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SOUTHERN
SCIENCE RECORD
AND
MAGAZINE
OF
NATURAL HISTORY
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. I.—No. 1.—New Series.
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Southern Science Record.

AND

MAGAZINE OF NATURAL HISTORY.

VOL. I.—(New Series.)

Miscellaneous Contributions to the Palæontology of the Older Rocks of Australia,

By Professor Ralph Tate, F.G.S., F.L.S., &c.

Rhynchonella Baileyana, *spec. nov.*

Shell transversely ovate-trigonal, subdepressed; dorsal valve regularly convex from the umbo to the middle, thence flattish to the front of the mesial fold, which is broad and not very prominent; the ventral valve is less convex, with a broad sinus of moderate depth, commencing at half the distance from the beak and extending to the front. The anterior fourth of each valve is plaited and circumscribed by a conspicuous fold of growth; there are seven plaits on the mesial fold and about four on each lateral area. The mesial fold occupies about one-third of the front of the shell, rising abruptly from the lateral areas. The beak is very small, moderately produced, with a minute circular foramen under its angular and slightly incurved extremity; foramen surrounded and separated from the hinge-line by a deltidium of two pieces. Length, 25; breadth, 18; thickness, 12 millimetres. Jemmy's Point, Gippsland Lakes. (J. F. Bailey).

The species is dedicated to the memory of Mr. John F. Bailey, of Melbourne, to whose enthusiasm for science he recently fell a martyr.

Fissurellidæa laqueata, *spec. nov.*

Shell narrow, ovately oblong, twice as long as wide; periphery slightly arched in the medio-lateral regions. Foramen in the posterior third, oval, large, contracted in the middle, excavated

behind. Ornament consisting of radial threads interrupted by discontinuous transverse threads giving rise to the appearance of trapezoid depressions, which are about 144 in number to each 4 millimetres square.

Major and minor diameters, 20 and 11; height, 6 millimetres.

Clays at Schnapper Point, Port Philip Bay, Victoria. (R. Tate).

This new species is very different from the other Australian Tertiary congener, *F. malleata* (Tate), which has close resemblance to the living *F. concatenata* (Crosse).

Genus Pelicaria—(Gray).

Of this genus, allied to *Struthiolaria*, having its head-quarters in the seas of New Zealand, only one species is known, namely, *P. scutulata* (Martyn), which inhabits the coast of New South Wales. *Pelicaria* differs from *Struthiolaria*, chiefly in the enamel-covered spire of the adult shell. The two fossil species, now to be described, do not differ in any striking manner from *P. scutulata*, but both are less turreted.

Pelicaria clathrata, *spec. nov.*

Shell ovate, spire acuminated, whorls 6 convex, suture linear or slightly impressed. Surface ornamented with numerous lamelliform rugæ, becoming confluent by twos and threes or more at the anterior third to form ridges, and by spiral threads about 10 in number. Last whorl quadrate, depressed in the medial part, with a row of small acute nodulations at the shoulder, and a thickened ridge at the periphery; ornamented with sigmoidal lamelliform rugæ and lines of growth which are cancellated by numerous longitudinal ridges. Callous-enamel spreading over the columella and body-whorl for two-thirds of its length and overlapping on the penultimate whorl. Length and breadth of shell, 28 and 22, of aperture 16 and 8 millimetres. (J. F. Bailey).

Cheltenham, Hobson's Bay.

Pelicaria coronata, *spec. nov.*

Shell ovate, spire acute, whorls 8, angled, suture impressed. Surface ornamented with transverse striæ and spiral ridges, and a row of small nodulations in the angle of the whorl. Last whorl sub-quadrate, slightly depressed in the middle line; angle without nodulations and separated from the suture by a broad and deep groove. Callous-enamel spreading over the whole of the body-whorl and the anterior half of the penultimate whorl.

The canaliculate suture of the body-whorl is peculiar.

Length and breadth of shell, 45 and 32; of aperture 23 and 14 millimetres.

Muddy Creek (J. Dennant); Jemmy's Point, Gippsland Lakes (J. F. Bailey).

Caloscala, *gen. nov.*

Shell turriculated, imperforate; whorls united, cancellated, and varieed; last whorl with a spiral rib at the base.

This new genus unites the characters proper to *Opalia* (H. and A. Adams), and *Cirsotrema* (Morch), having the basal rib and circular peristome of the former and the cancellated varieed whorls of the latter. It is constituted for the reception of two species belonging to the older Tertiaries of Australia and New Zealand, viz., *Scalaria lyrata* (Zittel), and *Caloscala Mariæ*, n.sp., which are representative.

Some of the Scalarias of the Paris Basin may belong here.

Caloscala Mariæ, *spec. nov.*

Shell turreted, about three times as long as wide, imperforate, whorls numerous, convex, suture deep; transversely ribbed and varieed, and longitudinally lirate. Ribs elevated, thin, subequal, from 14 to 20 in a whorl; varices usually conspicuous, about one in a whorl, sometimes as many as three on the body-whorl; liræ subacute, prominent, equidistant, about 10. Base carinated; peristome rounded, margin thickened; columella slightly expanded and projecting.

The posterior whorls are occasionally slightly angular and their ribs and varices are usually subspinose towards the posterior suture. In well-preserved specimens the ribs are frilled and rarely are multilamellate.

Length and breadth about 35, and height of last whorl 8; diameter of aperture, 8 millimetres.

Glauconitic limestones and polyzoal sandrock, Aldinga Bay; Muloowurtie clays, York-Peninsula; sandy clays, Adelaide bore; Gastropod-bed, River Murray Cliffs, South Australia; Corio Bay, Geelong. (R. Tate).

The species is named after my wife, who was the first to direct my attention to it in the sea-cliffs of Aldinga Bay.

Trigonia tubulifera, *spec. nov.*

Shell minute, quadrate; the flattish posterior area with about 16 thin radial ribs beset with truncate tubular projections; the remainder of the surface with about 20 concentric ribs similarly ornamented.

The tubular projections are short though conspicuous, and are separated one from the other by intervals not much wider than the tubes. Only two examples have occured to me—one, a left valve, from Schnapper Point, on which the two areas are well-marked, the other, a right valve, from Muddy Creek, has the anterior area so masked by the long tubular projections as to conceal the concentric arrangement of the ribs.

Length and height, about 5 millimetres.

PSAMMOBIA HAMILTONENSIS, *spec. nov.*

Shell shining, compressed; transversely elliptical, attenuated anteriorly and obliquely truncated posteriorly; sculptured with incised lines concentric with the margin, which become rugæ on the angulated posterior area.

The fossil closely resembles the living *P. zonalis*, Lk., from which it differs in being narrower, more attenuated anteriorly, and less abruptly truncated posteriorly. The post-dorsal line is not so straight, and the post-ventral margin is a little more ascending, so that the posterior margin is more attenuated and less abruptly truncated; the anterior margin is also more produced.

Length, 31; height, 15 millimetres. Common at Muddy Creek, Hamilton. (R.T.)

PSAMMOBIA ÆQUALIS, *spec. nov.*

Shell compressed; umbo central, depressed; transversely elliptic; attenuated anteriorly; roundly truncated posteriorly; sculptured with concentric closely arranged raised lines.

Length, 22; height, 11 millimetres.

Muddy Creek. (J. Dennant).

This species differs from *P. Hamiltonensis* by the absence of a posterior keel. Its representative in living creation is the British *P. tellinella*, Lk., from which it differs by its central or depressed umbo, compressed valves, more attenuated anterior margin, and rounded posterior margin.

FIBULARIA GREGATA, *spec. nov.*

Test ovate-ovoid, elongate, ventricose, sub-acuminated posteriorly; vent small, oblong, longitudinal to the axis of the test, close to the mouth.

Dimensions of a large specimen—Length, 13; breadth, 10; height, 10 millimetres.

