	Wurrawa-noattye Wurrawa Low-anna	Nena tura tena	
Wife, newly married	Kroatta langunya	Poya lanuné	Waggapoonynurrah
Will-o'-the-wisp (*Ignis fatuus*)	Packareetea	Puckarenh	
Wind	Rawlinna	Rallinganunné	Lewan
Ditto, high	Raalanghta	Rallinga proiena	Lewanhock
Windpipe (*Pomum Adami*)	Lonna	Lonna *and* Loarinna	
Wing	Poilinna	Maykana Pounghna	Loyorunna
Wink	Mentroiack	Nubra rotté	
Winter	Tunna	Turra	

English.	*Tribes from Oyster Bay to Pitwater.*	*Tribes about Mount Royal, Brune Island, Recherche Bay, and the South of Tasmania.*	*North West and Western Tribes.*
Witch *or* female goblin, said to be clothed with grass or fibrous bark	Murrambukanya lowana		
Woe's me! ah me!	Pagra! Kum leah!	Wayleabeh!	Taqueaté!
Woman	Lowanna *or* Lowa	Ne-eanta *and* lowanna	Nowaleah
Ditto, handsome	Loanna eleebana *and* loa niry	Loa-niré lyadywayack	
Ditto, young girl	Krotto meleetyé	Loalle puggana	
Ditto, adult	Puggya malleetya	Longatallinah	
Ditto, aged, old	Payanna	Nena ta poiena	
Ditto, white	Ria lowana		
Wombat (*Phascolomys vombatus*)	Raoompta, Raoomata	Rowitta	
Wood, firewood	Wiena *and* winna	Muggrawebé *and* mattawebé	Koeebah *or* Problattena
Wren, blue-headed, (*Malurus longicandus*)	Poitenena	Lueena	Moomerah
Wrinkle	Niangté nepoony	Pelanypooneh	
Wrong	Miengana	Nuyeko	
Wrist	Rapoolmena	Riapoolumpta	
Yawn	Granna Kunna	Leakanny	
Yes	Narramoona, Narrawallee	Narrawarrah, Narrawé, Narraluawah	Narro-barro *or* narrapa
Yesterday	Néntegga Menyawa	Neea nunnawa	
You	Neena	Neena *or* Nee	
Young (little) boy	Kaeetenna Mallangyenna	Puggata paweena	
Ditto (little) girl	Lowanna Kaeetenna		

SHORT SENTENCES IN THE NATIVE LANGUAGE.

Give me a stone	Lonna *or* Loina tyennabeah mito.
Give him a stone	Lonna tyennamibeah.
I give you some water	Lina tyennamibeah.
I will not give you any water	Noia meahteang meena neeto linah.
You give me food	Tyennabeah tuggené.
You do not give me food	Noia meah teang meena neeto tuggené.
Give me some bread	Tyenna miapé pannaboona *or* Teengananana ma pannaboo *or* Tunghmbibé tungaringaleah.
We will give you a stick	Tyennamibeah weena.
We will not give you a stick	Noia tyennamibeah weena.
Give me some bread to eat, I am hungry	Teeanymiape tuggané, Meeongyneeomé *or* Teeanymeiape teeacottym'na *or* Teeampiapé Matughala Mapilrecottai.
This is my hand	Reena *or* Riena narrawa !
This is not my hand	Mi-ang-unnah.
Sing a song	Lyenné riakunna *or* Rialinghana.
Where is your Father	Ungamlea nangéena.
My Father is here	Nangamea numbé.
He is my Father	Nangamea numbé.
He is not my Father	Mianguunana.
Tell your Father of this	Onnabea nangato.
We go to see the river	Nialomiah manaiah.
I like to drink the water	Monna langarrapé.
I make the boat go fast	Parapetaleebea malanna talea warrangaté.
The ship goes upon the sea	Tiretya teeakalummala.
The waves make the sea rough	Leea leetyah poinummeah.
You see the sea over the hill	Roogoomalé linoiyack.
Go down from the hill	Rongtané Tyungerawa.
Run over the ground	Ringápyanganaweberé.
Do not run along the road	Parrawé ringapa.
The man feeds the dog	Tyénnabeah kaeetabeah.
The woman makes a basket	Lowanna ollé tubbrana.
The woman is very fair	Lowa maleetya.
The child eats his food	Teeana malangeebeah.
The child is small	Malangeebeah.
A horse	Pangooneah.
The horse runs on the ground	Pangoonea rene pateleebea.
The horse kicks the child	Pangoonea paraingumenah.
A cow or ox	Packallah.
Numerals One	Marrawah.
„ Two	Piawah.
„ Three	Luwah.
„ Four	Paguntawulliawah.
„ Five	Pugganna marah.
I shall go to my house	Tugganna lunameatah.
I strike the horse	Pella pangooneah.
Touch his hand	Rientonnabeah.
Do not touch his hand	Tellé tallé parrawé.
Cut down the tree	Ugana puyé loté.
Tell him to go to the house	Tallé lenutoo, *or* Talle leebraluto.
Speak to the man	Oonah beah.
He is in the house	Lunaretah.

They jump over the river	Wuggala menayé.
They walk through the river	Yangé menayé.
Run along the side of the river	Tawé ranté weberé.
They swim in the river	Puawé menayé.
They sink in the river	Tongé menayé.
We drink water	Loa liyé.
He cuts his hair with flint	Tugganna pugheranymee trautta.
My brother has a long arm	Nietta mena oon root' eleebana.
My sister is very tall	Nienta mena tuggara root' eleebana.
He has two children	Malang-piawah.
Take a stick and beat the dog	Tial wee pella kaeeta.
The dog is beaten with a stick	Pella kaeeta naoota mena.
The sun is rising	Pugguleéna pareébara
The sun is set already	Pugguleéna toomla pawa.
The moon is risen	Ooeeta *or* Weeta poona.
The moon is not seen	Ooeeta mayangti byeack.
The moon is behind the cloud	Ooeeta toggana warratena lunta.
You stand behind the tree	Mangana lutena.
They climb up the tree	Crongé lotta.
The swan swims in the water	Kalungunya tagumena liyetitta.
The water is very warm	Lia pyoonyack!
The water is not warm	Lia tunnack.
Salt water	Lia noattye.
Fresh water	Lian eleebana *or* liana eleebana.
He is a good man	Puggana tareetyé.
He is a bad man	Tagantyaryack.
Come and drink the water	T'allé ie loolaka lia.
This water is salt	Lia noattyé!
That water is fresh	Liana eleebana.
Milk comes from the cow	Prughwullah packalla.
Send him to get milk	Rangé prughwullah.
I saw the tree yesterday	Lotta monté meena cotté.
I have cut my finger	Rié poyé pueningyack.
He limps with one leg	Raggamuttah!
He sees with one eye	Raggunnah!
My face is very black	Raoonah mawpack.
Make the horse run fast	Pangoonya rené wurrangaté.
When the warm weather is come	Nente pyoonta.
It is now cold weather	Tunna.
They are white men (the men are white)	Riana. Rianowittyé.
This woman is very white	Lowana eleebana!
Bring him and put him down here	Nunnalea pooranamby *or* Kannawattah ponnawé *or* Kannawuttah ponnapoo.
Come along, I want to speak to you	Talpyarwadeno tuyena kunnamee *or* Tutta wuttah onganeenah *or* Tunneka makunna talmatieraleh.
Aha! you are sulky all of a sudden	Anyah! Teborah! Keetrelbya noomena peniggomaree!
Hold your tongue—be patient—by and bye	Mealkamma *or* metakantibe *or* kannyah mielbeerkammah *or* kanna moonalané, Wannabee kannybo.
Come here	Tia neberé *or* Tialleh.
Walk naked	Tia reea lungungana.
Go ashore	Tawé locata.
Make a light, I want to see you	Mené le monghatiaple monghtoneelé *or* matangunabee nubratonee.
Run together (a race)	Rene nunempté *or* leongana.

Stay or keep a long way off	Onamarrumnebere *or* crackné lo maba *or* kleaba rowé.
Awake, rouse ye, get up!..................	Tientable taggamunna *or* nawatty! pegraty! wergho! *or* takka wughra!
Don't wake him, let him sleep	Tialenghpa lontun-narra *or* Kunuyam tilanga bah *or* Kuunyam narraloyea.
Whisper, speak low, let nobody hear ...	Kukkana lengangya nunty pateinuyero *or* Onabeah dayaleah.
Hither and thither	Tackwaybee Tutta watta *or* &c.

SOME ABORIGINAL NAMES OF PLACES IN TASMANIA.

Cape Portland District	Tebrakunna.
Country extending back from Ringarooma Township	Warrentinna
Douglas River	Leeaberryaek *or* Leeaberra.
Nicholas's Cap	Mita winnya, Kurunna poima-langta.
Doctor's Creek (East Coast)	Wuggatena menennya.
Long Point	Wuggatena poeenta.
Salt Water Lagoon, near the Coal Mines	Mungarattya.
Governor's Island	Tittanariack.
George's River District	Kunarra-kunnah.
Maria Island....................................	Toarra-marra-monah.
Mount Royal and Port Cygnet, country lying between	Taluné.
Oyster Bay	Poyanannupyaek.
High lands behind ditto	Pothy munatia.
"St. Valentine's Peak, on Surrey Hills, Peak like a Volcano," of Flinders ...	Natoné.
Piper's River District	Orramakunna.
Port Davey	Poynduc.
East Bay Neck.................	Lueena langhta Muracomyiack.
Eagle Hawk Neck	Teeralinnack *on* Tera-linna.
Hampshire Hills District, in the North-west	Pateena.
Barren Joey Island	Roobala mangana
Glamorgan District............................	Tebranuykunna.
Port Arthur	Prémaydena.
Macquarie Harbour...........................	Parralaongatek.
Recherche Bay.................................	Leillateah.
Port Esperance	Raminea.
Southport	Lamabbéle.
Brune Island	Lunawanna-alonnah.
South Arm	Reemeré.
Huon Island.....................................	Prahree.
Betsey Island	Temeteletta.
Three-hut Point	Taoonawenna.
Tinder-box Bay	Renna kannapughoola.
Brown's River	Promenalinah.
Arch Island	Poora tingalé.
Tamar River.....................................	Ponrabbel.

Piper's River	Wattra Karoola.
Swan Island	Terelbessé.
Arthur River	Tunganrick.
Schouten Island	Tiggana marraboona.
Cape Grim	Kennaook.
Mount Cameron (West Coast)	Preminghana.
Mount Hemskirk	Roeinrim *or* Traaoota munatta.
Mount Zeehan	Weiawenena.
Circular Head	Monattek *or* Romanraik.
Frenchman's Cap	Mebbelek.
Albatross Island	Tangatema.
Hunter's Island	Reeneka.
Pieman's River	Corinna.
District north of Macquarie Harbour	Timgarick.
Lake St. Clair	Leeawulena.
Huon River	Tahuné-linah.
Satellite Island	Wayaree.
Derwent River	Teemtoomelé menennye.
Mount Wellington	Unghanyahletta *or* Pooranetteré.
Clarence Plains	Nannyeleebata.
Crooked Billet and on to the Dromedary	Unghanyenna.
Range of Hills between Bagdad and Dromedary	Rallolinghana.
Jordan River	Kuta linah.
Lovely Banks	Tughera wughata.
Ben Lomond	Toorbunna.
South Esk River	Mangana lienta.
Lagoon or summit of Ben Lomond	Meenamata.
St. Patrick's Head	Lumera genena wuggelena.
Tract on the Coast between Detention River and Circular Head	Purreka.
Small Island half-way between Maria Island and the main land	Lughretta.

SOME NAMES OF ABORIGINES OF TASMANIA.

MEN.

Mannalaggana	
Tonack	A native of Macquarie Harbour.
Wureddy or Ooareddy	
Pooblattena (literally—Wombat)	A native of N. W. District.
Kakannawayreetya (literally—Joey of the Forester Kangaroo)	A native of Oyster Bay.
Bonep	A native of Macquarie Harbour.
Kellawurumnea	A native of Pittwater.
Lanney	A native of the North West.
Kunnarawialeetyé	A native of Oyster Bay.
Meenapeckameena	A native of Lovely Banks.
Maywedick *or* Maywerick	A native of Port Davey.
Redaryioick	A native of Circular Head District.
Reeamia puggana	A native of Pitwater — the only capture when "the line" was out in 1830.

Menepackatamana	A native of the Derwent River District.
Paloona	A native of Circular Head District.
Rienalbuhye (literally—snow falling)	A native of same District.
Rialim	Ditto.
Laranah	A native of Cape Grim interior.
Noblatigh	These two last named were of the family captured in 1842 or 1843, and no wild aborigines have been seen on the main-land since.
Mooltea langana	A native of Launceston District.
Rawaeleebana	A native of Bay of Fires.
Noteningunna	A native of Port Sorell.
Munghepuganna	A native of the District about Bothwell and Oatlands.
Punghabonyena	A native of St. Paul's River District.
Rawanegh	A native of North West District.
Lannamena	A native of Ben Lomond.
Pennabookh	A native of Circular Head District.
Tarooltigh	Ditto.
Kaeetapanna	A native of Oyster Bay.
Lekamughné	A native of District of Circular Head.
Monopeletto	A native of District of Derwent River.

WOMEN.

Taenghanootera (literally—weeping bitterly	A native of George's River.
Worromonoloo (literally—boughs	A native of Piper's River Road District.
Rammanaloo (literally—little Gull	A native of Cape Portland.
Wuttawantyenna literally nausea	A native of East Bank of Tamar River.
Plooranaloona (literally—sunshine	A native of George's River.
Tenghanoop	A native of Port Davey.
Trooganeenie	A native of Mount Royal.
Metakartea	A native of North-east Quarter.
Tiabeah	A native of Bruni Island.
Koonya	A native of Sorell.
Pueelongmeena	A native of Oyster Bay.
Unghlottymeena	A native of North-east.
Rayna	A native of Pieman's River.
Penghanawaddick	Ditto.
Oattamottyé *or* Wattamottyé	A native of the valley of the Tamar River.
Rhomdyé	A native of Oyster Bay.
Kittawa	A native of District near Detention River and Circular Head.
Mialughtena	A native of Campbell Town District.
Kannabootya	A native of North-West interior.
Tialeawé	A native of Port Sorell.
Poingana-comyena	A native of Pittwater.
Mooreenunga	A native of North-West near Circular Head.
Pooratamena	A native of George's River.
Tangaragootta	A native of Banks of the Derwent River.

ABORIGINAL VERSES in honour of a Great Chief, sung as an accompaniment to a Native Dance or Riawé.

Pāppĕlă Rāynă 'ngōnȳnă, Pāppĕlă Rāynă 'ngōnȳnă,
Pappela Rayna 'ngonyna!
Tōkă mēnghă lēăh, Tōkă mēnghă lēăh,
Toka mengha leah!
Lūghă mĕnghă lēăh, Lūghă mēnghă lēăh,
Lugha mengha leah!

Nēnă tāypă Rāynă poōnȳnă, Nēnă tāypa Rāynă poōnȳnă,
Nena taypa Rayna poonyna!
Nēnă nāwră pēwȳllăh, Pāllăh nāwră pēwȳllăh,
Pēllăwăh, Pēllăwăh!
Nena nawra pewyllah, pallah nawra pewyllah,
Pellawah, Pellawah!

Fragment of Another Song.

Wānnăpĕ Wāppĕrĕ tēpără,
Nenname pewyllah kellape,
Māyngătēă.
Māynăpăh Kōlăh māypĕlēă,
Wāppĕră Rōnăh Lēppăkăh,
&c. &c. &c.

Fragment of Another Song.

Kōlăh tūnnămĕ nēănȳmĕ,
Pēwȳllăh pūggănārră;
Rōonăh Lēppakă mālămāttă,
* * * Lēŏnāllĕ.
Rēnăpĕ tāwnă nēwūrră pēwūrră,
Nōmĕkă pāwnă pŏolăpă Lēlăpăh,
Nōngănĕ māyēăh mēlărōotĕră,
Kōăbăh rēmăwūrrăh,
&c. &c. &c.

Legend of the Origin of Fire and of the Apotheosis of Two Heroes, by the Aborigines of Tasmania, as related by a Native of the Oyster Bay Tribe.

My father, my grandfather, all of them lived a long time ago, all over the country; they had no fire. Two black-fellows came, they slept at the foot of a hill,—a hill in my own country. On the summit of a hill they were seen by my fathers, my countrymen, on the top of the hill they were seen standing: they threw fire like a star,—it fell amongst the blackmen my countrymen. They were frightened,—they fled away, all of them; after a while they returned, they hastened and made a fire,—a fire with wood; no more was fire lost in our land. The two black-fellows are in the clouds; in the clear night you see them like two stars.* These are they who brought fire to my fathers.

The two blackmen staid awhile in the land of my fathers. Two women *(Lowanna)* were bathing; it was near a rocky shore, where mussels were plentiful. The women were sulky, they were sad; their husbands were faithless, they had gone with two girls. The women were lonely; they were swimming in the water, they were diving for crayfish. A sting-ray lay concealed in the hollow of a rock,—a large sting-ray! The sting-ray was large, he had a very long spear; from his hole he spied the women, he saw them dive: he pierced them with his spear,—he killed them, he carried them away. Awhile they were gone out of sight. The sting-ray returned, he came close in shore, he lay in still water, near the sandy beach; with him were the women, they were fast on his spear,—they were dead!

The two blackmen fought the sting-ray; they slew him with their spears; they killed him;—the women were dead! The two blackmen made a fire,—a fire of wood. On either side they laid a woman,—the fire was between: the women were dead!

The blackmen sought some ants, some large blue ants (*pugganyeptietta*); they placed them on the bosoms *(parugga-poingta)* of the women. Severely, intensely were they bitten. The women revived,—they lived once more.

Soon there came a fog *(maynentayana)*, a fog dark as night. The two blackmen went away, the women disappeared: they passed through the fog, the thick dark fog! Their place is in the clouds. Two stars you see in the clear cold night; the two blackmen are there,—the women are with them: they are stars above!

* Castor and Pollux.

XXI.—*On the Dialects and Language of the Aboriginal Tribes of Tasmania, and on their Manners and Customs.* By JOSEPH MILLIGAN, F.L.S.

THE day is not far distant, when according to the ordinary course of nature, the last of the surviving remnant of the aboriginal inhabitants of Tasmania, now maintained at a Government establishment, and little more than a dozen in number, must be removed by death, and a distinct people cease to exist. The entire extinction of a population, an isolated stirp of the human family, is neither a matter of every day occurrence nor of trivial import.

When Van Diemen's Land was first occupied by Europeans, half a century ago, its aboriginal population spread in tribes sub-tribes and families over the length and breadth of the island, from Cape Portland to Port Davey, and from Oyster Bay to Macquarie Harbour; and their aggregate number at that time has been variously estimated at from 1500 to 5000.

The early navigators make frequent mention of rencontres with numerous groups of "the natives," and of fires, and of "smokes," seen in the bush, which were considered to indicate their presence in considerable force in the neighbourhood. But experience has taught us that such evidence is at the best, fallacious and untrustworthy; we all know that bush-fires may smoulder and rage in turns for months together at certain seasons, and over a great extent of country, without the actual presence of any human being in the vicinity; we also know very well that a mere handful of aborigines appearing, shifting their ground, and re-appearing on the edge of a thick scrub, or in the recesses of forest ground, variously grouped and under different aspects, may easily be, and have often been, mistaken for a formidable number. We, therefore, receive with some allowances the higher estimates formed of the aboriginal population of this island, at or about the time of its discovery.

Assuming that the number of tribes and sub-tribes throughout the territory was then about (20) twenty, and that they each, mustered of men, women, and children 50 to 250 individuals, and allowing to them numbers proportioned to the means of subsistence within the limits of their respective hunting grounds, it does not appear probable that the aggregate aboriginal population did materially if at all exceed 2000. For it is to be borne in mind that all along the western side of the island the face of the country is thickly covered with dank and inhospitable forests, and that other physical conditions most unfavorable to a natural abundance of animal life prevail there, while our traditionary knowledge of the tribes known to have existed along the east and centre is sufficiently accurate to enable us to form a close approximation to their actual strength. The Estimates which fixed the native population at 5000 or upwards when the colony was first settled are therefore obviously in error.

The open grassy plains and thinly timbered forest ground along the eastern and central portions of the island were the most eligible for the purposes of the early settlers, and were therefore the portions of the territory first occupied; but these fine tracts of country were precisely those which naturally yielded the means of subsistence in the greatest profusion to the aborigines, and they were accordingly the districts chiefly frequented by the natives at that time. The first colonists were therefore unavoidably brought into contact, and frequently into immediate and familiar intercourse with the tribes belonging to the districts in which they had located themselves; they thus enjoyed peculiar facilities for becoming acquainted with their disposition and habits, and acquiring from the more intelligent of them some knowledge of their history and traditions. Few comparatively of these original settlers—the pioneers of colonization in Van Diemen's Land, remain to communicate the information which they may thus have obtained. A fortunate few returned home, enriched with the legitimate fruits of industry and good management; others, less successful here in the first instance, migrated early to a neighbouring province, and reaped largely of the golden harvest with which it has been blessed: while many have "passed that bourne whence no traveller returns," and left no record of the simple race whose position, rights, and very existence they had come to usurp and to supersede.

As, under such circumstances, every scrap of authentic information respecting the aborigines of Van Diemen's Land may be regarded as of some value, I avail myself of the opportunity afforded by the publication of the vocabulary of certain aboriginal dialects of Tasmania, and of some remarks necessary thereupon, briefly to make record of such particulars illustrative of their habits, manners, and customs, as have fallen under my notice, or been gathered directly from their statements to myself.

In order that ethnologists and others interested in the vocabulary of aboriginal dialects referred to may be inclined to place perfect confidence in their accuracy, I have to explain that every word before being written down was singly submitted to a Committee (as it were) of several aborigines, and made thoroughly intelligible to them, when the corresponding word in their language, having been agreed upon by them, was entered. This, of course, was a most tedious method to pursue, but it was the only plan which gave a fair chance of precision and truthfulness. On being completed the manuscript was laid aside for two or three years, when it was again submitted, *verbatim* and *seriatim*, to a circle of aborigines for their remarks. A revision which led to the discovery and correction of numerous blunders originating in misapprehension, on the part of the aborigines in the first place, of the true meaning of words which they had been required to translate.

But I found the fault had oftentimes been my own, in having failed to seize the exact and essential vocal expression, which, on being repeated to the aborigines at any time afterwards, would infallibly reproduce the precise idea which it had been stated to imply in the first instance.

This circumstance has strongly impressed upon me the conviction that much of the discordance apparent in the vocabularies of the same language or dialect, published by different travellers, is attributable to similar causes. For instance, a zealous naturalist, knowing nothing whatever of the language the words of which he desired hurriedly to secure, would point to a tree and repeat the word "tree," the reply to which, in all probability, would be not the equivalent for tree, but the specific name by which that particular sort of tree was known there; and so with other things. Abstract ideas are unfamiliar to and not easily comprehended by untutored aboriginal minds, and hence numberless mistakes which, from want of verification and correction, become fixed and permanent errors.

The language of a people, whether it be possessed of a copious or spare vocabulary—whether it consist of a plain collocation of a few simple and arbitrary sounds, or be characterised by elaborate inflexions and a complex arrangement of words of analogical import---ought to be accepted, one would say, as the index of the degree of mental culture and social and intellectual progress attained by those who make use of it, and find it sufficient for the expression of their various thoughts, feelings, and desires. A glance at the vocabulary of aboriginal dialects of Tasmania, and at the condition of the aborigines themselves, will perhaps be thought to lend confirmation to the opinion.

The words or vocal sounds of the unwritten language of rude predatory tribes are liable to more frequent and to more violent and arbitrary changes than are incident to a tongue embodied in the symbolic forms of letters, the various inflexions, combinations, and analogies of which have been recognised by the eye as well as the ear, and stereotyped, as it were, by the printing press.

The circumstance of the aboriginal inhabitants of Van Diemen's Land being divided into many tribes and sub-tribes, in a state of perpetual antagonism and open hostility to each other, materially added to the number and augmented the energy of the elements and agents of mutation ordinarily operating on the language of an unlettered people: to this was superadded the effect of certain superstitious customs everywhere prevalent, which led from time to time to the absolute rejection and disuse of words previously employed to express objects familiar and indispensable to all---thus imperiously modifying nomenclature and the substantive parts of speech, and tending arbitrarily to diversify the dialects of the several tribes.

The habit of gesticulation and the use of signs to eke out the meaning of monosyllabic expressions, and to give force, precision, and character to vocal sounds, exerted a further modifying effect, producing, as it did, carelessness and laxity of articulation, and in the application and pronunciation of words. The last named irregularity, namely, the distinctly different pronunciation of a word by the same person on different occasions to convey the same idea is very perplexing, until the radical or essential part of the word, apart from prefixes and suffixes, is caught hold of. The affixes, which signify nothing, are la, lah, le, leh, leah, na, ne, nah, ba, be, beah, bo, ma, me, meah, pa, poo, ra, re, ta, te, ak, ek, ik, &c. Some early voyagers appear to have mistaken the terminals *la*, *le*, &c., as distinctive of sex, when applied to men, women, and the lower animals. The language, when spoken by the natives, was rendered embarrassing by the frequent alliteration of vowels and other startling abbreviations, as well as by the apposition of the incidental increment indifferently before or after the radical or essential constituent of words. To defects in orthœpy the Aborigines added short-comings in Syntax, for they observed no settled order or arrangement of words in the construction of their sentences, but conveyed in a supplementary fashion by tone, manner, and gesture those modifications of meaning which we express by mood, tense, number, &c. Nor was this a matter difficult of accomplishment amongst a people living in a state so primitive that animal wants and gratifications, and the exigences of the chase and of war, comprised the sum total of events which characterized their existence either as individuals or as members of the communities to which they belonged. Barbarous tribes, living in isolated positions, antagonistic to and repellant of each other, would each, within its own sphere, yield to various influences, calculated to modify language, and to confirm as well as create dissimilarity. New words introduced into the language of civilized and lettered communities, betray their origin and relationship to pre-existing words in the same or in cognate and kindred tongues; but rude savage people often adopt the most arbitrary and unmeaning sounds through caprice or accident, to represent ideas, in place of words previously in use; a source of mutation, as respects the various dialects spoken amongst the Aborigines of V. D. Land, fertile in proportion to the number of tribes into which they were divided, and the ceaseless feuds which separated them from one another. Hence it was that the numerous tribes of Tasmanian Aborigines were found possessed of distinct dialects, each differing in many particulars from every other.

It has already been implied that the Aborigines had acquired very limited powers of abstraction or generalization. They possessed no words representing abstract ideas; for each variety of gum tree and wattle tree, &c. &c., they had a name, but they had no equivalent for the expression "a tree"; neither could they express abstract qualities, such as hard, soft, warm, cold, long, short, round, &c.; for "hard," they would say "like a stone"; for "tall," they would say "long legs" &c.; and for "round," they said "like a ball," "like the moon," and so on, usually suiting the action to the word, and confirming, by some sign, the meaning to be understood.

The elision and absolute rejection and disuse of words from time to time has been noticed as a source of change in the Aboriginal dialects. It happened thus:—the names of men and women were taken from natural objects and occurrences around, as, for instance, a kangaroo, a gum tree, snow, hail, thunder, the wind, the sea, the Waratah—or Blandifordia or Boronia, when in blossom, &c.; but it was a settled custom in every tribe, upon the death of any individual, most scrupulously to abstain ever after from mentioning the name of the deceased—a rule, the infraction of which would, they considered, be followed by some dire calamities: they therefore used great circumlocution in referring to a dead person, so as to avoid pronunciation of the name,—if, for instance, William and Mary, man and wife, were both deceased, and Lucy, the deceased sister, of William, had been married to Isaac, also dead, whose son Jemmy still survived, and they wished to speak of Mary, they would say "the wife of the brother of Jemmy's father's wife," and so on. Such a practice must, it is clear, have contributed materially to reduce the number of their substantive appellations, and to create a necessity for new phonetic symbols to represent old ideas, which new vocables would in all probability differ on each occasion, and in every separate tribe; the only chance of fusion of words between tribes arising out of the capture of females for wives from hostile and alien people,—a custom generally prevalent, and doubtless as beneficial to the race in its effects as it was savage in its mode of execution.

The Tasmanian Aborigines made use of some vocal sounds not met with in the English language; one, for instance, corresponds to the sound of *u*, as pronounced by the French; others are equivalent to *ch* and *gh* in the Scotch and Irish *loch* and *lough;* and there are some curious combinations of nasal and guttural sounds.

The Orthography of the Aboriginal Vocabulary agrees as nearly as possible with the ordinary phonetic expression of the English alphabet, with the following qualifications:—the vowel a, when it stands alone, is to be pronounced as in *cat*, *rap*, &c., but aa is sounded nearly as *aw* in the word *lawn*, e is pronounced as in the English word *the*, and ee as in *thee*, *me*, *see*, &c., but é is to be sounded like *a* in *potatoe* and in *day;* i is to be pronounced as in *sigh, fie,* &c.; o is to be sounded as in *so, go, flow,* and oo as in *soon, moon,* &c.; u is never to be sounded as in the English word *flute,* its usual sound being that in the French words *une, usage, usurier, fumer,* &c., but when followed by a double consonant, or by two consonants, it is to be sounded as in the English words *musk, lump, bump,* &c.; y is to be sounded as in the English words *holy, glibly, yonder, yellow,* &c.; i before another vowel has a full sound as in the English words *shine*, *riot;* ei coming together are to be pronounced as in *Leipsic*, ou as in *noun*, oi as in *toil*, &c. Consonants have their usual sounds when single; ch and gh are pronounced as in the German word *hochachten* and in the Irish *Lough.* When a double consonant, or two consonants stand together, the first carries the accent, as in the English words *cunningly*, *peppery*, *cobbler*, *pipkin.*

I propose to treat on another occasion, of the history, habits, and customs of the Aborigines.

XV.—*On the Introduction of Salmon into Tasmania.*

REPORT of a Sub-Committee appointed at the February Monthly Meeting of the Royal Society, to consider the questions submitted in the note of the Hon. the Colonial Secretary of the 9th of February, 1858, relative to the Introduction of Salmon into Tasmania, and the payment of the Parliamentary Reward of £500.

Members:—Hon. E. S. P. Bedford, Esq., M.L.C.
J. W. Agnew, Esq., M.D.
Morton Allport, Esq.
Joseph Milligan, Esq., F.L.S., Sec., R.S.T.

£500.—" Conditions on which the money would be paid:—viz. If Spawn be introduced, whether that should be the sole condition?"

1. Upon this the opinion of the Sub-Committee is,—that the mere introduction of *Spawn*, even though properly fecundated, and in a state of vitality, ought not of itself to entitle the person introducing it to any portion of the reward.

2. The Sub-Committee consider that the £500 ought only to be paid upon delivery in the Colony, to persons duly authorized, of not less than five hundred living Salmon fry three months at least after their escape from the ova, or of not less than two hundred and fifty of Salmon smolt, alive and healthy, or of five pairs of full-grown male and female Salmon,—that is, of fish which have visited the salt-water, whether grilse or older.

3. The Sub-Committee think that the introduction of a smaller number of healthy living fry of Salmon, or of healthy smolt, should entitle the importer to a proportionate amount of the reward; always providing that no claim exceeding half the amount specified in each case in the following scale should be recognized on any delivery of fry less than three months old, whatever their number or condition may be.

4. The Sub-Committee accordingly recommend that partial payments be made on the following scale;—

For the introduction of—

			£
100	Healthy living Salmon fry and no less number		300
200	Ditto	ditto	350
300	Ditto	ditto	400
400	Ditto	ditto	450
500	Ditto	ditto	500

Or for the introduction of—

50	Salmon smolts in good condition		300
100	Ditto	ditto	350
150	Ditto	ditto	400
200	Ditto	ditto	450
250	Ditto	ditto	500

Or for the introduction of—

2	Pairs of full-grown Salmon, that is, of the age of grilse or older, being male and female		200
3	Ditto	ditto	300
4	Ditto	ditto	400
5	Ditto	ditto	500

"If it should be required that the fish be kept *alive* until of an age to be placed in the rivers,—who is to be at the expense of keeping the fish in the meanwhile?"

5. Upon this point the Sub-Committee are distinctly of opinion that, as the successful introduction of Salmon into the Colony would benefit the whole community, all the expenses necessarily incurred in conducting the experiment to its termination ought to be defrayed by the Government, whether such charges be incident upon the safe custody and care (after arrival here) of Salmon spawn alive, but not hatched, or of Salmon fry of tender age, or of *smolts*, &c. of a size and age fitting them for a journey to the sea, or of adult Salmon.

6. About the year 1850 the French Government thought it of sufficient national importance to nominate a *Commission de Pisciculture*, with the celebrated naturalist, M. Coste, at its head, to inquire into and report upon a project for stocking various rivers of France with Salmon and Trout, &c., and to superintend an establishment formed for that purpose. In 1852 the system was adopted at Outerard in Ireland, and

in 1853 taken up and acted upon extensively and most successfully by the Municipality of Perth in Scotland, in which body certain rights pertaining to the fisheries in the Tay River there are vested.

7. The ample experience obtained by the persons employed at these large establishments, by Mr. Shaw of Drumlanrig, and by Mr. Young of Invershin, and at other establishments of minor importance at home, renders it unnecessary for the Sub-Committee to hazard any remarks upon the mode of procuring and shipping Salmon spawn, fry, or smolt, or of their management on board ship, otherwise than as they may be affected by the conditions of the voyage itself, through varying temperature, &c., to this Colony.

8. The Sub-Committee think that, were the Colonial Government to enter into a correspondence on the subject with the Burgh Magistrates of Perth, a thoroughly experienced and trustworthy person might by their means be engaged to take charge of and conduct any piscicultural station and operations which it may be necessary to maintain in this Colony for a year or two. It is accordingly suggested that it be a recommendation from the Royal Society to the Colonial Government to open communication with the Town Council of Perth, and to solicit such aid as they may be able to afford, as well in the selection of one or two active, intelligent, and well-behaved men of experience from the number of their *employés*, as in all the details of procuring and preparing spawn duly fecundated, or young fish, with suitable boxes, &c., to meet the exigencies of the long voyage and its changing climatic conditions.