This species differs from *F. oblonga* (Gray), recent off North Australia, in its more ovoid form and in being somewhat acuminate behind. This echinoderm seems to have been gregarious in its habit during the deposition of the glauconitic limestones of Aldinga Bay and the raggy polyzoal limestones of Mannum on the River Murray; it also occurs at Surveyor's Point and Muloowurtie, York-Peninsula; and at the River Bremer, below Callington.

LINTHIA ANTIAUSTRALIS, *spec. nov.*

It is difficult to express by words the characters which separate this fossil echinoderm from its living analogue *L. australis* (Gray), though it is easy to appreciate them when the two shells are examined side by side.

In *L. antiaustralis*, the test is much higher, and the sides are less tumid, and the base less angular; the apical area is very small and hardly sunken; the ambulacral zones are shallower, and the anterior pair is a little longer than the posterior pair, whereas they are of about equal length in *L. australis*. Moreover the angle of divergence of the posterior pair is greater in the fossil than in the living species, being 50° and 13° respectively. Diameters of base, 60 and 50; height, 40 millimetres. *L. australis* with equal dimensions of base, the height is only 34 millimetres.

"Calciferous sand-rock," River Murray Cliffs, Near Morgan. (R. Tate).

The Microscope and its Useful Applications.

By C. R. Blackett.

[An Address delivered at the Annual Conversazione of the Microscopical Society of Victoria, 27th November, 1884.]

The application of the microscope to the investigation of the obscure or hidden wonders of Nature is of modern date, and we may say that it is within the memory of many now living that its power, perfection, and value, have been attained. In the times before the Christian era, it is known that rude and imperfect magnifying glasses were used. It was in the year 1690 that Jansen invented the compound microscope; it was very imperfect and distorted all objects; it was only on the discovery of the achromatic lens by Dollond that it reached an advanced position among scientific instruments, and ceased to be what it was before, a mere toy. Even now, notwithstanding the beautiful perfection of the microscope, it is to be feared that it is too often more a plaything than an instrument of research. Certainly, even so, it is not to be condemned, because in most instances the person who, out of simple curiosity, without any definite scientific purpose, has once started in this fascinating study, will gradually find that to enjoy it fully it is necessary to select some field of useful investigation, and by a continuance in a carefully selected line of research the pleasures of the student and observer will be immediately enhanced by the consciousness that he is gaining knowledge which may be of service to his fellows, to say nothing of the intellectual advantage which always follows the study of Nature and her unchanging and unchangeable laws.

It is not necessary to describe the microscope. That has been done so well and so often, by such eminent microscopists, that it would be somewhat to tax your patience, and doubtless

most of the members of the Society are quite familiar with the subject. All that need be said is, "that an object to be magnified requires simply that it be brought near to the eye when first examined, but as the focal distance of the eye ranges from 6 to 14 inches—10 inches being the average focal distance—it follows that a limit to the magnifying power of the eye is attained whenever the object to be examined is brought so near. If, however, we blacken a card and pierce a hole in it with a fine needle, and then examine a minute object, as, for instance, the wing of an insect held about an inch from the card, we shall see it distinctly, and that, too, magnified about ten times its size. This is explained by the fact that the pin-hole limits the divergence of the pencil of rays, so that the eye can converge it sufficiently on the retina to produce a distinct impression, which is faint; and did not the blackened card exclude all light it would be lost. If we now remove the blackened card, without either removing our eye or the object under examination, it will be found that the insect's wing is almost invisible, the unassisted eye being unable to see clearly an object so close as one inch, thus demonstrating the blackened card, with the needle-hole in it, to be as decided a magnifying instrument as any set of lenses." The word "microscope" is derived from the Greek words *μικρὸς*, small, and *σκοπεω*, to see; that is, to see by its aid the indistinct or invisibly minute. As the telescope reveals the wonders of immensity, showing us the glories of the vast depths of the heavens, so the microscope opens to our vision the marvels of the infinitely little, and enables us to study the operations of Nature in regions once sealed from our gaze; and it matters not whether we contemplate the ways of the Eternal in the firmament, or in the minute organisms and form of earth, we shall, if true and reverent students, have our mental horizon enlarged, with its accompanying moral elevation. Let us even feel that spirit of loving dependence upon Nature expressed by the poet when he sang:—

"Nature, the old nurse, took
The child upon her knee,
* * * *
'Come away with me,' she said,
'Into regions yet untrod,
And read what is still unread
In the manuscripts of God.'

And he went away, and away,
With Nature, the dear old nurse,
Who sang to him night and day
The rhymes of the Universe.

And whenever the way seemed long,
Or his heart began to fail,
She would sing a more wonderful song,
Or tell a more marvellous tale."

Now let us consider what it is to pursue microscopical studies and investigations so that rare and useful results may be gained. The microscope is too often kept as an instrument for show, used to gratify the curiosity —often a quite unenlightened curiosity—of friends. The mere possession of a microscope does not make a microscopist. It is very much to be desired that the student should make himself acquainted with Optical Science, and also chemistry, for as no one can now be a geologist without an acquaintance with physics and chemistry, so no one ought to consider it satisfactory until these sciences, or at least an elementary knowledge of them, is acquired; for then only will it be found that experiments and researches can be conducted on a really sound foundation. In fact the various sciences are so mutually dependent, and overlap each other at so many points, that it will be found of great advantage to the student of the microscope to resolutely grapple with the elementary principles—if no further—of chemistry, physics, botany, physiology, and anatomy. This may seem to many who have taken up the microscope late in life a somewhat alarming suggestion, but it really is not so. At least I would urge upon the younger members of our Society the absolute necessity of these studies. Roscoe's Chemistry, Ganot's Physics, Lindley's School Botany, Huxley's Physiology, will be easily read and enjoyed—with results which will be a pleasant surprise. The student of course will follow with the more care and completeness those lines of study which will be the most conducive to render assistance in that branch of microscopic work which he has chosen. Our members ought also to remember that much time and trouble will be spared to them by these preliminary or at least collateral studies.

The next point upon which I would make some remark is, What object does the student propose to himself in the study of the microscope and microscopical work? Let him ask himself this question, and decide that he will follow out some regular and well considered plan and direction. If a certain subject is decided upon, let the student first of all find out what has been done by former workers. Before he can be expected to occupy himself with original research he must of course make himself a master with his instrument, &c., and having found that he has gained the necessary skill in manipulation, and power of correct observation, and interpretation, he will find it advisable to make himself acquainted with what has been done before upon the subject to which he intends to devote himself. The student of course is not recommended to rigidly confine his work to one undeviating line of work; that would hardly be expected to be done, but the point urged is that one main line of work should be selected according to the aptitude and taste of the aspirant for knowledge and usefulness. If you have no definite object, if you cannot find in any department of your own avocation any

technical use for the microscope, I think no better field for observation can be found than that of botany. You may not have a garden, but Melbourne is so well furnished with public gardens that no difficulty need be experienced in finding objects. You may even go into the kitchen and obtain a great number of subjects which will afford useful occupation. Take a potato, slice it, and wash out the starch, which will settle at the bottom of the vessel and can be examined, mounted in glycerine and alcohol, or plain water, by a $\frac{1}{4}$-inch objective. Take a thin section of an apple, or the coloured portions of a flower, a section of a leaf; you will then become acquainted with the cell! You may then study other starches, carefully noting their characteristic differences and measurements; obtain a camera-lucida and get into the way of making drawings of the objects; a little patience will be required at first, but no one will ever do any good work with the microscope or in any other branch of study who is deficient in patience. After gaining a familiarity with potato starch, proceed to that of wheat; then get some *tous les mois*, a beautiful starch, especially so when examined with polarized light, mounted in dammar and benzol. Rice, tapioca, sago, maize, oat, barley, arrowroot, turmeric, lentil, bean, pea, and pepper starches may be successively examined, and various plants may be taken and examined for starch granules, and compared.

This study may, when once there is a sufficient knowledge gained, be profitably employed in the examination of various articles of food for the purpose of detecting adulteration; and it is worth the consideration of our young members, because, under the new Health Act, it will be necessary to give employment to chemists and microscopists. In order to test starches we have to call in the aid of chemistry. If we take a drop of solution of iodine and apply it to the cells containing the starch granules, we shall find that the granules assume a deep blue color. This proves that they are starch, because no other substance but starch has the property of becoming blue under the influence of iodine. We have, then, a ready means of distinguishing starch. *

The various crystals found in the cells of plants may be studied. They are called Raphides, signifying their needle-like form. Beautiful crystals can be seen in the juice of the common hyacinth.

These observations will enable you often to determine questions of difficulty; and the adulteration of drugs can often be proved by this means—rhubarb, the onion, the squill, cactus, and many other plants may be examined. In a paper read recently before the Microscopical Society, I made an imperfect effort to draw the attention of pharmacists to the use of the microscope in the examination of drugs; and no young pharmacist should neglect

* A few examples exhibited were here explained.

the opportunity of gaining an acquaintance with the microscope. No well-educated physician now is content to be ignorant of this science, and cannot satisfactorily conduct his practice without the frequent employment of the microscope. In the many forms of disease to which man is liable great light is often thrown upon the cause by the aid of this instrument. Uric acid, oxalate of lime, pus-cells, triple phosphate, and many other bodies can thus be detected and the treatment suitable indicated: many obscure causes of disease are thus often discovered. Some absurd mistakes have been made by imperfectly-trained observers; thus pollen-grains—well worth careful study—were often regarded as bodies connected with the production of cholera!

The examination of water is often much assisted by the use of the microscope. The study of vegetable fibres, as compared with hairs, &c., derived from the animal kingdom, may be found of great service to anyone engaged in any department of business connected with cloth, linen, cotton wool, and silk, which should all be examined and compared. By means of the microscope we know that the cere-cloths in which Egyptian mummies were wrapped is a linen fabric, whilst that investing Peruvian mummies is cotton. Blood-stains in medico-legal inquiries must also be examined by the microscope.

The geologist now finds this instrument of invaluable service, and if some of our members would devote themselves to this branch of microscopy it would be of great use, probably in unexpected ways. The worker in iron, the engineer, the worker in wool, the gardener, the farmer, the brewer, in fact nearly everyone can find some useful and practical advantage in the study of microscopical science.

Finally, I would again urge upon our members the importance of careful, systematic, and well-directed work; for without method and purpose much time is lost and the good which might result never done.

Those about to commence microscopical studies and work may be recommended to read or consult Dr. Beale's, Dr. Lankester's, Mr. Hogg's, Carpenter's, and Davis's works, which are replete with information, some of which I have quoted.

Remarks on the Flora of the Australian Alps,

with introductory notes on the

Geology and Meteorology of the Area.

By James Stirling, F.L.S.

Member Royal Society Vict., Hon. Corr. Member Royal Society S.A.

In order to obtain a knowledge of the Physiography of the Australian Alps, and especially on the subject of the evolution of plant-varieties under meteorological or geological conditions, I commenced some years since to study the native vegetation of the Omeo Survey District, in which I am officially employed.

By taking advantage of all holidays, and also when travelling in different parts of the district, I have been able to make extensive notes on the original distribution of endemic species, and, by the formation of an herbarium, to study the differentiation of varietal forms under many complex meteorological and geological conditions.

I am greatly indebted to Baron Sir F. von Mueller, K.C.M.G., &c., our distinguished Government Botanist, for his kindness in naming many species sent to him from time to time for identification, and also for various hints and helps conveyed to me during a correspondence extending over many years. I have adopted the ordinal arrangement published in his "Systematic Census of Australian Plants"—a standard work of great value to the Phytographer. From personal experience of the perilous nature of camping out amid the deep glens or higher snowy table lands of these Alpine regions, I can freely testify to the many difficulties which must have beset that illustrious and now venerable botanist's early explorations — a solitary wanderer, traversing, compass in hand, wild and broken mountain ranges, crossing dangerous torrents, struggling through dense scrub, or climbing the rocky heights amid the icy solitudes of the highest peaks to take barometrical or trigonometrical observations. Those who have a local knowledge can fully appreciate the untiring energy and devotion to botanic science which must have characterised this true pioneer of botanical research. It is my pleasing duty as an Australian to place on record, on behalf of all students of Australian Botany, the deep sentiment of gratitude which we owe to the labors of our illustrious master for the work he has accomplished —a work which posterity will recognise as the crowning effort to the labors of that glorious triumvirate of botanic *savans*, the illustrious Brown, Hooker, and Bentham.

I have also great pleasure in referring to the splendid geological and mineralogical examinations of my kind and talented friend Mr. Howitt, F.G.S. (the famed discoverer of the remains

of the two heroic Australian explorers Burke and Wills), whose systematic researches, beset with many difficulties to the explorer, must form the basis for all subsequent detailed geologic examinations amid the Australian Alps; and through whose generous assistance the writer has been able to acquire that desire for knowledge which led to the study of the great rock-masses referred to in the following pages.

TOPOGRAPHY.

The area under consideration includes the higher regions of South-Eastern Australia, within 146° 30′ and 148° 30′ meridians of East long. and 36° 20′ and 37° 30′ parallels of South lat. The surface configuration of the main watershed line, viz., that dividing the Murray affluents from the streams flowing into the Gippsland Lakes or Southern Ocean —which extends from Mount Selma (at the heads of the Goulburn) to Mount Kosciusko (at the heads of the Murray River) —is very varied. In some places well defined, at an elevation of 6,000 feet, as a clearly-outlined ridge; at others, flat expanses of table lands alternate with broken rangy country; again, a series of high and rugged peaks, at an elevation of 6,000 feet, determine its position; while at others dome-shaped heights, which form the culminating points on the Main Divide of high lateral ridges, give place to low depressions or gaps, which form the usual routes from the northern to the southern seaboard regions. The lowest of these gaps is not more than 2,500 feet, while the highest peaks of Mount Kosciusko do not exceed 7,300 feet above sea-level.

To the varying effects of meteorological agencies upon the chemical constituents of the great rock-masses this polymorphism of surface configuration is no doubt due. "The granitic rocks, rich in easily-decomposable felspathic constituents, are subject to more rapid decomposition and sub-aerial denudation, under similar climatal conditions, than the Silurian slates and sandstones, etc., which are generally poor in the alkalies, although rich in siliceous materials; so that the ratios of denudation and erosion are dissimilar over different lithological areas. This difference in the ratio of denudation to erosion is well seen in the Silurian areas, where the steep ridges and deeply-eroded valleys are in striking contrast with the more open, undulating, and rounded contours of the hills and the wide valleys of the granitic areas.

CLIMATE.

A glance at the meteorological conditions which prevail at different altitudes will show the extent to which the vegetation is affected thereby. During winter months—June, July snow falls at all elevations above 2,000 feet, seldom remaining longer than a few days on the flats of the lower valleys; on the sub-alpine ridges and table lands it falls to a depth of six feet, and