9. The Sub-Committee do not suppose that any difficulty would be experienced in finding, by this mode of procedure, men practically acquainted with the artificial propagation of fish, who would be perfectly willing to make an agreement to enter and continue in the service of the Government or of an association organized here for the purpose of carrying out the project, during a period of three years,—a term which would afford ample time to test its practicability, and, probably, to diffuse the breed of Salmon over many of the rivers of Tasmania.

10. It is concluded that persons undertaking such an enterprise would correspond with the Colonial Agent in London. The Sub-Committee therefore suggest the propriety of this officer being instructed to place such persons in communication with the Town Council of Perth, in order that the latter may be thereby enabled nicely to time the engagement and departure, &c. of the men they may be empowered to hire, and that the experiment may have the full advantage of the experience and aid of men so hired during their voyage to the Colony.

11. In order more completely to ensure the success of the experiment, the Sub-Committee, without entering into minutiæ of arrangements previous to shipment, which would be better left to those more immediately interested and of greater experience in such matters, beg to recommend that young Salmon fry (pars) should be shipped in tanks, at the same time and together with the boxes of spawn, as the men who attend to the latter could with perfect ease manage the former; and similar contrivances for maintaining a constant flow of fresh water would be requisite in either case.

12. In the event of young fish being selected for the experiment, your Committee would suggest that the trial might, with very little additional expense or trouble, be made still more complete and decisive by shipping, in a separate tank or tanks, Salmon smolts, about twenty-four months of age, when they would naturally be prepared to migrate to salt water, and to sojourn there for two or three months, and might be expected, therefore, to thrive if kept in it during the voyage, in which case it is scarcely necessary to remark, that any quantity might, with facility, be procured for them alongside the vessel.

13. It is not to be expected that the enormous growth, peculiar to the Salmon during its migration to the Sea, could manifest itself under such circumstances; and it would probably be discovered that smolts, so confined in tanks of sea water, would require a regular supply of food, besides that yielded in the shape of animalculæ by the salt water itself.

14. The grand obstacle to the introduction of Salmon spawn hitherto having been the difficulty, or rather impracticability, of retarding the process of maturation in the ova, so as to prevent hatching out the young fry during the voyage, the Sub-Committee consider that the experiment made with spawn would still be almost certainly frustrated, unless means were devised for preserving the ova comparatively cool during the whole, or nearly the whole, of the passage out. Ice, as suggested at page 221 of Vol. ii. of Papers and Proceedings of the Royal Society, presents itself as a most convenient and manageable agent for the purpose. The ova of Salmon have, under favourable circumstances, been hatched in fifty days, while cases have, on the other hand, occurred in which the young fry did not emerge till 140 days had elapsed from the date of fecundation. In the course of experiments at Barnhill, near Perth, spring-water directed so as to flow over boxes of Salmon spawn was found to answer perfectly the purpose of the continuous stream known to be essential for preserving vitality in the ova, and so treated, the fecundated spawn yielded young fry in sixty days. In France the Salmon ova are said to be hatched in the artificial breeding ponds in sixty days. At Stormontfield, the site of the piscicultural operations of the proprietors of the Tay fisheries, the time for maturation of the ova and hatching out of the Salmon fry is 120 to 140 days. The temperature of the spring-water referred to would, probably, be a few degrees under the mean annual temperature of the place, which is about 47·5, say 42°, while the temperature of the water employed by the Perth authorities, which was taken from Stormontfield mill-race, would probably range about 4° or 5° lower, the atmospheric temperature for the winter quarter there being 38·8°. Organic development in the ova is, therefore, hastened or retarded just in proportion as the temperature may be high or low. M. Coste hatched Salmon ova arranged with layers of gravel, &c. in the usual way in canals or drawer-like compartments placed successively one over another from bottom to top of a tub, into the uppermost of which, a run of fresh water being intro-

duced from a tube with a regulating stop-cock, was made to percolate unintermittingly through the whole series. M. Coste's contrivance seems particularly well adapted for the narrow space and the limited amount of fresh water which can be afforded on board ship. Were one such tub containing the ova enclosed within another, so much larger as to admit of an interspace filled with water, the temperature of which could, by means of ice surrounding the cistern whence it issued, be preserved at a point near to that of the water employed in Stormontfield breeding troughs, say about 38°, and the ova continuously supplied with water from the same source, an equable temperature might be maintained within and around the spawn tub, so low as to give every reasonable assurance that the ova would not be hatched within the time occupied on an ordinary passage from Europe to the Colony. The tubes employed, it need scarcely be observed, ought to be of flexible material, and the boxes or tubs containing spawn or young fish should be so placed and secured as to obviate violent shocks, and to have a command of good air. In the case of young fry it would still be essential to keep up a run of fresh water through the tanks holding them, but the low temperature might be dispensed with. Smolts of two years of age, as already observed, would, probably, live out the voyage in tanks of sea water, if aided by subsidies of food thrown in to them.

15. In anticipation of young Salmon fry being delivered here alive, it would be expedient and most desirable to have pens and ponds prepared for their reception near the margin of a perennial stream or rill of pure water, to be diverted at will into or away from them, as might be required.

16. Similar ponds, connected with an ever-flowing rill of good water, would be absolutely essential for the reception of ova, should such be delivered here unhatched, though still in a living and healthy condition. The character of the streamlet and of the brook or river into which it falls should correspond as nearly as possible with the affluents of the Salmon rivers at home, up the tributaries of which the pregnant fish are known to force themselves, in order to deposit their spawn in the beds of shingle and gravel prevailing there.

17. It appears to your Sub-Committee to be indispensable that the site selected for the first of such ponds should not only be connected with a suitable main river channel, but that it should be within a moderate distance of Hobart Town, so as to admit of frequent and close supervision from Head-quarters.

18. The stream which most perfectly fulfils these intentions is probably the North West Bay River. The Derwent is the only river besides, which, within an accessible distance, is at all adapted to the purpose, and there can be no doubt that one or other of its many smaller affluents a few miles above New Norfolk would be found to suit admirably in every respect, except in the matter of distance from Hobart Town, which is no immaterial consideration, however, where constant supervision is so essential.

19. Mr. Morton Allport, who is familiar with the North West Bay River, gives the following reasons for preferring it to any other :—

"*First.*—The moderate distance from town, and consequent ease of supervision.

"*Second.*—The great purity of the water and quantity of feed.

"*Third.*—The comparative absence of natural enemies.

"*Fourth.*—The river presents a series of shallow, gravelly rapids, and deep, still holes, from its source to its mouth, and is fully as large as many of the streams in which I have caught Salmon fry in Wales.

"*Fifth.*—The short course of the river (about twelve miles), which will enable the fish to reach the sea in a short time. This is of the greatest importance, as it has been incontestably proved that the destruction of fish from natural causes is infinitely greater in the fresh than in the sea water.

"*Sixth.*—The slight variation in the temperature of the water which at the source is not perceptibly different summer and winter. The rapidity of the fall prevents any great change of temperature below."

20. In the event of spawn or young Salmon fry being brought in safety to Hobart Town, it would be essentially necessary to have them immediately removed, with all care and tenderness, and with every precaution against accidental

injury, to nursing ponds prepared beforehand. Ground ought therefore to be enclosed and ponds excavated, in anticipation of such arrival. The ponds should be connected by shallow channels on one hand with the river, and on the other with some slender tributary. Clean wooden troughs, provided with sluices to guard against floods and sediment from back water, if near the river's level, would probably answer best. The egress of young fish and the ingress of voracious aquatic enemies would have to be prevented by the use of wire gratings, and the ponds would probably need to be netted over to avoid the depredations of rapacious birds. An area of two to four acres would probably afford space enough for all the contrivances and appliances needful, and also admit of the construction of a cottage and garden for a resident overseer.

21. The cost of forming ponds and channels depends much upon the nature of the ground to be excavated, and upon surface levels, &c. No precise site having yet been determined upon, your Sub-Committee are unable to form any close estimate of the probable amount of outlay which these works would entail; but they are of opinion that all the preliminary operations taken together may be executed upon contract for a sum not exceeding £200.

22. In conclusion, the Sub-Committee venture to suggest, that even after the safe arrival and delivery of fecundated spawn or of young fry, the success of the experiment may be rendered still more certain by the offer of an additional premium, to be paid upon the production of the first proof of Salmon having actually spawned and bred in any Tasmanian river, to the person who first placed Salmon spawn or young Salmon in such river.

(Signed) JOSEPH MILLIGAN,

Secretary.

The Report which was brought up, read, agreed to, and ordered to be communicated to the Government, at a meeting of the Royal Society held on the 16th March, 1858, was transmitted accordingly to the Hon. the Colonial Secretary, on the 25th March, 1858. J. M.

XVI.—*On the Genus Eremophila, by* FERDINAND MUELLER, M.D. PH.D., *Government Botanist of Victoria, and Director of the Botanic Gardens of Melbourne, Member of the Imperial Charl. Leop. Academy, &c. &c.*

A TRAVELLER in the extensive desert-tracts of Australia is often well rewarded for his toils and privations by the enjoyment which the sight of the varied works of the Creator must ever cause to contemplative minds; more especially when it is observed that, with the increase of the country's barrenness, variety and beauty in the vegetation increase in proportion.

Prominent amongst the attractive plants to be met with in the solitudes of the interior are those of the Myoporinous order, and amongst these again are the genera *Stenochilus*, *Eremophila* and *Pholidia*, comprising forms exquisitely ornamental.

Having enjoyed many opportunities of scrutinizing a considerable number of the species which constitute the above genera, I have become convinced that the limits within which the latter are narrowed are extremely uncertain, and that it would be preferable to unite the whole network of species into a single and seemingly very natural genus.

This, my opinion, formed many years ago, has received additional strength from the recent discovery of several interesting species of these genera; and I believe, that if the great author of the *Prodromus Floræ Novæ Hollandiæ* had been enabled to observe even those plants which were considered by him as typical of the above genera in full development of flowers, no lines of demarcation or different ones would have been drawn between them.

More desirous, however, to avail myself of this opportunity of bringing some of the rarest and most elegant desert plants of Australia under notice, than to enter into an elaborate essay on the species, for which, moreover, the Western Australian forms are but partially at my command, I beg to limit these notes to a diagnostic definition of *Eremophila Freelingii*, discovered by Mr. Hawker in Capt. Freeling's Journey to Lake Torrens, and to *Eremophila Behrii*, a plant of the South Australian desert, on which more than nine years ago I bestowed the name of its discoverer, Dr. Hermann Behr, a physician and naturalist of great learning and acute observation, now carrying on his researches in California.

To the definition of these a simple enumeration is added of all the species hitherto described, merely to serve as a temporary systematical disposition, until all the connecting forms, which probably will be found to predominate in Central Australia, and which the new expeditions into the interior are likely to reveal, shall be discovered.

In collecting all the species of *Eremophila*, *Pholidia*, and *Stenochilus* under one universal generic appellation, preference has been given to the expressive name *Eremophila*; not only because it is so well adapted for all these plants, (all without exception being restricted to the desert tracts of Australia), but also as it claims equal right with those of *Stenochilus* and *Pholidia* in regard to priority, whilst neither of the latter names applies to the generality of the species.

If in these plants the principal form which the corolla assumes is to be regarded as a distinct mark of the genera, then the former arrangement of the species has to undergo a considerable change, according to the combinations of a scarious enlarged calyx of *Eremophila*, or an almost unaltered calyx of *Stenochilus* or *Pholidia*, with the legitimate form of the corolla of *Stenochilus* and *Eremophila*, or with that of *Pholidia*. The flowers of *Stenochilus glaber*, *S. maculatus*, and many others, are, in general structure, identical with those of *Eremophila alternifolia*, and *E. latifolia*, whilst those of *Stenochilus longifolius*, *S. Bigononiflorus*, *Eremophila oppositifolia*, and several others, are much more in accordance with those of *Pholidia*. Indeed, the gradations between the typical forms of the flowers, as originally described by R. Brown in *Pholidia* and *Stenochilus*, are so complete, that I have deemed it scarcely advisable to employ these differences for the sectional character of the species.

EREMOPHILA.

Stenochilus, Pholidia, and Eremophila, R. Br. Pr. 517–518.
Eremodendron, De Cand. in Meisn. Gen., p. 292.
Pholidiopsis, Ferd. Mueller in Linnæa, xxv., p. 429.

Sect. I.—Sentis. Ferd. Mueller, Transact. Phil. Soc. Victor., i., 47. — Calyx quadripartitus. Drupa rostrata imperfecte quadriloculata.

1. *Eremophila divaricata.*—
Pholidia divaricata, Ferd. Muell., l. c. Murray, Darling, and Murrumbidgee.

Sect. II.—Eremodendron. D. C., l. c.—Calyx quinquepartitus demum auctus. Drupa imperfecte quadriloculata.

2. *Eremophila arborescens.*—All. Cunn. ex D. C., l. c.
E. Cunninghami, R. Br. in Sturt's Centr. Austr. ii., app. p. 84.
Eremodendron Cunninghami, D. C., l. c. Lachlan, Murray, Darling.

Sect. III.—Xerophila. Calyx quinquepartitus demum auctus. Drupa perfecte quadriloculata.

3. *Eremophila latifolia.*—Ferd. Muell. in Linnæa, xxv., p. 428.

Stenochilus serrulatus, All. Cunn. in D. C., pr. xi., 715, huc forsan pertinet. Flinders' Range.

4. *Eremophila viscida.*—Endl. Annal. Wien. Mus., ii., 203. South Western Australia.

5. *Eremophila alternifolia.* — R. Br., Pr. p. 518. Murray, Darling, Spencer's Gulf, Flinders' Range, Lake Torrens.

6. *Eremophila Latrobei.*—Ferd. Mueller. Interior of Eastern, tropical, and sub-tropical Australia.

7. *Eremophila tuberculata.*—Ferd. Mueller. Hooker's Creek, interior of North Western Australia.

8. *Eremophila Mitchelli.*—Benth. in Mitch. Trop. Austr., p. 31. From the Gilbert River to the Burnett River, and on the tributaries of the Darling.

9. *Eremophila Sturtii.*—R. Br. in Sturt's Central Austral., app. p. 85. Barrier and Grey Range. Murray River, Darling River,—Mr. Dalachy and Rev. Thos. H. Goodwin.

10. *Eremophila oppositifolia.*—R. Br. Prodr. Fl. N. Holl, p. 518. Murray River, Lake Torrens, Spencer's Gulf.

SECT. IV.—PHOLIDIA. Calyx fructifer vix mutatus. Corollæ labium inferum latum divisum. Drupa perfecte quadriloculata.

11. *Eremophila polyclada.*—

Pholidia polyclada, Ferd. Mueller, in Transact. Phil., Soc. i. p. 47. From the Burdekin River to the Murray Desert.

12. *Eremophila bignoniflora.*—Ferd. Mueller.

Stenochilus bignoniflorus. Benth in Mitch. Trop. Austr., p. 386. Sturt's Creek, (towards Central

Australia), from the Gilbert River to the Dawson; tributaries of the Darling.

13. *Eremophila longifolia.*—Ferd. Mueller.
 Stenochlus longifolius, R. Br., Prod. p. 517.
 S. salicinus, Benth, l. c.
 S. pubiflorus, Benth. l. c. From Spencer's Gulf, Lake Torrens, and the Murray River, to the deserts of tropical Australia.

14. *Eremophila santalina.*—
 Pholidiopsis santalina, Ferd. Mueller, in Linnæa, xxv. p. 429. Flinder's Range.

15. *Eremophila Freelingii.*—Ferd. Mueller.
 Viscidulo-pubescens, ramulis parce tuberculatis exsulcis demum valde cicatricosis, foliis sparsis planis lineari-lanceolatis acuminatis integerrimis non tuberculatis pedicellis calyce longioribus. *Sepalo supremo maximo ovato* acuto lateralia angusto-lanceolata amplexante corollæ extus pubescentis labio supero bidentato, labii inferi tripartiti lacinia media ovata, lateralibus lanceolatis, omnibus acuminatis et subæquilongis; fauce alba lanuginosa, antheris inclusis glabris, stylo pubescente, germine glanduloso.

In deserto juxta rivum Blanche Waters prope lacum Torrens detexit cl. G. Hawker in expeditione Freelingii.

Folia $1\frac{1}{2}$-2 inch longa, $\frac{1}{8}$-$\frac{1}{4}$ inch lata longe in basin angustata. Sepala glandulosa, puberula ciliate parce punctata, circiter semiuncialia. Corolla forsan albida et immaculata, unciam parum excedens, labio supero breviter et acute bidentato, infero eidem subæquilongo, lobis æstivatione imbricatis; tubi basis glabra. Antheræ hippocrepicæ, loculis apice confluentibus, basi demum divergentibus. Stylus filiformis inclusus. Stigma minutum brevissime bilobum. Drupa ovato-globosa circiter $\frac{1}{3}$ inch longa perfecte quadri locularis tetrasperma. Putamen lignosum. Semina cylindrica ex apice loculi pendentia scilicet albuminosa. Floret vere.

16. *Eremophila scoparia.*—Ferd. Mueller.

Pholidia scoparia, R. Br. Pr. p. 517. Rivers Murray and Darling, Lake Torrens and Spencer's Gulf.

17. *Eremophila resinosa.*—Ferd. Mueller.

Pholidia resinosa, Endl. Annal. Wien. Mus. ii., p. 203. South Western Australia.