remains unmelted on the shaded slopes for several months; while on the highest peaks and plateaux, where the fall is much greater (14 to 20 feet), and where the average temperature for July does not exceed 30° Fahr. at 12 noon, it frequently remains during the greater part of the year. At these elevations the changes are very rapid, and during summer, while the sun is scorching the lower lands the summits of the higher peaks are frequently being covered with slowly-descending flakes of snow. On the slopes of Mount Kosciusko, in the deep ravines of southern aspect, the névés form maiden glaciers—glaciers which never mature owing to the great variations in summer temperature and to warm currents of air. The characteristic hot winds of Australia, wafted in front of cyclonic movements of the atmosphere whirling across the arid interior of the Australian Continent—from North-west and N.N.W. South-easterly—ascend the dry northern slopes of the mountains, and aid in dissolving the slowly consolidating masses of snow. The regions of densest vegetation are principally those receiving the greatest quantity of rainfall, and comprise localities on the South-west and North-west flanks of the Alps at the normal line of cloud flotation (approximately at 4,000 feet). By the light which recent discoveries in meteorological science afford, we can understand why the rainfall is proportionately greater over the South-west, etc., flanks of the Australian Alps. As a majority of the cyclonic whirls, originating probably in the Indian Ocean, are deflected along our Southern Victorian coast, the advancing isobars are resisted by areas of high pressure over the land, and the result is that the atmosphere, moisture-laden from oceanic expanses over which it has passed, is condensed and precipitated in torrents of rain. The effect of hygrometric conditions is also very noticeable, for in the deep glens of southern aspect the shrub vegetation attains its greatest luxuriance—an exuberance of luxuriance in striking contrast with the facies of the flora inhabiting the dry northern and eastern slopes. The withering effects of frost on the herbaceous vegetation of the low-lying flats is also very marked: many species of low-land genera which perish on the flats under the extremes of temperature preserve their vitality, and are prolific on the adjoining ranges, where more equable temperature prevails. As an instance of the great range of temperature to which plants are subject at sup-alpine habitats—2,000 to 4,000 feet—it may be mentioned that while the maximum in the shade during summer frequently rises to 105° Fahr., the minimum during winter is lowered to 19°, or 13 below freezing-point. These figures are taken from my meteorological register at Omeo—January and July 1884.

(*To be continued.*)

PROCEEDINGS OF SOCIETIES.

THE ROYAL SOCIETY OF VICTORIA.

A meeting of the Royal Society of Victoria was held on Thursday, 11th December, 1884, at the Society's hall, Victoria-st. Mr. R. L. J. Ellery (president) occupied the chair, and there was a fair attendance. Mr. A. H. S. Lucas, B.Sc., M.A., F.G.S., and Mr. Donald Mason (Sydney) were elected new members.

A paper by Dr. Davy, of Malmsbury, suggesting floating breakwaters at the entrances of harbours, was read. The contrivance proposed consists of three parts a float, a moorage, and a tether. The float may be a log of light wood, or hollow barrel of air, and the moorage with which it is connected by the tether may consist of baskets filled with heavy stones. On the approach of a wave, the float being confined, will be unable to rise with it, and will thus rob the wave of a considerable portion of its bulk, and so reduce the height of the sea. A combination of floats would have all the effect of a solid breakwater, and not cost anything like so much.

A short discussion took place on this paper, and it was stated that floating breakwaters were already in use in England, though the principle adopted differed somewhat from that advocated by Dr. Davy. Several speakers expressed the opinion that the strain on the tether would, in the case of very high seas, be too great to be met by any known system of mooring.

Mr. James Stirling, F.L.S., read a paper upon the meteorology of the Australian Alps. It stated that the importance of meteorological observations from the highest elevations over south-east Australia can hardly be over-estimated, because the conditions are exceedingly favorable. The establishment of a chain of high-level observations from the Western Australian ranges across South Australia and the summits of the Australian Alps to the Blue Mountains in New South Wales, might be expected to furnish data enabling astronomers to frame some valuable weather laws. The observations recorded in the paper were principally made at Omeo between June, 1879, and November, 1884; but they also included large areas on the Australian Alps. Tables were given in reference to the fall of rain, snow, and hail, the moisture of the atmosphere, fogs, clouds, frosts, temperature, evaporation, winds, pressure of the air, &c., and the meteorological features of the district alluded to were detailed with considerable minuteness. The paper was received with applause, and after a brief discussion the meeting separated.

THE MICROSCOPICAL SOCIETY OF VICTORIA.

The annual Conversazione of the Microscopical Society of Victoria was held on Thursday, the 27th Nov., in the College of Pharmacy, Swanston-street, a large number of members and visitors being present. The first part of the proceedings consisted of addresses or lecturettes by Dr. Ralph, the President, on Vegetable Protoplasm; by Mr. C. R. Blackett, one of the Vice-Presidents, on The useful applications of the Microscope; and by Mr. A. H. S. Lucas, M.A., B.Sc, on Micro-aquaria. The Rev. J. J. Halley and Mr. E. C. Symonds gave an exhibition of microscopic objects by the aid of the sciopticon, creating much interest among the audience, especially when a number of living marine organisms were shown on the screen. In the laboratory microscopes and objects were exhibited by Dr. Ralph, the Rev. J. J. Halley, Messrs. F. Barnard, R. G. Haig, W. W. Allen, W. M. Bale, J. Lindsay, C. R. Blackett, J. Gabriel, M. Allan, A. H. S. Lucas, J. O. Moody, F. H. Baker, and Wilson. The microscopes represented the work of Ross, Powell and Lealand, Beck, Swift, Crouch, Baker, Nachet, and several other makers. A great variety of objects were exhibited, the most popular being the living specimens, of which Mr. Blackett showed the circulation in the frog's foot, and Mr. Gabriel, that of the tadpole, while various Rotifers and Vorticellæ were shown by Mr. Moody, *Tubifex rivularum* by Mr. Halley, and some fresh-water Bryozoa, as well as the action of the heart of a young pond-snail (Planorbis), by Mr. Barnard. Among the mounted specimens exhibited Australian subjects predominated, especially Foraminifera, Bryozoa, Hydroida, and Diatoms, most of the slides having been prepared by the exhibitors.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

A special general meeting of the Field Naturalists' Club of Victoria was held on Monday evening, 8th December, 1884, at the Royal Society's Hall, to consider certain alterations in the rules, of which notice had been given. After some little discussion the amended rules were passed. The effect of these will be, that on the commencement of the financial year in May next, the subscription will be increased to 15s., and the *Victorian Naturalist* forwarded free to all members.

At the conclusion of the special business the ordinary monthly meeting was held, Mr. A. H. S. Lucas, vice-president, occupied the chair, and about 60 members and friends were present.

The hon. librarian acknowledged the receipt of the "Transactions of the Linnean Society of New South Wales," vol. IX., part 3.

An interesting paper was contributed by a lady member, entitled "Another Scotch Naturalist," in which were described the result of the natural history labors of a poor bootmaker named Patterson, in a small Scotch town, whose only spare time was before and after a long day's work.

Mr. A. J. Campbell read a paper on "Mallee Hens and their Egg-mounds," in which he fully described the curious and interesting manner in which these birds incubate their eggs, by burying them in vegetable remains, and covering the whole with mounds of sand. His remarks were illustrated with sketches on the blackboard, and specimens of the eggs.

Several members brought under the notice of those present natural history questions, which elicited considerable discussion.

The principal exhibits were :—By Mr. E. Bage, Brown's "Forest Flora of South Australia," parts I to IV; by Mr. F. G. A. Barnard, young shark, taken from egg-case; by Mr. D. Best, Australian Coleoptera, family *Chrysomelidæ*; by Mr. A. Borthwick, three species Victorian sea birds, from Phillip Island; by Mr. A. J. Campbell, mallee hen's eggs and sand taken from nest, in illustration of his paper; by Mr. G. Coghill, birds' eggs and dried orchids; by Mr. A. Coles, fossil, from bed of Suez Canal; by Rev. A. W. Cresswell, precious opal, from Queensland; by Mr. J. E. Dixon, seven species of British Lepidoptera and four of Hymenoptera; by Mr. E. A. Dombrain, ten species Australian birds; by Mr. C. French, humming birds, from Central America; by Master C. French, Victorian fossils; by Mr. J. T. Gillespie, five species Victorian birds' eggs; by Masters H. and G. Hill, insects taken at Windsor and Mount Macedon: by Mr. Johnson, curious stone from Maryborough; by Mr. H. Kennon, English fossils, and polyps from Western Port; by Mr. W. Kershaw, one drawer timber-feeding Lepidoptera; by Mr. A. H. S. Lucas, English fossils; by Mr. F. M. Reader, fodder grasses; by Mr. F. Roberts, two tropical orchids; *Oncidium Crispum* (S. America) and *Cypripedium Bullenina* (Borneo); by Mrs. Simson, rice and, nickel ore, from New Caledonia; by Mr. D. Le Souef, tiger skull, flying fish from Java, death adder from Queensland, and case of crabs from Malay States; by Mr. H. Watts, marine algæ from Queenscliff, and oyster-spat from Western Port Bay; by Mr. T. Worcester, two species of shells, *Voluta magnifica*, from New South Wales, and *V. purpurata*, from Solomon Islands.