18. *Eremophila Behriana.*—

Pholidia Behriana, Ferd. Mueller, in Linnæa xxv., p. 40, adnot. Ramis apice pubescentibus, foliis parvis alternis ovatis basi cuneatis supra medium dentatis margine ciliatis, calycis sessilis ciliati laciniis acutissimis angustis canaliculatis limbum corallæ attingentibus, corollæ parvæ violaceæ extus glabræ labio supero bidentato, labii inferi tripartiti laciniis acuminatis, fauce barbata, antheris glabris inclusis, stylo parce puberulo, germine glanduloso.

Tumbey Bay (Wilhelmi). Gawler River (Behr.)

Fruticulus 1-2 pedalis. Folia $\frac{1}{4}$-5$\frac{5}{12}$ in. longa plana venosa nitentia, antice plus minusve distincte dentata. Calyces $\frac{1}{6}$ in. vix excedentes. Corolla circiter $\frac{1}{3}$ in. longa.

Habitu Pseudopholidiam brevifoliam simulat, quod genus fructu ignoto dubium forsan ad Pholidiam reducendum est Duttonia (Ferd. Mueller in Hook. Kew. Miscell., 1856) ad hasce Eremophilæ species approximat, quibuscum autem vix coadunari possit, nisi subgeneris ratione.

19. *Eremophila crassifolia.*—

Pholidia crassifolia, Ferd. Mueller, in Linnæa, xxv., p. 430. Spencer's Gulf (Wilhelmi).

Sect. V.—Stenochilus. Calyx fructifer vix mutatus. Corollæ labium superum quadridentatum, inferum angustum in divisum.

20. *Eremophila Brownii.*—Ferd. Mueller.

Stenochilus glaber, R. Br., Pr. p. 373. Deserts of Southern, Eastern, and Central Australia.

21. *Eremophila maculata.*—Ferd. Mueller.

Stenochilus maculatus, Ker. Bot. Reg., 647.

S. curvipes, Benth in Mitch. Trop. Austr., p. 221.

Gulf of Carpentaria, Eastern tropical and extra-tropical Australia, Australia Felix, Central and South Australia.

22. *Eremophila Grahamii.*—Ferd. Mueller.

Stenochilus viscosus, Grah. in Edinb. Phil. Journal, 1829, p. 385. Interior of South Australia.

23. *Eremophila racemosa.*—Ferd. Mueller.

Stenochilus racemosus, Endl. Annal. Wien. Mus. ii., 220. Interior of South Western Australia.

24. *Eremophila albicans.*—Ferd. Mueller.

Stenochilus albicans, Bartling in Lehm. pl. Preiss I., p. 351. et forsan—S. subcanescens, Bartl, l. c. South Western Australia.

25. *Eremophila incana.*—Ferd. Mueller.

Stenochilus incanus, Lindl. Bot. Reg. 1839, Miscel. n. 116. Murray Desert.

XVII.—*Contribution to the Insect Fauna of Van Diemen's Land,* (now TASMANIA), *with particular reference to the Geographical Distribution of Insects. By* Dr. W. F. ERICHSON. (Translated by Miss S. A. FOGG.)

ALTHOUGH the exertions of Robert Brown have procured for us an extensive acquaintance with the Flora of New Holland, not merely with respect to individuals, but also in a general and universal sense; although we are acquainted with the Fauna of different classes of mammalia and birds, yet our knowledge of the entomological Fauna of this part of the world, viewed as a whole, is extremely limited. The most important and peculiar productions have not, indeed, remained unnoticed and unknown; different authors, Kirby, Marsham, Donnovan, and others, have produced excellent descriptions of particular species; but a thorough knowledge of a Fauna demands not only an acquaintance with its chief peculiarities, but also a wide survey of its most generally distributed forms. Buisdoval has arranged all the insects of Australia which have yet been discovered, including those in the Parisian collection, and their description is to be found partly in the entomological part of the "Voyage of the *Astrolabe,*" 1832, partly in the Faune Entomologique de L'Oceanie," 1835; but the classification affords no good insight into the character of this Fauna, both on account of the paucity of its materials and their imperfect arrangement. I trust that this present brochure may be more successful.

Mr. Schayer, superintendent at Worlnorth, on the north-west coast of Van Diemen's Land, animated with the desire of improving his residence in a country so little known, of advancing science, and of enlarging the collections in his native town, has not left the natural productions of his temporary residence unnoticed, but has enriched the different Museums at home by important additions and collections. The Entomological Cabinet has already received three assortments of carefully collected insects, which are very valuable, few specimens of the New Holland Fauna having hitherto been received; besides, these collections are not confined to the larger and more remarkable varieties, but they embrace also the most insignificant: in this respect they throw great light on the subject of the New Holland Fauna, for they show the relationship of its peculiar forms to those of more extensive circulation. I have examined systematically all the insects which Mr. Schayer sent to this collection, and I believe that an accurate description of them, with reference to their geographical distribution, would be extremely interesting. The English have many favourable opportunities of introducing the natural productions of New Holland into their Museums, and, consequently, these latter afford rich materials for the compilation of a Fauna: we can, therefore, only regret that we have hitherto been able to obtain but small portions, and not the whole of this valuable matter. This brochure will be so far interesting, in that it indicates the peculiar locality of each distinct species, for it is only by an accurate description of localities, that the geographical distribution of distinct species can be ascertained: the first step in geography, as connected with Natural History, is to ascertain the extent and boundaries of these localities. In this respect, how much further advanced is botany than entomology, for in this latter we have hitherto been satisfied with only the general term New Holland, or even Australia.

In a Natural-History point of view, Australasia must not be considered as one entire country like Africa and America, but it must be divided into three parts. The first embraces those islands to the north of New Holland, with New Guinea, and New Ireland. They belong to the Indian Archipelago, not only geographically, but also in the character of their Fauna and Flora; they are most closely allied to the Moluccas, having the same luxuriant, rich vegetation; and although they are remarkable in ornithology as being the sole habitat of the birds of Paradise, they present no entomological forms foreign to the Asiatic Islands. (*) They are remarkable, as well as the Moluccas, for their numerous *Lepidopteræ*. (†) The second part of Australasia comprehends all those small islands in the Pacific Ocean which have been elevated at a more recent date: they are covered with rich and dense vegetation, but their Fauna is extremely poor, and will not bear any comparison with the luxuriant growth of the vegetable world. (‡) Lesson found this vegetation so similar to that of India, that

(*). I bring forward the well-known genera of *Cicindela, Therates,* and *Tricondyla* as examples.

(†). D'Urville, Voy. de l'Astrolabe, Entomol., pp. 23-31. De Haan, Treatise on the Natural History of the Dutch East Indian Islands. Bezitt. Zool. IH., S. 3.

(‡). Boisduval (Voy. de l'Astrolabe, Entomologie, p. 32) expresses the hope that the time will come when its zoology will be of some importance. He says—"The vegetation, which is already varied and luxuriant, must naturally appear earlier than the insect world, to which it serves as food, and this again earlier than insectivorous birds." The ground of this opinion is a belief in the continuous creation of new species. Until, however, experience has confirmed this view, which appears to be founded on a visionary natural philosophy, rather than on a plain, we must not renounce the other view, according to which the organisms of these islands were carried thither from the West, in the course of centuries, by winds and currents: hence the slight individuality presented by the Flora and Fauna of these islands, the decline of their organisms to the eastward, and the great superiority of their vegetable world; for animals are less easily distributed than plants. That such a distribution is not impossible may be proved by the fact, that insects and plants have found their way from N. America to Great Britain. Thus, *Eriocaulon septangulare* is by no means an European species of this peculiarly American genus, but it is identical with an American species. (S. Kunth, Enum. Plant., III., p. 541.)

he considered the disproportion between the Fauna and the Flora to be the great characteristic difference between these islands and the first-mentioned division of Australasia.

The character of organised nature on the continent of New Holland and its dependent islands, of which Van Diemen's Land is the most important, is more peculiar than that of any other part of the world. Notwithstanding some peculiarities, New Zealand appears in general closely connected with New Holland.

The character of an insect Fauna is much influenced by that of the corresponding Flora, even if, as in the present case, the former does not entirely depend on the latter. Unfortunately we are not yet able to trace the influence the Flora exercises on the insect Fauna: to do so we require to have a knowledge of every plant which affords nourishment to each species of insect, both in its first and last stage. Of this knowledge we are now wholly deficient, and yet it is of the greatest importance in our study of the geographical distribution of insects, for by it alone can we determine the connection between Flora and Fauna. For example, were the numerous species of the genus *Paropsis (Blattkäfer)* to be found only on one family or genus of plants in New Holland, the knowledge of the limits of this family or genus would have a double signification. We must hope for future elucidations of the intimate connection between the Fauna and Flora, and confine ourselves now to a comparison of their more distant relations,—a comparison from which interesting results are nevertheless obtained. In the vegetation of New Holland, the most important families, such as *Polypodiaceæ, Gramineæ, Cyperaceæ, Orchidaceæ, Compositæ, Euphorbiaceæ,* and *Papilionaceæ,* have an equal distribution, and are in the same proportion to the rest of the Flora as in other countries.

Restiaceæ, *Proteaceæ*, *Epacrideæ*, and *Myrtaceæ*, on the contrary, are particularly numerous. The *Myrtaceæ* have their principal locality here. The *Epacrideæ* are almost entirely peculiar to New Holland. As to Van Diemen's Land, notwithstanding that its geographical position, and the greater humidity of its climate, assimilate it to the temperate zone of the northern hemisphere, the aspect of its vegetation, according to Robert Brown, is, on the whole, the same as that of the continent of New Holland. Of the natural families, which determine the character of vegetation in the latter country, some have materially decreased in Van Diemen's Land, but none become more numerous; the *Epacrides*, the *Eucalypti*, and the leafless *Acaciæ* alone maintain an equal relative position (*).

(*). "Flinder's Voy. to Terr. Austral.," 2nd, Append. III., p. 586. "Robert Brown's Miscellaneous Writings," by Nees Von Esenbeck, I., s. 121. In the Journal of Botany for 1840, the younger Hooker commenced a systematic review of the plants of Van Diemen's Land. I think it will be interesting to mention here the families and genera of the plants found in the same districts as the insects I am about to describe. Carefully selected specimens have been forwarded by Mr. Schayer to the Royal Herbarium; for their examination and arrangement I am indebted to Dr. Klotzsch.

The *ferns* are forms analogous to the European genera *Polypodium* (two species), *Blechnum*, *Aspidium*, *Pteris*; the *grasses* are similar to those of the genera *Panicum*, *Festuca*, *Bromus*; the *Cyperaceæ* correspond with two European species of *Carex*; the *Restiaceæ* belong to the genus *Restio* (common also to S. Africa), and to *Anthistiria* (kangaroo grass, peculiar to N. Holland); of the *Xyrideæ* there is 1 *Xyris*; of *Junceæ* 1 *Juncus* and *Luzula campestris*; of *Colchiaceæ* 1 *Angularia*; of *Liliaceæ* 1 *Blandfordia* and 3 species of the gen. *Tulbaghia* (common also to the Cape of Good Hope); of *Irideæ* 1 species of the gen. *Sisyrinchium* and 1 *Cipura* (the former is common to America also); of the *Orchidaceæ* only forms peculiar to N. Holland, 1 *Spiranthes*, 5 *Prasophyllum*, 3 *Diuris*, 4 *Thelymitra*.

Of the small family of *Stackhousiaceæ*, which is peculiar to New Holland, 3 species of *Stackhousia*; of *Thymelaceæ* the same number of *Pimelea* and 1 *Daïs*; of *Proteaceæ*, 1 *Manglesia* and 1 *Banksia*. The *Primulaceæ* and *Labiatæ* which have been forwarded present only European forms, viz.: the former, 1 *Anagallis* and 1 *Samolus (littoralis)*, the latter, 1 *Thymus*; the *Scrophularineæ* have 1 *Veronica* and 1 *Euphrasia*; the *Solaneæ* 1 *Solanum*; the *Borragineæ* 2 *Myosotis*, which are very similar to European species, and 1 *Exharrena*; the *Convolvulaceæ* 1 *Convolvulus*; the *Epacrideæ*, which are peculiar to New

As to the relationship of the New Holland Flora to others, it is a known fact, that its assimilation and analogies are principally with that of Southern Africa. *Proteaceæ*, *Restiaceæ*, and other families, which occupy an important position in the vegetation of New Holland, maintain a similar one at the Cape, but diminish in importance in America. (The *Epacrides* appear to answer to the *Ericæ* of Southern Africa.) The relationship to the South American Flora is less important, and consists chiefly in the similarity of plants of New Holland and some peculiar to the south-westerly coast of America, rather than with those of other parts of America: sometimes, although but seldom, we find relationship existing between South America and South Africa, which do not extend to Australia. Although these facts are well known, I mention them here, in order to point out how differently the Faunas are connected. Here, in contradistinction to the Floras, the relationships of New Holland to South America are more important than to Southern Africa, and not only to the western coast, but also to the eastern,

Holland, 9 *Epacris*, 1 *Sprengelia*, and 3 *Dracophyllum*; the *Campanulaceæ* 2 *Wahlenbergia*; the *Lobeliaceæ* 4 *Lobelia*; the *Stylidiaceæ* 1 *Stylidium*; the *Compositæ* 4 *Gnaphalium*, 1 *Marus*, 1 *Spilanthus*, 5 *Eurybia*, 4 *Senecio*, 1 *Humea*; the *Umbelliferæ* only 2 species of *Apium*; the *Ranunculaceæ* 3 *Ranunculus* and 1 *Clematis*; the *Cruciferæ* 1 *Lepidium*; the *Hypericineæ* 1 *Hypericum*; the *Geraniaceæ* 3 *Pelargonium* and 1 *Erodium*; the *Oxalideæ* 1 *Oxalis*; the *Violaceæ* 2 species of *Viola* and 1 *Hymenanthera*; the *Droseraceæ* 1 *Byblis*; the *Polygaleæ* 1 (shrubby) *Polygala*; the (shrubby) *Rutaceæ* 1 *Correa*, 2 *Boronia*, and 1 *Cyria*; the *Caryophylleæ* 1 *Dianthus*; the *Alsineæ* 1 *Arenaria*; the *Lineæ* 1 *L. usitatissimum*, which is identical with our own; the *Onagreæ* 3 *Epilobium*; the *Myrtaceæ* 1 *Eucalyptus*, 5 *Leptospermum*, 1 *Melaleuca*, 3 *Bæckia*; the *Rosaceæ* 1 *Rubus*, 2 *Acæna*, 1 *Potentilla*; the *Papilionaceæ* 1 *Goodia (latifolia)*, 1 *Indigofera*, 1 *Hedysarum*, 2 *Hardenbergia*, 1 *Physolobium*, 1 *Zichya*, and 3 *Kennedya*. (The four last genera present those forms so characteristic of New Holland, which bear simple leaves, or rather they are leafless, with leaf-like petioles.) The *Mimoseæ* 6 species of *Acacia*; the *Rhamneæ*, 2 *Pomaderris*. The *Proteaceæ*, *Myrtaceæ*, *Papilionaceæ*, *Mimoseæ*, and *Rhamneæ* form trees in the thick, impenetrable woods with which Van Diemen's Land is partly covered. The *Kennedyæ* are creepers.

though so different in vegetation. The peculiarities of the Faunas of these three continents are most distinctly shown in the *Mammalia.* Africa and America have little in common with each other, and Australia is unlike all other countries, although the order of pouched animals is not confined to it alone; the genus *Phalangista* extends over a part of the Indian Archipelago, but is not found in Africa: it is America that in this respect presents so great an affinity with New Holland. The insect world presents numerous similar examples; among the most extraordinary is that of the genus *Thynnus (Hymenoptera)*, which is peculiar to New Holland and both the coasts of S. America, and is rich in species on both continents. The *Coleopteræ* furnish further proofs of the prevailing affinity of South America to New Holland. The genus *Julodis (Buprestidæ)* occupies an important position in the Fauna of South Africa; answering for, if not analogous to, the genus *Stigmodera* of South America and New Holland, which, though rich in species, is confined to these two continents. Of the *Elateræ* the genus *Monocrepidius* presents numerous species in America, but elsewhere is to be found in New Holland only. Of the *Rhipiceridæ* is *Rhipicera* common to both continents; of the *Telephori*, the genus *Chauliognathus (Callianthia* Dej.), is characteristic of America, and only known besides to New Holland. Of the *Lucanidæ*, the *Lamprimæ* are characteristic of New Holland, and similar only to the *Pholidoti*, which are peculiar to South America; thus also the small genera *Hexaphyllum*, South America, and *Syndesus*, New Holland, present the highest degree of analogy: in New Holland the *Passali* are almost as numerous in species as they are on the eastern coast of America, whereas in Southern Africa they are entirely wanting. Of the Stag-beetles *(Bockkäfer)* the numerous group of *Stenocoridæ* are equally characteristic of America and New Holland, but found no where else. Affinities between South America and New Holland are not wanting in the family of the *Rhyncophoræ (Rüsselkäfer)*; the *Cryptorhynchæ*, but meagrely represented in other parts of the world, are in both these continents very widely distributed; and the genera *Rhinotia* and *Homalocerus*, *Aterpus* and *Ægorhinus*, (*) *Melanterius* and *Chalcodermus*, present forms analogous to each other.