After the usual conversazione the meeting terminated.

THE ROYAL SOCIETY OF NEW SOUTH WALES.

MR. CALDWELL'S AUSTRALIAN RESEARCHES.

A special meeting of the members of the Royal Society of New South Wales was held in the society's rooms, Elizabeth-street, on the 17th December. There was a very large attendance, and the chair was occupied by Mr. H. C. Russell, Government Astronomer (president of the society). The meeting had been convened in order that Mr. Caldwell, a Fellow of Caius College and Balfour Student of the University of Cambridge, who for some time past has been making extensive researches in different parts of Australia into the embryology of marsupials, monotremata, and the ceratodus, might exhibit the specimens he had collected, and describe the result of his work up to the present time.

The CHAIRMAN, in opening his remarks, said that the members of the society would agree with him that the council of the society had done right in convening the meeting; and, further, that they would all join him in according a most hearty vote of thanks to Mr. Caldwell for his kindness in presenting some of the results of his investigations to the members of the society. He therefore had much pleasure in asking Mr. Caldwell to address them. (Applause.)

Mr. CALDWELL, in introducing his remarks, described the circumstances under which he had been led to the colonies. It was three years since his master, the late Professor Balfour, suggested to him, when still his pupil, that it might be possible for him to leave his university for a period of two or three years to obtain the necessary material in connection with this matter. On his death the memorial which was subscribed for in England and all over the world made this possibility much easier to him, for whilst he had left his post in Cambridge he was still attached by holding the Balfour Studentship. When he came out, two years ago, he found very great difficulty in getting specimens of the platypus or the echidna. Whilst everyone told him it was to be obtained in this river, or that, he generally found that the skin hunter had been before him and had got only two or three specimens. The first few months of the present year he spent in obtaining marsupials, such as kangaroos, opossums, and native bears. Marsupials were considered in the colonies to be universal property, and everyone considered himself qualified to tell him how the kangaroos produced their young. As a matter of fact, the scientific world knew already that the kangaroo produced its young in the same way as the rest of the milk-giving animals. That had been proved by Professor Owen nearly 50 years ago, whilst the early stages of that development which formed the basis of the modern logical work upon the subject had not been found. No one expected to find the kangaroo growing on the teat, but nevertheless no one had found the

stages from impregnation up to birth of the young, owing to the insufficient quantity available to enable the embryology of these animals to be determined. This information, however, he had obtained in the last months of 1883, and the first few of the present year. He had made a number of expeditions all over New South Wales in search of marsupials, and in April of this year he went to the Burnett River, in Queensland, where the ceratodus is found, both there and on the Mary River and these two only. He had remained there since that time, and whilst he obtained there the ceratodus, he also got in the same district the early stages of the ornithorhynchus and the echidna or bush porcupine. He then said a few words about his camp. He found it was useless on the stations or far away from the river if he hoped to observe the ceratodi. It was four months before he found any trace of their mode of depositing their eggs in the river, till he found it by chance, which could only have occured by his camping on the bank of the river. His material for observation was obtained by an aboriginal, he having at one time nearly 50 aboriginals at work for him. They got the porcupines for him, and some he employed searching the weeds for ceratodus. He promised to describe the outlines of the embryology of the three main groups of animals which formed his scheme of work in Australia, and the embryology of which was, in the case of two entirely unknown before, and in the case of marsupials unknown in the early stages. To make the matter clear to those present, he asked them to listen to a few elementary tenets he would state. Many present might think that only the hen and similar creatures laid eggs, but, as a matter of fact, all animals except the very simplest, such as the protozoa, reproduced sexually through the male and female. He then entered upon an explanation of the structure of the egg, illustrating his remarks by diagrams on a blackboard. What he would state with regard to his investigations were not his opinions, but were facts, and were, consequently, not open to argument. Within the last few weeks he had received several letters from people denying that the platypus had an egg, and they wanted him to argue about it. That was impossible. He stated a fact; it was possible to disbelieve it; but, being a fact, it could not be argued. The interpretation of these facts he was not prepared to add, as he had come there with the simple intention of exhibiting a few specimens, and not with the intention of entering into any theoretical consideration derived from these facts. Starting with the marsupial animals, he would go on to describe the ceratodus and then the monotremes. Marsupials were found all over Australia, and were in a way characteristic of it, as it was the only place where they had their habitat except in South America and reaching to North America as far as Florida and San Francisco; but they were essentially Australian. They were milk-giving animals, the same as the higher mammals such

as dogs and cats; but the difference between the marsupials and the higher mammals of the old world was that the young were born at a very early stage, and this fact carried with it a series of changes, such as differences in structure, which were characteristic of marsupials. But on the whole the marsupials did not differ to any great extent from the ordinary mammals, such as the cat, dog, or sheep. The main difference between them and the marsupials was that the egg in the uterus before the birth had no vascular attachment to the walls. There was no blood nourishment passing from the parent to the young animal. The egg of the marsupial was, in common with that of the higher mammals, a very simple kind of food-yoke. He then, by the aid of diagrams, described the structure of the egg of the marsupial. On the whole the marsupials had a peculiar arrangement of the membranes, but the development of the egg itself was not essentially different from the development of the higher mammals. He then passed on to the development of the ceratodus. This animal was a representative of a series of animals which once were numerous in many parts of the world. At the present day there were three living representatives of this group of animals, the dipnoi,—one found in Queensland only in the Mary and Burnett Rivers; another, the lepidosiren, found in the Amazon; and the third, the protopterus, found in the Nile and other rivers in Africa. These three formed a class different from all other animals, inasmuch as they possessed gills, and had the form of a fish in an adult state, and at the same time they possessed lungs. The structure known in other fish as the air bladder became in this fish highly vascular, and the aerated blood freshened by oxygen did not pass from the air-bladder through the system, but passed direct to the heart, and there they had the first indication of two chambers in the heart, and they had for the first time arterial blood in the heart of a fish. Blood was found in an arterial state in animals with lungs, but in a venous state in animals without lungs. His chief object in coming to Australia had been to obtain the development of the ceratodus. He went up to the Burnett river in April, and found that at that time the fish were ripe, the ovaries and testes being nearly developed; but it was not till the beginning of September that he found the first eggs of the ceratodus. It was his belief that the fish had been in the water the whole time, but the extent of the waterhole and the habits of the fish made the difficulty very great in securing it. He spent many weeks hunting, and, with the assistance of the blacks, turned up many hundred waterholes before he found it. The eggs were laid upon the weeds. They were laid singly, resembling those of the common newt. The whole development of the ceratodus had a strange resemblance to that of the amphibians, and any one who had any acquaintance with the development of the newt would at once perceive the similarity. It seemed that