Affinities between New Holland and Southern Africa are not, however, entirely wanting, although much limited by the following laws:—Those forms which Southern Africa possesses in common with the interior of the continent do not all extend to the other countries of the southern hemisphere, and least of all to New Holland. Of the remaining forms, those of Southern Africa which are at all analogous to any on the western coast of South America, (for this alone presents any affinity to the Cape countries), do not appear in New Holland. To the first category belong the above mentioned *Julodis*, the greater part of the *Melasomæ*, so numerous both in Southern Africa and in its interior, as well the *Brachyceræ* and *Clenæ* of the *Rhyncophoræ*. These form so interesting and characteristic a part of the South African Fauna that their greater affinity latitudinally, as compared with the same longitudinally, is not to be mistaken. In the second category belong the analogies between the *Melasomæ* peculiar to Southern Africa; as *Moluris*, with those of the western coast of South America, and the greater resemblance which the South African *Anisonyx* and *Lepitrix* have with the South West American *Cratoscelis* and *Lichnia*, than with the *Glaphyrus*, *Anthypua*, and *Amphicoma* of the central Fauna (†).

(*). *Lophotes* Schönh. But as this name belongs already to a genus of reptiles, the name I have mentioned may be retained.

(†). See volume the first of this Archive, 1st Part, p. 268.

The *Melasomæ* of New Holland are very different from those of South Africa: the greatest similarity is to be found among the *Curculionæ.* The genus *Hipporhinus* is common to both continents, but superior in South Africa as to the number of its species. The genus *Amycterus,* so rich in species, and so characteristic of New Holland, has one South African analogue. Other forms common to both South Africa and New Holland extend also over tropical Africa and the East Indies.

The Fauna of New Holland is allied to that of Madagascar in some few instances; viz.—in the *Cetoniæ* with a divided *clypeus,* and also in the total absence of the Spanish Fly, *Lytta,* so generally distributed elsewhere.

A slight affinity between New Holland and North American forms is worthy of notice;—for example, the analogy between *Carenum* and *Pasimachus;* also the genus *Notiophilus* Schönh., of *Curculionæ,* of which Schönherr mentions two North American species, to which I shall now add one from Van Diemen's Land.

We should misunderstand the character of the insect Fauna of New Holland, were we to imagine that it produces only forms peculiar to itself: on the contrary, many European forms occur here, no less than in vegetation. Rob. Brown asserts his opinion, (*) that a great number of species of plants do not owe their appearance in New Holland to colonization, but are cotemporaneously indigenous to both Europe and New Holland. This observation is not, in my opinion, equally applicable to the insect world: with the exception of *Colymbetes pulverosus,* (†) and a few insects brought hither from the Indian Archipelago, I know of no species in New Holland that is not peculiar to the country,

(*) A. o. a. O.

(†) Compare volume the fifth of this Archive, 2nd Part, p. 321.

unless where its introduction can be traced to human influence. This assertion is not contradicted by the appearance of *Calosoma, Harpalus, Pterostichus, Cyphon, Limnichus, Cercyon, Onthophagus, Aphodius, Tenebrio, Mordella, Anthicus, Brontes, Graptodera, Phalacrus, Scymnus, Corylophus,* and *Batrisus,* for these genera are spread over the whole world; but the appearance of *Attalus, Salpingus, Cryphalus, Dendrophagus, Psyllioides, &c.,* is remarkable, for they are more peculiar to the European Fauna.

Geographical peculiarities are most distinctly exhibited in the order of the *Coleopteræ;* one-third of their genera appears both in Europe and New Holland; one-fifth is distributed in other parts of the world, so that less than one-half is restricted to New Holland; certainly a favourable example of the peculiarity of this Fauna. It is not so in other orders: about two-thirds of their genera are common to both Europe and New Holland; one-sixth is excluded from the European Fauna, but found in other parts of the world; and only one-sixth is peculiar to New Holland. The *Diptera* and *Hymenoptera* show a greater degree of peculiarity than the *Hemiptera,* the *Orthoptera* show least. The *Lepidoptera* are not included in my summary, none having been forwarded by Mr. Schayer, but I believe their relations similar to those of the last-mentioned. The affinity of the Fauna of Van Diemen's Land to that of New Holland is the same as Robert Brown has assigned to the Floras of the two countries, viz.—that those forms which are peculiar to this part of the world, and characteristic of it, are common to both countries. I am not sure that the genera *Carenum, Pamborus, Ryssonotus, Tragocerus, &c.,* appear in Van Diemen's Land: no doubt we are still unacquainted with many modifications of the character of the Fauna caused by the appearance and disappearance of genera, which are confined to particular degrees of latitude. Van Diemen's Land, as well as the Continent, possesses the remarkable and extensive genera *Diphucephala, Lamprima, Adelium, Amycterus, Gonipterus, Stenocorus, Paropsis, Thynnus, Myrmecia, Rutilia, Eurymela, &c.*; often a species appears throughout the whole of the island, and only on a part of the Continent. Their peculiarities will be shown best in a systematic account of the insects sent by Mr. Schayer from Van Diemen's Land.

COLEOPTERA.

I shall follow as much as possible the classification of Latreille, as I am not acquainted with a better one. The family of *Cicindelæ* is less extensive in New Holland than in other parts of the world, and is limited, as far as we know with certainty, to several species of the genus *Cicindela*: although the collections hitherto received have not contained a single species, still we can hardly suppose that so universally distributed a genus should be entirely wanting in Van Diemen's Land, particularly as it appears in New Zealand. Twenty-nine species of the great family of *Carabi* have been forwarded. The discovery of a species of *Calosoma* is not surprising, for the very general distribution of this genus pre-supposed the existence of at least a few species in New Holland; it is interesting, because the new species is ascertained to occupy a central position between our own well-known and indigenous species *C. sycophantes* and *C. inquisitor*. Future researches must determine whether any species of *Carabus* exist on the snow-clad mountains of Van Diemen's Land: probably they do, for their appearance in Southern America proves that they are not limited to the northern hemisphere, like *Nebria, Elaphrus,* and *Notiophilus*. There is a remarkable new genus *(Scopodes)* of the *Truncatipennæ*, belonging to the group *Pericalides*, which it represents in New Holland,—also by a new species. The rest of the species belong to well-known and widely-distributed genera. Thus *Plochionus,* indigenous in America and the East Indies, (and enriched by the new species *Calleida),* generally distributed, except in European Faunas, loses its bright colouring in New Holland, where it takes the colours of our *Dromiæ:* the specimens from Van Diemen's Land resemble our *Dromius maculatus. Lebia* and *Cymindis* are spread over nearly the whole earth; *L. corticalis,* (*) *L. posticalis,* (†) and *C. Australis,* (‡) and two new species of the latter genus have been forwarded: these two have a peculiar small, short, compressed, and flat appearance—they are found also in New Holland: according to *Boisduval, C. Australis* is found also in Port Jackson.

The group of the *Heteromorphidæ* (‖) is common to America and New Holland, herein presenting a point of affinity similar to that already mentioned respecting marsupial animals. New Holland contains fewer genera than America. This group is remarkable for its peculiar structure, which approaches, in some respects, to that of *Phalacrus.* Van Diemen's Land has only one species *Adelotopus,* Hope (§), which is quite new among the three genera from New Holland, which we possess.

Of the genus *Scarites,* the only species of New Holland, *Sc. rotundipennis,* Dej. (¶), has been sent to us. It is the

(*) *Carabus corticalis,* Fabr. Syst. El. I., 201, 174. *Lebia corticalis,* Dej. Spec. Gén. des Coleopt., v. 390, 60; Boisd., Faun. de l'Ocean., 18, 1.

(†) *Lebia posticalis,* Guérin, Voy. de la Cocquille, Zool. 2nd, II., p. 58. Atl. Ins. Pl., I., f. 8. Boisd., Faun. de l'Ocean., 19, 2.

(‡). *Cymindis australis,* Dejean, Spec. Gén. des Coleopt. II., 449, 25.

(‖). Hope, Coleopterist's Manual, II., p. 108.

(§). Transact. of the Entomol. Soc. of Lond., I., p. 11.

(¶). Spec. Gén. des Col., I., 401, 35. Boisduval, Faun. de l'Ocean., p. 21. Dejean assigns (though not positively) the Cape as the habitat of this species. Boisduval, a. a. O., places it in New Holland.

only insect out of the entire group of *Scaritides:* it is probable, however, that the genus *Carenum* (*), hitherto thought peculiar to New Holland, but analogous to the North American genus *Pasimachus,* is to be found in Van Diemen's Land. And it is scarcely to be supposed that the genera *Dyschirius* and *Clivina,* especially the latter, distributed everywhere else, are wanting here.

The group of *Harpalinæ* presents in New Holland a peculiar genus,—*Promecoderus,* of which Van Diemen's Land possesses a series of species (†). Mr. Schayer has, however, forwarded but one: it agrees with *Pr. Brunnicornis* Dej. (‡), except that it is somewhat smaller. Of *Harpalus* the collection contains *H. Australasiæ,* Dej. (||), and three new species.

Six out of the seven species of the group of *Pterostichinæ* belong to the genus *Pterostichus* (§), *(Feronia,* Dej.*)*, and in this to the division *Pœcilus* and *Argutor,* that is, according to Dejean's classification. To the first belong *P. chalybeus* (¶) *P. sphodroides,* (**) and two new species: to the second *P. Australis* (††), and one new species. In the seventh species I recognised *Carabus curtus,* Fab., which I had seen in the Kiel Museum, but of whose proper classification I had so long been doubtful. Its habitat, colour, and the formation of the feet seemed to place it among the

(*) I imagine that *Arnidius* Leach. is synonymous with *Carenum,* though they are separated by Boisduval (Faun. de l'Ocean., pp. 23, 24.)

(†) Guérin (Rev. Zool., 1841, p. 188) enumerates three new species from Van Diemen's Land, viz., *Pr. gibbosus, degener., subdepressus.*

(‡) Spec. Gén. des Col., IV., 28, 1. Boisduval (Faun. de l'Ocean., p. 39) assigns Port Jackson, Brullé (Hist. Nat. des Ins., IV., p. 448) Kangaroo Island, as the place of its discovery.

(||) Spec. Gén. des Col., IV., 386, 158. Boisd., Faun. de l'Ocean., 44, 7.

(§) Compare "My Beetles in the Brandenb. M.," I., p. 67.

(¶) *Feronia (Pœcilus) chalybea,* Dej., Spec. Gén. des Col., III., 234, 26.

(**) *Feronia (Pœcilus) sphodroides,* Dej., (in the same), 236, 27.

(††) *Feronia (Argutor) Australis,* Dej., (in the same), 262, 55.

Truncatipennæ, but I could not arrange it among any of the known genera. An examination of the mouth gave me, at length, an insight into its systematic affinity. I shall speak of it again as the new genus *Amblytelus.*

The group of *Anchomenides* numbers six new specimens in Mr. Schayer's collection: of these there are two new species of *Anchomenus,*—one of the genus *Euleptus,* Kl., (*) (formerly observed in Africa only), and two different species of *Dyscolus* Dej., *(Loxocrepis,* Esch*),* found in both America and the East Indies by Dejean. It was classed with the *Truncatipennæ,* but incorrectly so, as an examination of the mouth proves. The relationship to *Anchomenus* is so close, that the arrangement of a species often depends on the shape of the fourth joint of the foot. The two species described below have one lobe *(Lappen),* perceptibly longer than the other: they are, therefore, *Loxocrepi.* A wingless beetle, which forms the new genus *Lestignathus,* has the shape and the simple feet of the more slender of the *Anchomeni,* but it presents also a great anomaly in this sub-family of *Carabici,* in its possessing strongly-defended mandibles.

The last collection contained one, but a very interesting species of the family *Dytiscus:* it belongs to the genus *Eunectes,*—is nearly related to, and yet specifically distinct from, *E. griseus.* Of this genus one single species, *E. griseus,* is distributed over all the warmer parts of the old world: two others, *E. helvolus* and *succinctus,* Kl., have a very limited distribution; and a fourth is peculiar to New Holland.

(*) Klug founded this genus on a species brought from Madagascar: another species was brought from S. Africa by Drège: I saw a third in Copenhagen, in Westerman's and the Royal Collections; it was from Guinea, and was distinguished by its broad and flattened *autenna.* Our collection has received a second species from New Holland, through Lhotzky.

The most important *Staphylinæ* were in the first collection, and have already been described by me in the "Gen. et Spec. Staphyl.;" since then we have received but one new *Aleochara*. The remaining species are *Conurus Australis*, (*) *fumatus* (†), *Xantholinus cyanopterus* (‡), *chloropterus* (‖), *Staphylinus lanio* (§), *Phylonthus ruficollis* (¶), *hybridus* (**), *pacificus* (††), *Oxytelus collaris* (‡‡); all of which belong to widely distributed species. The *Xantholidæ* approach more nearly to those of the tropics than to those of the northern hemisphere.

Staphylinus lanio, although closely allied to our own *St. maxillosus*, forms with the New Holland species *St. erythrocephalus*, and the New Zealand *St. oculatus*, a group peculiar to Australia, distinguishing itself in the family *(Creophilus* Leach.*)*, to which it belongs, by its colour and its want of down. The type of this family is the above-mentioned *St. maxillosus*.

The *Buprestidæ* of New Holland present many peculiarities, particularly in the preponderance of the genus *Stigmodera*, which is common also to South America. Its numerous small species are very characteristic of New Holland. Van Diemen's Land, however, does not appear so rich in species as the continent; as yet we have received only one small, but new, species of *Stigmodera*. On the whole, the number of *Buprestidæ* there is very small. Two new species

(*) Genera et Species Staphylinorum. 221. 3.
(†) The same. 228. 15.
(‡) The same. 311. 9.
(§) The same. 311. 10.
(‖) The same. 354. 9.
(¶) The same. 431. 5. Staphyl. ruficollis Grav. Mon. Micr. 71. 58.
(**) Gen. et Spec. Staphyl. 432. 6.
(††) The same. 501. 125.
(‡‡) The same. 789. 7

belonging to the genus *Melobasis* Gory (*Abrobapta* Dej.) conclude the present number of our specimens.

The number of the *Elateridæ* is not quite so limited as that of the *Buprestidæ;* their forms are little remarkable, though in some respects peculiar. Among those with *f. antennæ* appears the universally distributed genus *Lacon.* (*) : it is represented by two species, of which one is new; the other, *L. caliginosus,* has been repeatedly described (†), and, according to Guérin, is found also in New South Wales, (Port Jackson). *Monocrepidius* Esch., a genus common both to New Holland and America (‡), affords six species, all of which are new, with one exception, *M. Australasiæ* (§) Dej. A new species of the genus *Melanoxanthus* Esch. (||), whose type (*El. melanocephalus* F.) is distributed over the East Indies and Madagascar, and of which Dejean mentions two more East India species, has been sent from Van Diemen's Land: it will be described below. Another remarkable new species presents all the characteristics of the genus *Pristilophus* Latr. (¶). which has been formed at the expense of *Ludius* Esch., although this latter requires a yet closer definition of its limits. Finally, there are two new genera to be mentioned, both of which are probably peculiar to New Holland: the one, *Crepidomenus,* presents great analogy to those forms which

(*) Laporte, Selb. Rev. Entomolog., IV., p. 11. German Periodical of Entomology, II., p. 260.

(†) *Lacon caliginosus,* Germ. a. a. O., 261. 1. *Adelocera caliginosa,* Guérin, Voy. de la Cocquille, Zool. 2nd, II., p. 68. Atl. pl., II., f. 7. Boisd., Faun. de l'Oceanie, 7. 98. *Elater caliginosus,* Boisd., ditto, 105. 4.

(‡) Dejean in his Catalogue mentions one East Indian species. I know of no species in the Old World which belongs to this genus.

(§) *Elater australasiæ,* Boisd., Faun. de l'Oceanie, 104. 2. A second description will be necessary to distinguish it from other nearly allied species.

(||) Dejean, Catal. des Col., 3e. éd., p. 103.

(¶) Annales de la Soc. Entomol. de France, II., p. 151.

Eschscholtz arranges under *Ludius,* but it differs from them in the formation of the feet, of which the third and fourth joint (limb) have a tough sole, but no leathery appendage. It contains three new species, all remarkable for their colouring. The other genus, *Atelopus,* is closely related to *Agriotes* and *Dolopius;* but is distinguished by having the fourth joint of the foot shortened, and provided with a small appendage. The four new species belong to the least important of the *Elateridæ.*

The small family of *Rhipiceridæ,* distinguished by having an onychium between the claws, has one species in Van Diemen's Land—this is *Rhipicera mystacina* (*) : the points of difference between it and the Brasilian species of the same genus have been examined by Kirby, *(a. u. a. O.),* who decided that they are too slight to require the formation of a separate genus.

In the family of *Cyphonides,* the typical genus *Cyphon* has an extensive distribution (†), and we possess species from the different parts of America, Africa, and the East Indies. It is interesting to find it also in the Australian Fauna: our collection has received, however, but one new species, which is allied to our own *Cyphon lividus.*

No species of the family of the *Lampyridæ* has, as yet, been found.

The *Lycidæ,* on the contrary, have furnished principally new species; one of which belongs to the genus *Porrostoma*

(*) Boisd., Faun. de l'Oceanie, p. 111. *Ptilinus mystacinus,* Fabr. Syst. El.. I., 328, 1. Herbst, Käf. V., 45, 1, T. 46, f. 13. *Polytomus mystacinus,* Dahn, Anal., 22, 3. I do not know whether, or in what way, *Rhipicera femorata* Kirby, Trans. of the Linn. Soc., XII., 458, 9, differs from this species.

(†) *Scirtes* is widely distributed, as well in the Old World, particularly the East Indies, as in the New. Fabricius has arranged single species among his hopping *Chrysomelæ.*

(Laporte): (*) three others, (one of which *P. rufipennis*, is imperfectly described by Fabricius) (†) belong to *Metriorhynchus* Guér.; but this is not materially different from the other. (‡) A fifth new species may possibly belong to *Anarhynchus* Guér. (§)

(*) Silbermann. Révue Entomolog. IV. p. 26.

(†) *Lycus rufipennis.* Fab. Syst. Eleuth. II. 144, 20. Generally speaking, this has been confounded with another larger species, on which Laporte founded his genus *Porrostoma*, and which was forwarded to our collection under that name by Lattreille. But the species to which I refer was sent by Fabricius himself, who received it from Labillardiere. As its description by Fabricius is very imperfect, I will give a more accurate one below. Possibly *Lycus rhipidium* or *septemcavus* Mac Leay, (King, Narrat. II. 442, 36.) may belong to that genus, but the question cannot be decided by its description only, as that suits several New Holland species equally well.

(‡) Guerin, Voy. d. l. Coquille, Zool. II. 2, p. 71, has given a classification of the *Lycus*, merely however a synoptical index, not even a list of the species belonging to the new genera. A more detailed account, (promised with a view to further elucidations,) did not appear. I am still undecided in my opinion respecting several genera, but on the whole, I think the classification far from good. Three divisions are made,—depending on the greater or less length, and the entire want of the proboscis; but a number of forms without the proboscis, as *Calopteron* Lap. (Charactus Dej.) have been included in the second division, with those having a short proboscis. A greater or less length of proboscis forms no *generic* distinction, all the three genera, which have a proboscis, have one division with a longer, and one with a shorter proboscis. *Lycus* presents a very distinguishing character in its shortened mandibles, almost like those of butterflies, and it contains partly, species in which the male has broad wings, and partly, species in which both the sexes are alike large, and have narrow wings, as *L. ferrugineus* F.; the division with a short proboscis contains *Lygistopterus cardinalis*, Dej., several other Mexican, and one North American species. In this, the mandibles are the same as in the first division A second genus is *Lygistopterus*, Dej.(*Dictyoptera* Guer., but it appears to me more accordant with Latreille's views, to employ this name after Dejean's example for *Lycus aurora, etc.*) in which *L. succinatus* (Latreille) represents all those having a long proboscis; *L.sanguineus* those with a short proboscis; of the latter there are many species in different parts of the world. *Porrostoma* differs from these two genera in having the antennæ turned in, not at the base of the snout, but on the fore part of the head. The long proboscis-form, which corresponds with *Porrostoma* Lap. Guer: is confined to three extremely similar New Holland species; the short proboscis-form is distributed also over the Indian archipelago; it was called by Guerin the genus *Metriorhynchus*, but this name is now no longer applicable, so that the two forms are united in one natural division, one family of *Porrostoma*.

(§) According to Guerin's definition *Anarhynchus* has not any proboscis; the second joint of the antennæ is as long as it is broad; and the third joint is at least double as long as the second; this last characteristic distinguishes it from *Homalisus*, of which the third antenna joint is very little longer than the second. As Guerin has not described *Dictyopterus* Dej,, of which I must here remark, that according to the above-mentioned definitions, *D. minutus* would be an *Anarhynchus* and *D. affinis* an *Homalisus*, I am not certain, whether I am right in supposing the Van Diemen's Land species to be an *Anarhynchus*. It assimilates most with *Homalisus*; it has a flexible head, and longer feet, not a two-plated shield behind; it differs chiefly in the shield

Of the family of *Telephoridæ,* two species have been found; one is a new, genuine *Cantharis* (*) : and the other belongs to the genus *Chanliognathus,* Hents, (†) hitherto held to be exclusively American. It has been repeatedly described (‡) under the name *C. lugubris.*

The family of *Melyridæ* presents only one small beetle of the Malachian group. It is a new species of my genus Attalus (§), which has hitherto seemed limited to Southern Europe.

Several Van Diemen's Land species of the family of *Cleridæ* have been mentioned by Mr. Newman (¶) ; one of them called *Hydnocera* (*nitens*) is distinguished from the American species by the formation of the male antennæ, though it resembles them in habit. This species was forwarded by Mr. Westwood; the others are unknown to me. The species in our collection are very different; one, *Clerus intricatus,* belongs to an unimportant division of this genus, which division differs from the typical form chiefly in its slightly toothed claws, and by an approach in habit to that of *Opilus.* A second species, *Opilus patricius* (**) forms with two Madagascar species a small group in this genus, which group differs from its type in the breadth

being rounded, not pointed, and in the third joint of the antennæ being fully as long as the fourth.

(*) It appears more correct to retain the Linnæan name of this genus, for Linnæus is certainly the best authority as to nomenclature. I should not, however, call the family Cantharides.

(†) Transact. Amer. Philosoph. Soc.N. Ser. III. It is identical with *Callianthia* Dej. I do not know how far the extreme elongation of the maxillæ is characteristic of the numerous species. This genus is distinguished from *Cantharis* also by the shape of the palpi, of the feet, and in the male by a large plate which covers the oval duct from below.

(‡) *Cantharis lugubris,* Fabr. Syst. El. I. 297, 17. *Telephorus pulchellus,* MacLeay, King, Nar. II., 442, 38. Guer. Voy. d. l. Coquille, Zool. II. 2, p. 77. *Callianthia pulchella,* Boisd. Faun. de l'Oceanie, p. 131.

(§) Entomography, I., p. 89.

(¶) The Entomologist, 1841, p. 35. (*Clerus?*) (*Pylus,*) *fatuus, Eleale aspera, Hydnocera nitens,* and *H. Malthinus.*

(**) This, and the species previously mentioned will be described in the periodicals of our academy by Dr. Klug.

of the final joint of the male *antennæ*. A third species, *Notoxus porcatus* (*) Fab., belongs to the same genus, with which it agrees in the formation of the foot, and in habit, but it differs in the final joint of the max. palpi not being club-shaped.

The *Ptiniores* have one beautifully marked new *Ptinus* in our collection: there is also a new species of *Lymexylon*. The group of the *Apatæ* (nearly related to the *Anobiæ*), which has been broken up by Stephens (†) into a series of feebly characterised genera, contains one new species of that genus which still retains the name of *Apate*. To this group is united also the genus *Lyctus*, *(L. canaliculatus pubescens)*, whose chief characteristic is a double, instead of a treble antenna-tip; it is not found under bark, and in the ducts of other insects, like those with which it has hitherto been ranked, but it feeds on wood, like the entire family of the *Ptiniores*, including the *Apate* (‡). The genus *Xylotrogus* Steph. (§), of which one species *X. bunneus*, Steph. (||) has been sent from Van Diemen's Land, is very closely united to *Lyctus*, and, as I think, separated from it on insufficient grounds. This insect has been widely distributed in drugs and other articles of commerce, and doubtless, this was the way in which it was first introduced into Van Diemen's Land.

The family of the *Silphæ* is represented in Van Diemen's Land by the *Silpha lachrymosa* of Schreiber. (¶)

(*) Fabr. Syst. Eleuth I. 287, 1. *Not. cribripennis*. Boisd. Faun. d. l'Ocean, 140, 3, might be the same insect, provided that its supposed habitat, New Guinea, be not the real one.

(†) Stephens, Illustr. of British Entomol., vol. 3, p. 349.

(‡) In this Archive, vol. 2, Part II, p. 46, I have pointed out the relationship of *Apate* to *Anobiæ*, and Westwood (Introduc. to the Mod. Classif. of Inf. I. p. 277,) is also of my opinion. *Phloeotribus Cis.* must however, be taken out of this group. The most natural arrangement would be to embrace the *Ptinæ*, *Lymexylæ*, and *Apatæ* in one family, of which the above-mentioned forms should represent so many different groups.

(§) Ibid 116.

(||) Ibid 117, Part I, pl. 18. f. 4.

(¶) Transact. of the Linn. Soc. VI. p. 194, 20, f. 5.

The *Nitidularidæ* are systematically as imperfectly arranged, as any division of the *Coleopteræ*.

Stephen's genus *Carpophilus* is the most important of a small group, which is distinguished by shortened wings. Two new species from Van Diemen's Land belong to a new genus of this group *Brachypeplus*, whose characteristics will be found below. The *Nitidularidæ* stand in similar relationship to the *Trogositæ*, as the *Apatæ* to the *Anobiæ*. The mouth parts are alike; the chief difference is in the formation of the foot; the *Trogositæ* having the first joint extremely short, so that the foot has apparently but four joints. Our collection does not contain a real *Trogosita* (*), (according to the type *T. mauritanica caraboides*), but it has received a remarkable new species related to *Gymnochila*, (†), and the type of a new genus, *Egolia*, which differs in the formation of the foot, and is remarkably analogous to *Trogosita*, in the same manner as *Lyctus* to *Apate*.

It is remarkable, that out of the entire family of *Histeridæ*, species of *Saprinus* only have hitherto been forwarded from New Holland. Van Diemen's Land has two, *Saprinus lætus*, Er., (‡) and a new, smaller species. Is it possible that the genus *Hister*, of which numerous species are widely distributed in other parts of the world, can be entirely absent from New Holland?

The family *Dermestidæ* presents European forms in two new species, one of *Megatoma* (||), and one of *Trogo-*

(*) Boisduval (Faun. de l'Ocean, 463-2) describes a *Tr. Australis* from V. D. Land, which is unknown to me.

(†) *Gymnochila* Kl. (*Tr. squamosa* Griff. An. Kingd. XV. pl. 60. f 3) is distinguished from *Trogosita* by having the eyes situate on the top of the head, and by the long lip: *Peltis squamulosa* Gebl. (Ledebour's Journey II. App. III. 97. 3) agrees with it in the form of the lip, but differs from it in having the eyes in the usual place: *T. decorata* has not the elongated lip, else the three species (?) would agree in appearance, and in the scaly covering of their bodies. *Trog. varia* F. would also belong here.

(‡) In Klug's "Annual of Entomol." I. 179, 15. (*Hist Cyanens.* Payk, Mon. Hist. 56, 40, t. 5. f. 2.)

(||) There is still some uncertainty as to the definition of the genera *Attagenus* and *Megatoma*, which would be remedied by abolishing the latter name altogether:

derma(*). In the family of *Byrrhæ,* the forms peculiar to our northern hemisphere are replaced by the genus *Microchætes* Hope, (†) which has enriched our collection with one new species. The genus *Limnichus* is found in every zone ; one new species from Van Diemen's Land is extremely similar to our European *L. versicolor,* Waltl. (riparius Dej.)

Of the family of *Hydrophilæ,* the waters of Van Diemen's Land probably contain some species ; for it is a family distributed nearly equally throughout the different zones ; the rivers and lakes of New Holland, however, have as yet been but little examined ; we know of only one genus, *Cercyon,* which is found everywhere.

Of the *Lamellicornæ* :—A continent destitute of the larger Mammalia, cannot be expected to produce the more important forms of *Coprophagæ ;* thus, while America on the one hand, Africa and East India on the other, are rivals in the number, importance, and the peculiarities of their genera ; New Holland presents few that are valuable, and Van Diemen's Land possesses only *Onthophagus* and *Aphodius,* both widely distributed, and rich in species ; of the former genus we have six, of the latter one species, all new, and some remarkable ;—one, *Onthophagus* (*pronus*) has an unarmed head, but a long, spear-shaped horn issuing from the neck-plate, (of the male) and projecting beyond the head in a straight direction. In another species the unarmed head (of the male) is compensated for by longer fore legs.

Attagenus would then be a fitting name for *D. pellio : Tiresias* for *D. serra,* and a new name must be found for the third genus, now known in England as *Megatoma.* Meanwhile, however, I shall employ the English definition. *Megatoma* distinguishes itself from *Attagenus,* by the front edge (Rande) of the Prosternum occupying (?) the mouth. Neither Stephens nor Heer, who have adopted the generical definitions of the English, have characterised them rightly ; hence they confine these definitions to *M. undatum,* although *D. emarginatus* Payk. and *D. nigripes* F. belong here.

(*) The characteristics of *Trogoderma* are not so much the number of joints in the clubbed antennæ, as in their cavities on the under part of the neck plate, which are wanting in *Megatoma.* The form of the antennæ is different in the different species, those of V. D. Land, are only three-jointed, and club-shaped.

(†) Trans. of the Entomol. Soc. of London I. p. 12. The species here described is

Of the group of *Trogidæ*, I have to mention a most remarkable and rare insect, it is the *Scarabæus proboscideus* Schrieb. (*) from which MacLeay formed the genus *Elephastomus* (†). Doubtless modifications occur in the length of the horn and the snout shaped prolongation of head-plate, not in this male only, but in all Lamellicorn males, according to the size and form of the individual; these being dependent on the amount of nourishment received by the larvæ; the insect, therefore, which was described by MacLeay (‡) as a *female*, having a blunter horn, a shorter snout, and a slightly marked vertical appendage (fortsatz) must be a less perfectly formed *male*: the real female is a true *Bolbocerus*, viz.—*B. Australasiæ* Kirby (§), with the exception of the sexual distinctions, it agrees accurately with *Elephastomus proboscideus*, and, like this, is to be found in our collection. It follows, therefore, that *Elephastomus* must not be regarded as a distinct genus, but as an erratic form of *Bolbocerus*, in which the irregular formation of the mouth parts, especially the elongation of the palpi, depends on the particular position of the mouth: and this again on those parts which protect the head.

The widely distributed genus *Trox*, is represented in Van Diemen's Land by *Trox Australasiæ* Latr.

The collection contains two species of the family *Dynastidæ*, both of which belong to forms peculiar to New Holland: one is a new species of the genus *Cheiroplatys* Kirby (||); the second forms a distinct genus,—*Pimelopus*.

distinctly different from our own. To this genus belongs also without a doubt *Byrrha Australis* Dej., which however is too imperfectly described by Boisduval (Faun. de l'Ocean, p. 149) to be recognised as a third species.

(*) Transact. of the Linn. Soc. vi., p. 189.

(†) Horae. Entom. I., p. 121.—Griffith's Animal Kingdom, xiv., pl. 40, f. 4.

(‡) Ibid, p. 122.

(§) Trans. Lin. Soc., XII., 462, 11, T. 23, f. 5.

(||) Hope, Coleopterist's Manual, i., p. 84. Besides *Geotr. truncatus*, (considered to

Van Diemen's Land furnishes one new species of the genus *Cryptodus* MacLeay (*), the systematic arrangement of which occasions so much difficulty (†).

The *Melolonthæ* forwarded from Van Diemen's Land all belong to genera peculiar to New Holland. *Anoplognathus* appears to have its chief habitat on the Continent:—only one species, *A. suturalis*, Boisd (‡), has been sent to us from Van Diemen's Land. Four new genera occur between *Melolontha* and *Serica*; they agree with the former in having a distinctly marked lip, with the latter in other peculiarities, particularly in the form of the maxillæ, which have a palate, but a sharpened and unarmed point. *Silopa*, containing no less than eight new species, whose number in time will increase materially, is easily recognized by the projecting upper edge of the lip. *Nepytis*, founded on a single species, is distinguished by having only seven antenna-joints, an example I believe to be unparalleled in the entire division of the *Melolonthæ*. *Scitala* has eight antenna-joints, also a rare occurrence. *Telura*, with the usual number of nine, is distinguished by the unusual length of the third joint.

Of the genera already known, *Diphucephala* affords us two species *D. splendens* (MacLeay) (§) and *D. pulchella* (Kirby:) (‖) *Liparetrus* (¶) presents one new one, very similar to *L. sylvicola (Melol. sylvicola F.)* *Phylloctocus* (**) presents *Ph.*

be its type,) this genus contains the species : *Scar. latipes* Guer. Voy. d. l. Coquille Zool. II. 2. p. 80. Atl. Ins., pl. 3, f. 1. Boisd. Faun. de l'Ocean, 163, 3,—and probably also *Sc. porcellus* Boisduval a. a. O. 164-5.

(*) Horæ. Entomologicæ i., p. 138.

(†) Compare the sixth series of this Archive, vol. 2, p. 249.

(‡) Faun. de l'Ocean, 178-14.

(§) Cpt. King's Narrat. of a Survey of the Intertrop. and West. Coasts of Austr. ii., 440, 15.—Waterhouse Transact. of the Ent. Soc. of Lond. I., 220-6.

(‖) Waterhouse ibid, 221-7.

(¶) Guérin, Voyage de la Coquille, Zoologique, II. 2, p. 90.

(**) Fischer Mem. de la Soc. Imp.des Nat. de Moscou, VI., p. 255. It is identical with the genus *Macrothops* MacLeay, but this name must be subordinate to that of Fischer as it was given subsequently.

MacLeay Fisch. (*) and one new, analagous species.

The *Melitophilæ* must be rare in Van Diemen's Land, as compared with the Continent; our collection does not contain a single species.

The *Lucanidæ* present much that is remarkable.