the fish would only drop their eggs on a particular weed. These eggs were fertilised in the water in a similar way to some species of the newt. The eggs he found it very difficult to get. They were covered with an enormous quantity of gelatinous matter which required some special means, such as a scissors, to remove. He was eight days before he got a single egg out whole. When he succeeded in getting the early stages, it remained to rear them until they were practically identical with the adult fish. This was a very difficult task, as the enemies of the ceratodus were very numerous. There were two kinds of fungi which attacked the eggs. He put in crustacea to devour the fungus, but these in turn attacked the young fish when it emerged from the egg. He was three months, till near the end of November, developing the eggs. The fish were now living—had been hatched some weeks ago. The hind legs of the ceratodi were not yet developed. The development of the fins would probably yield important knowledge on embryology. The egg of the ceratodus was similar to that of the kangaroo. He then proceeded to describe the monotremata, namely, the ornithorhynchus and echidna. These, though differing from one another, were identical in structure, and were essentially similar animals. They were the representatives of large series of forms which once existed in other parts of the world. These two living representatives formed something quite as unique in its way as the ceratodus. They were both milk-giving, and both suckled their young. When he came out he had a strong belief that the ornithorhynchus and echidna produced their young in much the same way as the marsupials, and he thought last year he had confirmatory proof of its being so; but he found he was in error. He thought he found in the pouch of the ornithorhynchus a cellular membrane; but he found it to be only part of a ruptured egg. He then, with the aid of diagrams, described the stages in the development of the platypus. He had found that invariably the female platypus had two eggs, and these left the parent at the age of about a chick, 36 hours after the laying of the egg. With regard to the echidna, he had not determined the exact age at which the young were born. That of the platypus he had discovered by a lucky chance. He happened to kill one which had laid one egg, and had the other on its way out through the passage, and the age of this egg enabled him to determine when the eggs of the platypus were laid. His series of monotremata would be made up in the early stages by the echidna, and in the latter by the ornithorhyncus. These were the facts determined by his researches, and as to their interpretation it would take years before they were of service in connection with the problems of embryology, and the special problems to be worked out in connection with these animals were very numerous. They might perhaps ask what all these investigations were for. In the early days of evolution it was hoped to

get some approximation to the pedigree of all animals by observing the embryology; but now embryologists were not so ambitious. They knew that all animals had a pedigree, but what it exactly was, was not now regarded as of such consequence. So long as they could tell more or less accurately what it was, was sufficient. These researches were all working to find out the laws which govern living things, and thus light would be thrown upon the great problem of life.

Mr. Caldwell, in answer to a question as to whether he had come to any conclusion with regard to what became of the embryo of the marsupial, and how it became attached to the mother's teat, said that the exact mode in which the kangaroo or other marsupial put the young to the teat was not of so much importance as the other facts. It had been observed by Professor Osborne, of America, who had seen the act, that the mother lifted it from the vulva to the teat. Marsupials possessed a very large and sensitive tongue, and lips which would enable them to lift the embryo and place it on the teat. The young were not attached to the teat at all. Hitting a kangaroo on the head would be sufficient to knock the young off the teat. It was a few weeks after the first attachment that the lips grow over the extremity of the teat, but no connection actually took place between it and the mouth. By careful manipulation one could always extricate the lips of the young kangaroo from the teat. How the embryo was actually moved into the pouch he had not observed. He had not considered it of sufficient importance to waste any time about. He could conceive no difficulty in the lips or tongue of the kangaroo placing the structure, which was at least an inch long when born, upon the teat. It did not appear to him to be a matter of much importance. It did not form part of his researches, it belonged more to the habits and nature of the animal.

A hearty vote of thanks was passed to Mr. Caldwell for his interesting address.

Mr. Caldwell states that he is very anxious to find a large number of kangaroos, and would be obliged if anyone knowing of a kangaroo drive in actual work, no matter in what part of the colonies, would inform him of the locality.

THE GEOGRAPHICAL SOCIETY OF AUSTRALASIA.

INTERCOLONIAL CONFERENCE.

On Tuesday, 16th December, 1884, the first Australasian Geographical Conference assembled at the Town Hall, Melbourne, and continued its sittings during the three following days. The Conference comprised representatives of the New South Wales and Victorian branches of the Geographical Society. Sir Edward Strickland, K.C.B., president of the New South Wales branch,

was unanimously elected chairman of the Conference. Baron F. Von Mueller, K.C.M.G., &c., was appointed vice president; and Messrs. E. M. La Meslee and A. C. Macdonald consented to act as joint secretaries. The membership of the Society and its branches was also well represented.

After a few inauguratory remarks by the Chairman, Mr. La Meslee, secretary of the New South Wales branch, read a paper, on the necessity for defining the meaning of the term "Australasia." Some discussion ensued, and the matter was referred to a committee consisting of Baron von Mueller, Dr. Bride, Professor Elkington, Mr. Ellery, Mr. Wall, Mr. Panton, and the mover. The committee, after due consideration, brought up a report the purport of which was that the term "Australasia" should be provisionally accepted as accurate, that "Australasia" should signify and include New Zealand and Tasmania as well as Australia proper, and that as settlement proceeded it might be desirable from time to time to amend it, and ultimately discontinue it altogether in favor of some such expression as "The Dominion of Australia." The report, after some discussion, was referred back to the committee for reconsideration.

Considerable discussion took place with regard to the proposed exploration of New Guinea; and on the motion of Mr. Brodribb, seconded by Mr. J. A. Panton, it was resolved—

"That the Conference proceed to consider the best means to be adopted for a scientific exploration of New Guinea under the Society's auspices with the material aid of the various colonial Governments, and further to consult as to the appointment of a leader of such expedition."

It was further resolved, on the motion of Mr. Macdonald, seconded by Mr. Brodribb—

"That the appointment of a leader or leaders of the proposed expedition be left in the hands of the Exploration Committee appointed in New South Wales, with such additions as may hereafter be made thereto, subject to the approval and confirmation of the members of the administrative council of New South Wales and the council of the Victorian branch, and the concurrence of such other branches as may be inaugurated."

The question of the boundary line of New Guinea was then brought forward by the Chairman, who spoke of the necessity of defining the exact boundary line dividing the English and Dutch portions of New Guinea, at the same time pointing out the difficulties and complications which arose in America in consequence of disputed boundaries. Dr. Belgrave denied that any other power than Great Britain had a legal title to a part of the island. Actual settlement alone gave that; and the Dutch, so far as he knew, had taken no steps to assume possession beyond an occasional visit to secure laborers. Some additional discussion followed, during the course of which a general feeling was expressed that the whole island should be annexed. It was ultimately resolved, on the motion of Dr. Bride, seconded by Mr. Julian Thomas—

"That the Geographical Society of Australasia is strongly of opinion that every effort should be made to have the whole of New Guinea annexed to the

British Crown, and that the President of the Conference be requested to communicate with the Governments of the Australian Colonies, urging upon them the desirability of taking every possible step with a view to this end."

On the motion of Mr. Wall, seconded by Mr. La Meslee, the Conference affirmed the advisability of adopting better means to secure a uniform system of teaching geography in the Australian schools and the desirability of compiling standard works on the geography of Australasia under the sanction of the Society. It was further resolved to remit the question for report and inquiry to the committees of the respective branches of the Society.

Baron Von Mueller moved, and Mr. A. C. Macdonald seconded, a resolution affirming the desirability of effecting improvements in the nomenclature of Australian geography by abolishing inconvenient or misleading synonymy and substituting unambiguous names. The resolution was unanimously approved, as was also a cognate one, inviting the surveyors-general of the different colonies to compile a general map of Australasia on a uniform system, omitting present objectionable names and those that are too often repeated, and also to use native names wherever practicable.

The proceedings of the Conference were brought to a close on the following Monday evening by a public welcome tendered to the Rev. W. G. Lawes, at the Collins-st. Independent Church, there being a very large attendance, and the chair on the occasion being occupied by His Excellency Sir Henry B. Loch, K.C.B.

THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

EXCURSION OF FIELD NATURALISTS' SECTION.

On Monday, 10th November last, fifty ladies and gentlemen, members of the Field Naturalists' Section of the Royal Society of South Australia, made their first excursion of the season to Golden Grove, Bishop's Springs, and the gorge of the Little Parr River. At twenty minutes before 10 the Hon. Secretary of the Section (Mr. W. E. Pickels, F.R.M.S.) sounded his bugle, and the two coaches provided by Messrs. Hill for the outing started from the front of the Adelaide Town Hall. The wind was decidedly unpleasant, and the dust by no means added to the day's enjoyment, but the Field Naturalists did not appear to mind the disagreeable weather at all. The coaches proceeded through North Adelaide to Modbury, where a halt for fifteen minutes was made to give the teams "a breather." On resuming the journey the North-Eastern road was left on the right, and the party went on to Golden Grove, arriving there just before noon. Here the members left the coaches, and, some dispersing under the shady trees and others along the creek, spent an hour in lunch.