Two species of *Lamprima* appear in Van Diemen's Land, *L. fulgida* Boisd. and a new one (†) : *Dorcus* presents *D.cancr-*

(*) The same, t. 25, f. 2.—*Macrothops præustus* Dej. Boisd. Faun. de l'Ocean, 210-1.

(†) In Guerin's Revue, Zool., 1841, p. 50, Mr. Reiche declares all the species of *Lamprima* hitherto known, particularly those arranged by MacLeay, to be merely varieties of one and the same species, whose general and specific characteristic is the three-cornered shape of the one point on the front of the leg, (in the male.) I cannot decide how far this opinion respecting MacLeay's species is correct, for I know them but slightly; but after a careful examination of a number of specimens in our own collection, I have come to the conclusion, not only that several species are there distinguishable, but also that all these species are different to *L. ænea,* (Lethr. æn. F.) so carefully described by Schreiber: they differ in the proportions of the body, in color,—which is not nearly so varied, as it is supposed to be by the French (on Lesson's Authority, s Boisd. Faun. de l'Ocean, p. 231)—in the markings, especially those on the wing-cases of the female, and the direction of the projection of the Mesosternum, in the following manner:

One point on the front of the leg of the male axe-shaped.

L. Latreillei. Sterni mucrone acute prominente, viridis, nitida, capite rufo-aureo.

Mas.—Thorace sparsim subtiliter punctato.

Fem.—Thorace *fortiter* crebreque punctato,elytris fortius crebrius-que punctulatis.

MacLeay. Hor. Ent. i, 101-2.—*Lamp. ænea* Boisd. Faun. de l'Ocean, 228-1.—*Lucan æneus* Donov. Ins of N. Holl. fig infer.

The Mandibles of the male longer than in 3 and 4 : the edge of the tip, particularly in the large specimens, rimmed: the wing-cases, as compared with the neck-plate shorter than in the other species. Donovan has figured this species unmistakeably, and Mac Leay follows his authority.

(‡) *L. splendens n. sp.*

Sterni mucrone acute prominente,viridis,capite,thorace elytrisque supra purpureo-aureis.

Fem.—Nitidissima, thorace crebre fortiterque punctato. elytris parce subtiliterque punctulatis.

Similar to the female of the former species, excepting in colour, which is of a reddish golden hue on the back of the neck-plate, and of a deep copper gold on the wing-cases; these are rather longer than those of *L. Latreillei,* simple, and covered with minute punctures scarcely visible to the naked eye. The male is not yet known.

(§) *L. fulgida.*

Sterni mucrone recte truncato, viridi-cuprea, thorace obsolete canaliculato.

Mas.—Viridi-auratus, subnitidus, thorace crebrius, subtiliusque punctulato.

Fem.—Viridi-cuprea, nitida, tibiis, tarsisque chalybeis, thorace creberrime fortiter punctato, elytris fortius crebriusque punctulatis.

Boisd Faun de l'Ocean, 231-2.—*Lucanus ænus var.* Don. Ins. of N. Holland, (fig. super.)—*Lucan æneus var.* Schreib. Transact. Linn. Soc., vii., p. 117, t. 19, f. 9-14—*L. aurata* MacLeay Hor. Ent. I., 100-1.

oides (*) and *D. obtusatus* (†). *Ceratognathus* Westwood (‡) and *Syndesus cornutus* (§)are forms peculiar to this island. *Passalus* presents only one species, *P. hexaphyllus* Latr. (||).

Of the family *Melasoma* (belonging to the *Heteromeræ)* but one insect appears; it is *Silpha lævicollis* Fabr., of which none but Fabricius (¶) and Olivier (**) make any mention, I must therefore form it into a separate genus *Saragus.* A genus described by Dejean as *Cestrinus,* is nearly related to *Opatrum,* but separated from it again by its crippled (small) wings, and a few other characteristics: two species of *Cestrinus* appear both in Van Diemen's Land and on the Con-

The edge of the tip of the mandibles is not rimmed, even in the largest specimens; the wing-cases, as compared with the neck-plate are a little longer than in *L. Latreillei;* Mac Leay appears to have confounded both species with *aurata* and *Latreillei* but Donovan's plate is very accurate.

L. rutilans. Prosterni mucrone prominente, obtusiusculo, rubrocuprea, thorace obsolete canaliculato.

Mas.—Subopacus, thorace crebrius subtiliusque punctato.

Fem.—Nitida, thorace creberrime fortiterque punctato, elytris parcius subtiliusque punctulatis.

The mandibles as in the last species; the male is distinguished by its color, the female by the scarcely visible punctures on the wing-cases, these are a little longer as compared with the neck.

L. ænea MacLeay Hor. Ent. I., '101-3.—*Lucan æneus* Schr. [Transact. Linn. Soc. VI, 185-7, t. 20, f. 1. *Lethr. æneus* Fab. Syst. El. I., 2, 2, from Norfolk Island: with the exception of the spined thigh it appears to resemble mostly the following species; it resembles this also in the structure of the mandibles (compare Schreib. a. a. O. t. 19, f. 1-3.

* Termination of one spine of the front thigh of the male knife-shaped.

L. viridis (n. sp.) Prosterni mucrone recte truncato, viridis, nitidula.

Mas—Thorace vage subtiliter punctato. The hinder thighs have also a different form from those of other *Lamprimæ;* they are rather longer and thicker, but equally thick throughout, whereas in other *Lamprimæ* the point is somewhat broad. A second species of this division would be *L. Micardi* Reiche (a. a. O.)

L. pygmæa MacLeay, a. a. O. 101-4, is perhaps an eighth species, unknown on the Continent: it belongs probably to the first division.

(*) *Lucanus cancroides,* Fab. Syst. El. II., 239, 12. Oliv. Ent. I., 1, 18, 12, t. 4, f. 11 Boisd. Faun. de l'Ocean, 234, 1. *Dorcus cancroides* Westwood Entom. Mag, V. p. 267.

(†) Westwood Entom. Mag. V., p. 267.

(‡) Ditto, p. 260.

(§) MacLeay Hor. Ent. I., p. 104. Boisd. Faun de l'Ocean, 240. *Sinodendron cornutum* Fab. Syst. El. II., 377, 2, *Lucanus parvus* Donov, Ins, of N. Holland.

(||) Boisd. Faun, de l'Ocean, 241, 1,

(¶) Syst. Ent., 73-7, Syst, Eleuth, I., 338, 8,

** Ent. II. 11, 12, 9, t. 2. f. 15.

tinent. *Upis* and *Tenebrio,* so widely spread over the whole earth, are the only genera of this division not peculiar to N. Holland. *Upis* (and of this the insects having square neckplates, included by Dejean under *Iphthinus)* has sent one new species; *Tenebrio* two new species, and *T. Australis* Mac Leay? (*). *Heleus* has not, as yet, sent any species, although its presence in Van Diemen's Land may be reasonably supposed: of the analagous, but less remarkable genus *Cilibe* Latr. (†) one new species has been forwarded. *Adelium* is well known as being peculiar to New Holland: our collection contains four species; three of which are new, the fourth is known as *A. abbreviatum* Latr. (‡). Nearly allied to *Adelium* is a new species of a new genus *Olisthæna;* and *Pachycœlia* also, of which the only species *P. sulcicollis,* (§) Dej. is one of the commonest insects in Van Diemen's Land. The new genus *Helops* assimilates more with the *Stenochiæ,* and is represented by two new species of the name of *Titæna.*

One single species of a new genus *Ulodes,* is related to *Boletophagus.*

The remaining *Heteromeræ* belong to more widely distributed forms; as *Lagria grandis* Schônh, (‖) two new species of *Anthicus,* one of *Mordella.* Of the family of the *Cantharides* we have but one single insect *Tmesidera rufi-*

(*) Boisd. Faun. de l'Ocean, 254, 1.

(†) Dejean Catl. des Coleopt. 3me, ed. p. 208, *Celibe.* Boisd. a. a. O. p. 262. Here belongs Kirby's *Heleus piceus,* Transact. of the Linn. Soc. XII. p. 468, where also the characteristics of the genus are given.

(‡) Boisduval, a. a. O. 281, 11.

(§) Boisd. Faun. de l'Ocean, p. 246, Voy. de l'Astrolabe, Ins. pl. 7, f. 5. Westwood in his Arcana Entomologica n. III. p. 44, t. 12, f. 4, under the name *Lepispilus sulcicollis,* Hope, has given a much more satisfactory representation of this insect, and an analysis of its generic distinctions, but he has omitted the mention of a very characteristic incision in the centre of the tongue.

(‖) Synonym. Ins. III. App. 9. 9. *Lagria rufescens* Latr. Boisd. Faun. de l'Ocean, 286. 1.

pennis Westwood,(*) which, though peculiar in form, is not sufficiently so to warrant its generic separation from *Zonitis*. (†) Of *Œdemeridae* one *Œdemera punctum* MacLeay (‡) belongs to Dejean's genus *Nacerdes*; (§) two others belong to *Pseudolycus* Guér. (‖) one being *Ps. hæmopterus* Guér. (¶) the other *Lycus hæmorrhoidalis* Fabr. (**) And lastly, a new *Salpingus* assimilates pretty closely to its European generic allies.

The *Curculionæ* of New Holland present mostly peculiar forms, few being more widely distributed. Although no species of the rich genus *Bruchus* have as yet been forwarded to us, it is highly improbable that they are entirely wanting in New Holland, because in other parts of the world they invariably accompany papilionaceous plants, and these occupy an important position, both in New Holland and Van Diemen's Land. Three new *Anthribi* belong to small species; two, to the universally distributed genus *Tropideres*, one of remarkable formation assimilates in its most important characteristics to *Anthribus*. One small new *Rynchites*, with antennæ turned in at the base of the proboscis, presents much affinity to European forms, and is regarded by Schonherr as a distinct genus, *Auletes*. The genera *Rhinotia* and *Eurhynchus*, both limited to New Holland, are represented,

(*) Guer, Mag. de Zool., 1841. 12 e. Livre. Ins. pl. 85. The male antennæ are nearly as long as the body; the third to the seventh joint rather broad. A remarkable variety has black wing-cases, with the exception of the base, and the outer edge.

(†) The species mentioned above has blunted palpi, a very similar species of New Holland agrees in this respect with *Zonitis*.

(‡) Captain King, Narrative of a Survey, etc., II. 443, 43.

(§) It is identical with *Nacerdes palliata* Dej. Catl. Col. 3 ed. p. 250.

(‖) Ann. de l'Soc. Ent. d. Fr. II. p. 155. Guerin mentions three other species of this (assumed) genus, one from Port Jackson, and two from Kangaroo Island.

(¶) The same.

(**) I have seen its type in the collection of Fabricius, and convinced myself, that he did not mistake it for the similarly coloured species of *Porrostoma, metriorhynchus* Guer.

the former by one, the latter by two new species. The trunk-beetles with short snouts and folded (?) antennæ which have been forwarded from Van Diemen's Land, belong exclusively to New Holland forms. Of *Gonipterus*, one known species, *G. gibberus* Dej. (*) has been sent: of *Amisallus*, a second new one: of *Prostomis*, *Pr. scutellaris* (†): of *Aterpus* two new ones: (of which one, *A. scoparius*, is nearly related to *A. cultratus*; the other, *A. rubus*, is the most important of the yet known species:) of *Pelororhinus* a second new one: of *Rhinariæ*, which I prefer, placing here, rather than with the long-snouted beetles, also a new one; of *Amycterus*, three species, two new, and one the real *A. mirabilis*. (‡) The remaining trunk-beetles of this division, though unimportant, form three new genera, one of these, *Steriphus*, is most nearly united to the European *Plinthus*; the other two *Nothrodes* and *Mandalotus* belong to the group *Otiorhynchæ*, and have most affinity with *Tyloderes*: our collection contains four species of *Mandalotus*, and one each of the other two genera.

Of the trunk-beetles with folded antennæ and long snouts, the genus *Orthorhinus*, peculiar to New Holland, presents us with three species, viz. *O. Klugii* Hope, (§) and two new ones; the more widely spread genus *Erirhinus* has sent one remarkable new species. One small Bagous-like

(*) Boisd. Faun. de l'Ocean, 324, 8. Schonh. Gen. et Spec. Curc. VI. 463. 5.

(†) Schonh. Gen. et Spec. Curc. I. 504. 1. *Curcul. scutellaris* Fab. Syst. Eleuth. II. 519. 71. Oliv. Ent. V. 83, 393, 475, t. 12. f. 142, t. 19, f. 420. Herbst. Beetles. VI. 312. 286, t. 84. f. 10. *Curc. exsertus* Fabr. Syst. El. II. 534. 163.

(‡ *Psalidura mirabilis* Kirby, Transact. of the Linn. Soc. XII. 469, 21, t. 23, f. 9. *Amycterus mirabundus*, Schonh. Gen. et Spec. Curc. II. 471. 2, Schonherr describes the female only; his *A. mirabilis* is another somewhat larger species, of which the male has a cork-shaped appendage to the thorax; this appendage is wanting in Kirby's species. A fine specimen of this trunk beetle might be thus described; Fusco squamulosus, thorace vitta laterali lineaque media tenui cinerieis, elytris nigro-cinereoque tessellatis.

(§) Schonh. Gen. et Spec. Curc. III. 246. 3.) In one beautifully coloured specimen the band of the wing-cases is snowy white in the centre, the terminating point of the wing cases is either fawn-coloured or white.

trunk-beetle presents all the characteristics ascribed by Schônherr to his genus *Notiophilus.*(*) One of the most remarkable and peculiar forms is *Rachiodes spinicollis* Schonh. (†) : three other less remarkable insects of this division form an equal number of new genera; of these *Cryptoplus* is related to *Anoplus; Meriphus,* with much of the appearance of *Anthonomus,* is closely allied to *Erirhinus;* and *Diapelmus,* with exactly the appearance of *Erirhinus; Dorytomus* is intimately connected with *Anthonomus.* The group of *Cryptorhynchi* appears to be very extensive, and presents unmistakeable American forms: of thirteen new species eight belong to *Cryptorhynchus;* three to *Acalles;* two, having the snout-groove not closed behind, form new genera, of which one, *Melanterius,* corresponds to the American genus *Chalcodermus;* the other *Cyllorhamphus* stands apparently in a similar relationship to *Cyphorhynchus* Sch. but in reality it belongs to a different division.

We have not received any species of the group *Calandræ* so widely distributed elsewhere: the *Cossonidæ* have afforded us two new species of *Rhyncolus.*

To this family belong also the bark-scarabs of two new species received by us, one is a *Tomicus (Bostrichus* Fabr.) and the other belongs to the genus *Cryphalus* (‡), of which hitherto, with the exception of *Cr. tiliæ,* we were acquainted only with European, pine-inhabiting species.

The number of Latreille's *Xylophagi* will be much reduced by the absence of the bark-scarabs, of the *Apate* with *Lyctus,* the *Trogositæ* with *Rhyzophagus* and *Nemosoma,* the *Lathridii* with *Dasycerus Monotoma* and *Paussus,* all of

(*) This name cannot be employed, on account of the similarly called *Carabus* genus, we might change it to *Notionomus.*

(†) Gen. et Spec. Curc. III. 362. 1.

(‡) Second yearly volume of these Archives, Part I, p. 61.

which have been or will be separated from them : on the other hand, however, they will be enriched by the addition of *Sarrotrium* and the analagous genera *Corticus* and *Coxelus ;* these have four joints in each foot, and assimilate with *Diodesma,* which Latreille has already rightly numbered among the *Xylophagi.* They approach most closely to *Colydium, Synchita,* and others (*) : one of the connecting forms is *Meryx rugosa,* (†) a native of V. D. Land, and not of the East Indies, as Latreille asserts. Insects having feet similar to those of the *Heteromeræ* are not entirely excluded from this family, as is shown in a species of a new genus, *Latometus,* which maintains a central position between *Sarrotrium* and *Synchita.*

A third species belonging to this division is nearly related to our *Cerylon histeroides ;* I have formed a new genus, *Pycnomerus,* for it and several other species, of which some are American. A fourth new Van Diemen's Land species of this division belongs to *Dïtoma.*

Van Diemen's Lànd has afforded us some interesting species of *Cucujus,* another family of the *Xylophagi:* the most important is a new genus, *Platisus,* which is most intimately connected with *Cucujus,* both in size, form, and the difference of the foot-joints in the two sexes : it is founded on a single species, represented in our collection by specimens of both sexes. Two other species of this family belong to the widely spread, though not rich genus *Brontes ;* a third to *Dendrophagus,* its position being determined by the antennæ joints ; and lastly, we must include *Silvanus,* of which our collection has received a new species, slightly differing in form from its type.

(*) I hope to give a further account of the stematic relations of these insects in the next volume of my "Insects of the Mark of Brandenburg."

(†) Latreille Genera Crust. et Ins. III. p. 17, t. 11. f. 1.

The group of *Prione*, in the family of *Cerambycinæ*, sends us two species: one, a new one, belongs to the genus *Macrotoma*, which is found in Southern Europe, the East Indies and New Holland, but principally in Africa: the other, described by Fabricius as *Prionus arcuatus*, forms a distinct, and in many respects a remarkable new genus, *Oncinotus*.