After lunch the bugle sounded "the assembly," and, under the leadership of Professor Tate, F.G.S., F.R.S., &c., who had

driven his own horses and joined the party at Golden Grove, the members wended their way down the gully to the Bishop's Springs, and there were many of that party who are not likely to forget that walk for some time to come. Very uneven, and, in consequence of the heat, more than usually slippery, it was a matter of surprise how the ladies should have found their way without meeting with some such accident as a sprained ankle, yet they accomplished the journey successfully, and the only ones who complained were the sterner members of the party. On arrival at Bishop's Springs an *al fresco* meeting was held, Professor Tate presiding. Five new members were elected, and votes of thanks were passed to the Right Rev. C. A. Reynolds, Catholic Bishop of Adelaide, and Mr. John Robertson, J.P., for their courtesy in according permission to the members of the Section to make use of their grounds. The ladies and gentlemen then formed themselves into a group, and were photographed by the hon. photographer to the Section (Mr. Pickels), the stony watercourse at their feet and the steep and rugged mountain behind them filling in and completing what ought to prove a very interesting picture. When the operation of photography was over Professor Tate addressed the party. He said that he was glad to avail himself of the opportunity of explaining to the members before they separated a few of the salient rock features of the locality in which they now found themselves. They consisted of thick-bedded sandstones and grits forty to sixty feet thick intercalated among clay slates. There were four of these bands, and where they were intersected by the stream courses they formed waterfalls. They were traceable on the surface as colossal walls, and on the elevated grounds appeared, seen from a distance, as Cyclopean ruins. From their moderate dip and the varying slopes of the ground, and the presence of two deep waterways, the outline on the surface of the gritbands somewhat resembled a collection of the letters V and W all inverted, and altogether afforded very interesting examples of the chief phenomena of stratification. These bands, which had previously been supposed to be of igneous formation, had been proved by Mr. Scoular, who had studied them at this and neighboring places, to be of sedimentary origin, some evidences of which, continued the Professor, such as the lamination of the lower part of the grits, were observable in the sections examined by the party. The position of these bands, in addition to forming a waterfall, had caused a deflection of the stream which flowed along the base for several hundred yards, by which a long mural line of cliff is maintained. This was the habitat of a rare plant in the southern portions of the colony, the *Scleranthus pungens*. In this neighborhood, also, was observed *Andropogon exaltatus*.

The Professor indicated that a botanical feature to this neighbourhood added to the conspicuousness of the grits, and that

was the prevalence of the she-oak (*Casuarina quadrivalvis*), and explained that even where the grits did not form any marked outcrop, yet their presence was invariably determined by the existence of this forest tree, especially in the broad belt of forest that crowned the main road approaching Golden Grove. The graceful poison-berry tree (*Pittosporum philtryæoides*) is exclusively confined to the grits at this locality.

The party then dispersed, and considerable excitement was caused by the discovery of a couple of snakes, which, however, were summarily put to death and taken away in triumph by an ardent histological student. Specimens of the snail *Bulimus texturatus*, and aquatic weeds, were collected. By-and-by the members found their way back to the coaches, and at 4 o'clock a start was made for the return journey. The party proceeded a little way along the road that skirts Golden Grove, and after having traversed about a mile dismounted. Here Professor Tate again addressed the members of the Section, and explained that this neighborhood was the habitat of the *Quinetia urvillei*, a very rare annual, existing far from its natural habitat, a limited area in extreme Western Australia. Its flowering season was over, and not a single specimen was secured. Professor Tate was so fortunate as to discover *Ptilotus erubesceus*, which he pointed out to the members, and then led the way into the immediate scrub, and explained that the many floral productions for which it was famous had now almost passed away, but still a few were left to swell the collections of the botanic students, among which were the variety *Ruscifolia* of *Daviesia ulcina*, and the pretty grass *Amphipogon strictus*. The learned Professor explained that the surface drainage from the scrub had in the course of a few years cut for itself a channel some yards in width, and of a depth of twenty feet in the sands which constituted the surfaces of the deposit-beds of coarse sandstones and stiff argillaceous rock that belonged to the Upland Miocene. The same were also visible in the roadside cuttings, where the horizontal arrangements of sandstones have an unconformable position to the sandstones of the old rocks. The peculiar vegetation of these scrub-lands was at this place clearly seen to be referable to this geological phenomena.

About half-past five the party rejoined the coaches and proceeded to Adelaide, arriving at the United Service Club Hotel about 7 o'clock, where the members of the section separated, after having spent a pleasant and, from a scientific point of view, a decidedly interesting day.

Definitions of some new Australian Plants;

By Baron Ferd. von Mueller, K.C.M.G., M.D., Ph.D., F.R.S.

[Continued.]

Bauhinia Persiehii.

Leaflets of herbaceous texture, almost ovate semi-orbicular, to about two-thirds of their length connate, each with five primary nerves, above glabrous, beneath pale-green, and as well as the branchlets short-downy; stipules linear-semilanceolar; flowers rather large, corymbous; stalklets together with the slender calyx-tube short-downy; limb of calyx spathaceous; petals spreading, membranous, glabrous, rhomboid-ovate, with wedge-shaped narrowly elongated base, pale-colored, the uppermost marked by numerous dark-red spots and its base ciliated; fertile stamen only one, glabrous, about as long as the petals; sterile stamens very short.

In the vicinity of the Endeavour-River; W. A. Persieh.

Stature hitherto unrecorded. Leaflets 1–1½ inches long, dimidiated, possibly in age rigid. Limb of the calyx ½–⅔ inch long, membranous, outside short-downy, not distinctly toothed. Petals 1–1½ inches long, assuming in drying a slightly yellowish tinge. Upper petal the innermost while in bud. Fertile anther narrow-oblong, about ⅓ inch long, dark above, bilobed at the base; style glabrous; ovary short-hairy.

This is the only species of Bauhinia, belonging to the section Casparea, which has yet become known from Australia; indeed of that section only one other is on record from any part of the eastern hemisphere, namely, *B. monandra* (Kurz, Forest-Flora of British Burma, I 395), to which our Australian plant is evidently much allied; the fruit of either remains hitherto unknown.

Goodenia tenuiloba.

Erect, copiously beset with short gland-bearing hair, besides bearing scattered glandless hair; leaves distantly-scattered, irregularly pinnatisected into linear-filiform rather long lobes; peduncles one-flowered, the lower axillary and elongated, the upper shortened and by abbreviation of the floral leaves somewhat racemose, all jointed under the calyx; bracteoles none; flowering calyx small, its tube attenuated at the base, much shorter than the almost lanceolar pointed lobes; corolla large, yellow, slightly hairy outside, almost glabrous inside except the base, its lobes nearly equal, much longer than the tube, broadly membranous

on the margin, truncated at the summit; the two upper lobes separated nearly to the base of the tube by very narrow stipes; anthers blunt; style comparatively short, almost glabrous; indusium short-downy; ovary blunt, free in its upper portion; ovules several; seeds membranously margined

In the vicinity of Mount Hale; C. Crossland, Esq.

Probably herbaceous; lowest portion of the plant not obtained. Leaves to two inches long, so far as seen, lobed from near the base, the terminal lobe the longest, lateral lobes mostly shorter than one inch. Lower flower-stalks to three inches long. Calyx at flowering time only about $\frac{1}{4}$ of an inch long. Corolla rather more than an inch wide, near the base of the lower lobes gradually orange-colored; the two upper lobes marked by a dark spot near the base. Stamens about as long as the calyx. Style hardly $\frac{1}{4}$ inch long. Ovary short-hairy; septum seemingly not developed. Fruit as yet unknown; on discovery of which the plant may possibly become transferable to Velleya.

Well marked in the genus (and indeed in the whole order), to which it belongs, by the pinnatisected form of the leaves, the rachis-like portion not being broader than the lobes

The systematic place of this plant would be best near *G. pinnatifida*, unless it is placed in the series of Foliosæ.