The group of *Stenocoridæ* occupies a prominent position among the *Cerambycinæ*: the typical form, which still retains the generic name, *Stenocorus* (*), has afforded us one new species, Hope's *St. longipennis* (†) and *assimilis* (‡) from the division having 2 spined antennæ, neck-plate and wing-cases, *St. elongatus* (§) and *rhombifer* (||) from that having a jagged neck-plate, and *St. scutellaris* (¶) from its having jagged neck-plate, antennæ not spined, and wing-cases rounded at the tip. Of the genera allied to *Stenocorus* we have received Hope's *Trachelorachys fumicolor* (**), *Meropachys MacLeayi* (††), *Scolecobrotus Westwoodii* (‡‡), and a new species. The group of *Callidiæ* presents one form peculiar to

(*) Hope, Transact. of the Zool. Soc. I. p. 107. Newman, Annals of Natur. Hist. V, p. 17, calls it *Phoracantha*, Dejean includes it under *Mallocera*.

(†) Hope, Proceed. of the Zool. Soc. 1840. p. 47, 3. *Phoracantha hamata* Newman Entomologist, 1841. p. 3, is only a variety; one of the specimens sent in comes very near to it, but it is deficient in the dark, transverse marking.

(‡) Hope, Proceed. of the Zool. Soc. 1840, p, 49, 11. *Phoracantha allapsa* Newman, Entomologist 1841, p. 4. Hope, (a. a. O. p. 47, n. 6, 7) assigns also *St. Obscurus* and *punctatus* Don. Epit. of the Ins. of New Holland to Van Diemen's Land.

(§) Boisd. Faun. de l'ocean, 478, 6.: *Stenochorus uniguttatus*, (MacLeay,) Hope, Proceed. of the Zool. Soc., 1840, y. 49. It seems widely distributed, as Hope obtained it from Swan River.

(||) Hope, Proceed. of the Zool, Soc. 1840, 49. It resembles the smaller specimens of the former species, but is distinguished by the situation of the spots, and the very short, scarcely visible spine at the extremity of the wing-cases.

(¶) *Callidium scutellare* Fabr. Syst. Eleuth. II. 538, 26. *Nov. Gen. piceum*, Newman, Entomologist, 1841, p. 9. I am surprised that Hope does not mention this beetle, as it is not by any means rare.

(**) Hope, Proceed. of the Zool. Soc., 1840, p- 51. Hope is of opinion that his second species also. *Tr. pustulatus*, comes from Van Diemen's Land, (Hobart Town.)

(††) Hope, ditto, p. 52.

(‡‡) Hope, Transact. of the Zool. Soc. I. p. 109, t. 15, f. 5. Proceed. of the Zool. Soc.

V. D. Land: though resembling *Hespherophanes* Dej. in appearance, it differs from it in some characteristics, and is arranged by Newman as the genus *Phacodes* (*) ; one of its species *Ph. obscurus* (†), was brought home by Banks, a second is new. The group of *Stenopteræ* affords one new genus, *Mecynopus*, remarkable for the great length of its antennæ and hinder legs.

The paucity of *Lamia* is remarkable; it presents but one species of the genus *Zygocera*, peculiar to New Holland. *Saperda* is equally limited to one, (unusually small) species, which forms the new genus *Illæna*. The group of *Lepturæ* is represented in New Holland by *Stenoderus:* our collections contain only the known species *St. abbreviatus* (‡) and *ceramboides* (§).

Of the *Chrysomelinæ*. We have not received as yet a single species of the groups *Eupoda* and *Cassidaria;* we must not, however, thence infer that these divisions, though represented in New Holland by but few species, are entirely wanting in Van Diemen's Land: certain it is, that New Holland cannot compare with South America in the number of its *Cassidi*. Among the *Chrysomelæ*, the genus *Paropsis* Ol. (*Notoclea*

1840, p. 33. Hope brings forward also *Uracanthus pallens*, (Proceed. of the Zool. Soc., 1840, p. 53.) and Newman, *Amphirhoe decora*. (Entomologist, 1841, p. 25.) as natives of Van Diemen's Land.

(*) Newman, ibid, p. 7. The third and fifth antenndæ joints are described as having one spine at the tip, but this is scarcely correct.

(†) *Callidium obscurum*, Fabr. Syst. Eleuth. II. 333. 1. Olivier, Ent, IV. 70, 9, 7. 4, f. 45. *Phacodes lentiginosus*, Newman, Entomologist. 1841, p. 8. It is strange that in London an insect is described as new, which must be found in Banks' Cabinet.

(‡) *Cerambyx abbreviatus*. Fabr. Syst. Eleuth. II. 275, 44. *Stenochorus suturalis*, Olivier, Ent. IV. 69, 29 25, t. 3. f. 29.

(§) *Leptura ceramboides*, Kirby, Trans. of the Linn Soc., XII. 472, 25, t. 23, f. 11. MacLeay (King's Narrat. II. 451, 87.) considers both insects to be one and the same the differences being merely sexual; but this is scarcely probable. Newman is also of the same opinion, (Entomologist, 1841, p. 35.

Macrones exilis, is a Van Diemen's Land insect, nearly allied to *Stenoderus*, Newm. Entomologist, 1841. p. 35.

Marsh, (*) peculiar to New Holland, is of great importance in the Fauna of Van Diemen's Land; among seventeen species sent in we distinguish *P. morio* (†), *rufipes* (‡), *lineata* (§), and *notata* (‖), the remaining new ones are described below; among the smaller species, several resemble the *Casidi,* in having the wing cases ornamented with shining, golden, silver, or mother-of-pearl coloured markings; which though they disappear after death, can be restored temporarily by means of moisture.

The genus *Chrysomela* as hitherto described, is divided in Dejean's catalogue into a series of genera, of which, for example, *Zygogramma* is formed merely from a certain similarity in its markings; it must nevertheless be divided into several parts, these to depend on the form of the palpi and clams. *Oreina* must not be separated from *Chrysomela,* though irregular in the shape of the last palpi-joint because this and other extreme forms will be connected by intermediate series. Other genera will be more easily and

(*.) Olivier counts fourteen; Marsham twenty-four; Boisduval in the Faun de l'Ocean, twenty-five; Dejean, in his last catalogue, twenty; (this is with the exception of two Siberian species that do not belong here) our own collection, though not particularly rich in the insects from New Holland, numbers fifty-seven species, how many more must be found in English collections to which the natural productions of New Holland find so easy an entrance!

(†.) *Chrysomela morio* Fabricius Syst. Eleuth. I. 308. 5. A more faintly colored variety is not uncommon; it is reddish brown on the upper part of the body, and has narrow black streaks on the wing-cases,

(‡.) *Chrysomela rufipes* Fabricius I. c. 430. 41.

(§.) *Notoclea lineata* Marsham Transact of the Linn. Soc. IX. 293. 19. t. 25. f. 19. The streaks on the wing-cases are more yellow than red.

(‖.) *Paropsis notata* Olivier, Entomol. V. 92. 13. 14., pl. 1., f 14.

naturally arranged, as, for example, *Australica* Chevr. (*) a form limited and peculiar to New Holland. *Ch. Curtisii* (†) and *Ch. maculicollis* (‡) have been forwarded from Van Diemen's Land. Another peculiar form with two species, *Chr. constricta* and *pacifica* has some resemblance to our *Helodes* in the pointed palpi ; but differs from it in the clams, which are toothed at the root. A third widely distributed form is Dejean's *Phaedon,* which also presents two new species.

Of three new *Colaspi,* not one is peculiar to New Holland ; one belongs to the typical genus *Colaspis,* so remarkably numerous in America, though deficient in other parts of the world : the other two belong to the genus placed by Chevrolat in Dejean's catalogue under the name of *Odontionopa ;* it is easily distinguishable by an appendage resembling two little teeth, which is affixed to the anterior part of the head.

Among the *Cryptocephali,* the form now regarded as typical, and which is more or less universally distributed,

(*.) This genus has the palpi and the simple bands of the typical *Chrysomelæ*, but its claws are strongly toothed to within a short distance of the tips. The antennæ are compressed from the sixth joint upwards. With respect to the name we should scarcely imagine that another branch of Zoology contains a similar one ; and yet Lesson has an *Australasia* : Entomologists however, reject this name for the insect genus, as do ornithologists for the parrot genus (*Trichoglossus Horsf.*), Hope (*Col Manual* III, p. 166.) proposes for this Chrysomela-form the new appellation of *Calomela,* a name which would always remind us of calomel.

(†.) *Chrysomela Curtisii,* Kirby, Transact. of the Linn. Soc. XII. 473, 26, t. 23, f. 12 Boisd. Faun. de l'Ocean, 577, 1:

(‡.) *Chrysomela maculicollis* d'Urv. Boisd. ibid, 578, 3.

is not wanting in New Holland, though Mr. Schayer's collections do not contain a single species. I do not know of any New Holland species of Dejean's genus *Pachybrachis,* which is distinguished by the mouth not being covered by the anterior edge of the Prosternum; in America it is particularly rich in species, and found occasionally in the three other continents also. On the other hand, New Holland possesses some peculiar forms; one of which corresponds with the genera *Cadmus* and *Odontoderes* of Dejean's catalogue, and is distinguished by its broad feet, thickly furred on the under side, with the terminal joint scarcely issuing from beyond the third joint, as in *Cassida.* Here belongs also the Van Diemen's Land *Cr. Australis* Dejean (*.)

A second form is *Ditropidus* Chevr. whose deviations from *Cryptocephalus* are as follows :—

The neckplate is deeply hollowed behind on either side; the central segment extends in between the wing cases, and is cut out at the smaller extremity for the reception of the point of the little plate. The little plate is oblong, narrow, pointed at each end, not prominent. The Prosternum terminates at the mouth without forming a projection, as in the typical *Cryptocephali.* The eyes are but slightly rimmed internally. The feet short and broad; the claw limb pro-

(*.) *Cryptocephalus Australis,* Boisd. de l'Oceau, 584, 1. In this description the prevailing color of the wing-cases is said to be a pale red, whereas it is in reality of a bright golden yellow. On this species is founded the genus *Odontoderes,* Chevr. I do not know how this latter is distinguished from *Cadmus,* to which also *Cr. rugicollis*, Gray An. Kingd. XV, pl. 67, f. 5; *rubiginosus,* Boisd. a. a. o. 587, 5; *crucicollis,* Boisd. a. a. o. 585, 2, belong. The toothed lateral edges of the neck-plate, to which the former name seems to allude, belong also to most of the species of *Cadmus.*

jecting but little from between the segments of the third limb; the antennæ moderately long, thin, the last joints rather broad. A new species from Van Diemen's Land, with two New Holland species, is described below.

Of *Galeruca* only one new, wingless species has been found. Of *Halticæ* three species, one of which, *H. (Graptodera) corusca* is nearly related to our *H. oleracea* (*), the second is a new species belonging to *Psylliodes*, a genus limited almost exclusively to Europe; the third species is also new, and it belongs to the genus *Arsopoda*, (†), which is peculiar to the Fauna of New Holland.

The family of *Erotylidi*, which unites so naturally with *Chrysomela* on the one hand, and with *Coccinella* and *Endomychus* on the other, contains besides those forms arranged under *Erotylus*, *Triplax*, and *Languria*, also *Engis*. Why Dejean's genera *Encaustes* and *Episcapha* have been separated from this family, I cannot tell; they agree with it in the formation of the feet and palpi, more closely than *Engis* does which has both simple feet and palpi and yet is rightly placed in this family. To *Engis* assimilate three new species, (I do not know any others,) of a Van Diemen's

(*.) A second species from V. D. Land is *H. Australis*, M. Leay; which Dejean places in his catalogue (with many other species) as a variety of *H. oleracea*.

(†.) Waterhouse (Transact. of the Entomol, Soc. of London II. p. 131) describes 16 species of New Holland *Halticæ*, but he does not define them very accurately or systematically One of them, *H. variegata*, is from V. D. Land; another is said to be nearly related to *H. nemorum*; a third belongs to *Psylliodes*, (*Macronema*). five are *Diboliæ* (?), but I think these last ought more properly to be classed with *Plectroscelis*, Chevr., one of the most widely distributed forms.

Land genus, *Thallis,* which differs principally in the shape of the tongue.

The proper position of *Phalacrus* has yet to be determined ; analogous forms of this genus appear to be distributed over the whole earth ; a new species from Van Diemen's Land is described below :—

Of the family of the *Coccinelli.*—Two varieties (*) of *Coccinella tricincta,* Fab. (†) have spread from the East Indies to Van Diemen's Land. C. *conformis* Dej. (‡) is common to Van Diemen's Land and New South Wales. A third species of the typical form is new. (§.) The genus *Scymnus* of which three species have been forwarded, assumes a larger, longer, and more flattened form in New Holland, than elsewhere. In other respects the New Holland species are not peculiar ; they have the same number (ten) of antennæ joints, which distinguishes *Scymnus* from other *Coccinelli,* (a circumstance, which, however, I do not find anywhere observed,)—only *Corylophus,* Leach, (||)

(*.) Syst. El. 361, 33. Schonh. Syn. II. 169, 42.

(†.) *a.* Rather smaller than its type, the connecting plate (Binde) behind the centre shortened, angularly bent.

b. Only half as large, the suture (Naht) broad and black ; the c. plates behind the centre not shortened, but more distinctly, angularly bent.

(‡.) Boisd. Faun. de l'Ocean, 604, 24.

(§.) This new species might belong to the *Micraspis* of Dejean's catalogue ; I have not however succeeded in determining any varieties of *Coccinella,* any more than of *Cheilomenes.*

(||.) Stephens Illustr. of Brit. Ent. II. p. 185.

Clypeaster, And. Latr. Regn. An. V. 162.

Cassyphus Gyll. Ins. Succ. II. p. 576. Latreille is the only entomologist who has a similar number of antennæ joints ; its species are mostly of an exceedingly small size, and are widely distributed. Van Diemen's Land has furnished two species described below.

The family of *Endomychidæ* presents a new genus *Daulis* which is not peculiar to the Fauna of New Holland, but common also to that of South America.

The family of the *Lathridiæ* have furnished us with two species ; one, a real *Lathridius* is new and probably peculiar to Van Diemen's Land ; the other is *Corticaria gibbosa,* (Latridius gibbosus Hbst. Gyll.) without doubt, it wandered over originally from Europe.

In the family of *Pselaphiæ,* it is interesting to observe how great a similarity exists between the exotic and the indigenous species. The genus *Batrisus,* whose indigenous species live as guests in the nests of ants, appears to be the most widely distributed. Some species from the different parts of America and Southern Africa are already known, and a new species from Van Diemen's Land will be described below.

The new species and genera of Tasmanian Coleopteræ, forwarded by Mr. Schayer, are as follows :—

has rightly determined its systematic position ; (a .a. o.), but he is not correct in stating that the number of antennæ joints is only nine ; it has ten like *Scymnus*. It is with this genus that it presents the greatest similarity, particularly in the larger species.

1. *Calosoma Schayeri.*

Supra viride, nitidum, elytris dense punctato, striatis, subtilissime transversim rugosis punctisque impressis triplice serie.—Long. 10 lin.

Statura fere C. sycophantæ et minimis enis individuis æquale, supra totum laete viride nitidum. Antennæ piceæ. Palpi castanei. Mandibulæ transversim rugosæ. Caput subtiliter punctulatum. Thorax subcordatum brevis, basi utrinque profunde impressus, omnium subtilissime parce punctulatus. Elytra confertim punctato striata, interstitiis rugis subtilibus transversis imbricatis, 4, 8, 12 punctorum majorum serie interruptis. Corpus infra jam piceum jam castanæum, viridi relucens. Pedes picei, maris validi, feminæ sat graciles, tibiis intermediis maris fortius, feminæ levissime arenatis.

1. *Scopodes.*

Fam. Carabi. Trib. Pericalidæ.

Labrum elongatum, mandibulas obtegens.

Palpi filiformes.

Mentum dente medio nullo, lobis lateralibus brevissimis.

Tarsi postici elongati.

A small beetle resembling an *Elaphrus* in its large and protuberant eyes, but distinguished abso by its having front plates and the mandibles almost entirely covered by the labrum; these characteristics place it in the group of the *Pericalidæ* (Hope, Col. Manuel, II. p. 105.) The missing tooth in the rim of the mentum assimilate it with the *Pericalus* and *Beleoptenus*, (Nycteis Lap.) but it differs from these and all other genera of the same group in the shortness of the lateral segments of the chin, the size of the eyes, the shape of the neckplate, the length of the hinder feet, &c., and it forms a distinct and very peculiar genus. The labrum is rather longer than broad, a little notched at each lateral tip, and almost entirely covering the mandibles. The lateral segments of the chin are short and small, bent inwards : the anterior space smooth.

Comparatively speaking, the maxillary palpi are short; the second joint is rather short—the third very short, the fourth as long as (all) the rest put together, and pointed; of the labial palpi, the second joint is rather long and thick, cylindrical, the third rather shorter and thinner, pointed. The antennæ are short, reaching only to the base of the wing-cases; the first joint is rather thick, the second and third are thinner than the following ones, which are rather compressed. The head is broader than the neck-plate, the eyes are very convex and protuberant. The neck-plate is narrow and narrowing posteriorly, it is provided laterally, in front, with a tooth-shaped, angular projection, and at the hinder part, immediately before the base, with a very prominent sharp tooth. The wing-cases are rather broad, flat, slanting towards the tip, and somewhat hollowed. The feet are simple, thin, the hinder feet half as long again as the thighs; in the male the fore feet are rather broad.

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