The Fertilization of Plants.

By Thomas Harrison.

Many of our readers will remember the well-known work on Orchids by the late Charles Darwin, which more than one stern reviewer has spoken of as being interesting as a novel. Sir John Lubbock's little volume on "British Wild Flowers in relation to Insects" may be similarly praised. The author of the "Origin of Species," dealt with but one family of the botanical world, while Sir John Lubbock treats of the phenomena of fertilization as manifested in a large number of other instances, all of which are alike worthy of note and deserving of careful study, not only by the scientist but by those also who have to contemplate the various arrangements of Nature for carrying out her multifarious designs.

To most persons the reproduction of vegetable organisms seems to be a matter of great simplicity. The seed is sown, the plant grows, it puts forth stamens, and developes its seed. An intermediate process, however, has to be gone through.

Every flower, even when well developed and perfectly healthy, does not bear fruit, and so it is that many trees and shrubs, that blossom fully in the spring, yield no return in the autumn. The explanation in most cases is that such flowers have not been duly fertilized, and that, therefore, they prove sterile. The fertilization in plants is a very beautiful arrangement, its general principles being easily understood. Take, for example, a flower such as a geranium. Its parts consist of a calyx, or that green portion which encloses the bud, and a corolla, or what is known as the flower proper. Within these are five, or more, thread-like processes known as the stamens, at the top of each of which is a little ovoid-shaped body termed an anther. These anthers are generally found covered with a fine dust known as pollen. In the centre of the flower is another projection, divided, at the top, into two or more branches, and known as the pistil, the branches of which are denominated styles, and are tipped with a fluid, the use of which will be presently alluded to. At the viscid bottom of the pistil is the ovary, containing the embryos, subsequently to be developed into perfect seed.

The method of fertilization is in this wise: The pollen, which sends out the fertilizing material, falls upon the viscid fluid secreted by the style and necessarily adheres thereto. The various grains, of which the pollen dust is composed, then commence to grow downwards into the pistil until the elongated tubes which they throw out reach the embryo seeds and fertilize them previous to subsequent developement.

In many instances this entire process is conducted within any simple flower itself, the seeds in the ovary being fertilized by the surrounding anthers. This, however, is not always the case. In trees such as the willow, the hazel, the oak, &c., a portion of the flowers are seed-bearers, while the remainder are fertilizers. In other instances, such as the hop, one plant produces the fertilizers while another is destined to bear the seed. As no seed can be produced from non-fertilized embryos, it is very evident that, unless some extraordinary contrivance is resorted to the seed will not develope. Of these contrivances there are at least three:—(1), many flowers are self-fertilizing; (2), others are fertilized by the wind, which wafts the pollen from the anthers of one plant to the styles of others; and (3), yet others are fertilized by the intermediate agency of insects, and, in some instances, by birds and even snails. Those fertilized by the wind have the stigma formed in a manner that is rather peculiar, it being often branched and covered with a number of short hair-like processes; whilst those fertilized by insects have stigmas of an altogether different shape. Sir John Lubbock illustrates these features by diagrams respectively of the elder, the hop, and the wheat, all fertilized by the wind, and of the willow, flax, and poplar—fertilized by insects.

The position and form respectively of stigma and stamens differ essentially in many plants of the same family, all evidently designed with the view of securing efficient fertilization. Thus *Malva sylvestris* and *Malva rotundiflora* (both of the mallow family) have flowers respectively large and small. The first-named, with its wide-spread petals, is especially likely to attract insects, and has stamens which droop downwards, while the stigma projects upward for some distance. A single glance at this arrangement will be sufficient to show that no pollen-dust can possibly fall upon the stigma under natural circumstances, but the deficiency is supplied by insect visitors who resort to the attractive object, and, having become dusted with pollen-grains, either rub themselves against the stigma of the same flower or bear the grains away to subsequently deposit them upon another. On the other hand, the flower of the *Malva rotundiflora* is very small and unlikely to be noticed by insects. In this case the branches of the stigma are much elongated, and twine themselves among the stamens, so that the flower can hardly fail to fertilize itself.

Then again, it is often found that the stamens and pistils do not ripen synchronously, so that fertilization, unless brought about by some intermediate agency, would be next to impossible. The same writer illustrates this by a reference to the *Epilobium augustifolium* and *E. parviflorum*. In the first of these the pistil does not mature until the stamens have shed their pollen, while in the latter both these necessary agents to fertilization come to maturity simultaneously. The assistance of insects is essential in the first instance, and the petals are large and conspicuous, while the latter has no such showy attractions: as the flower is able to fertilize itself they are not necessary.

Experiment, too, has demonstrated that self-fertilization is, in many instances, inimical to the best possible development of the seeds. There must be a sort of cross-breeding, in fact, or the progeny would degenerate. Hence, perhaps, the arrangement of the ripenings specified occurring one after the other. A singular method by which fertilization is secured under such circumstances is afforded by the common Arum (lords and ladies, as they are termed by children in England). The process is thus described by Sir John Lubbock:—"The well-known green leaf encloses a central pillar, which supports a number of stigmas near the base, and of anthers somewhat higher. Now, in this case, nothing would, at first sight, seem easier or more natural than that the pollen from the anthers should fall on, and fertilize, the pistils. This, however, is not what occurs. The stigmas mature before the anthers, and, by the time the pollen is shed, have become incapable of fertilization. It is impossible, therefore, that the plant should fertilize itself. Nor can the pollen be carried by the wind. When it is shed it drops to the bottom of the tube,

where it is so effectually sheltered that nothing short of a hurricane could dislodge it, so that it might be borne by the wind to another flower. It happens, however, that small insects which, attracted by the showy central spadix, the prospect of shelter, or of honey, enter the tube while the stigmas are mature, find themselves imprisoned by a fringe of hairs surrounding the pillar and pointing downwards, which, while permitting their entrance, prevent them from returning. After a while, however, the period of maturity of the stigma is over, and each secretes a drop of honey, thus repaying the insects for their captivity. The anthers then ripen and shed their pollen, which falls on, and adheres to, the insects. Then the hairs gradually shrivel up, and set the insects free, which carry the pollen with them, so that those which then visit another plant can hardly fail to deposit some of it on the stigma. Sometimes more than a hundred small flies will be found in a single arum. In these cases there is a great advantage in the fact that the stigmas arrive at maturity before the anthers."

The primrose and cowslip present us with another example of cross fertilization being enforced by a natural arrangement. If a number of these flowers are examined, it will be found that about half of them have the pistil at the top of the tube and the stamens half way down, while the other half have, on the contrary, the stamens at the top of the tube and the pistil half-way down. The two kinds are known to gardeners and schoolchildren as "thrum-eyed" and "pin-eyed." Mr. Darwin thus explains the significance of this curious phenomenon, and the important part it plays in the economy of the flower:—"An insect thrusting its proboscis down a primrose, of the long-styled form, would dust its proboscis at a part which, when it visited a short-styled flower, would come opposite the head of the pistil, and could not fail to deposit some of the pollen on the stigma. Conversely, an insect visiting a short-styled plant would dust its proboscis further from the tip; which, when the insect subsequently visited a long-styled flower, would again come just opposite to the head of the pistil. Hence we see, by this beautiful arrangement, insects must carry the pollen of the long-styled form to the short-styled, and *vice versa*.

"But furthermore the pollen of the two forms is dissimilar; that of the long-styled being considerably smaller than the other, nearly in the proportion of three to two, a difference the importance of which is probably due to the fact that each grain has to give rise to a tube which penetrates the whole length of the style, from the stigma to the base of the flower; and the tube which penetrates the long-styled pistil must therefore be nearly twice as long as in the other." Mr. Darwin has shown that much more seed is produced, if pollen of the one form is placed on the pistil of the other, than if the flower be fertilized by pollen of the same form, even taken from a different plant. Nay, what is more

remarkable, such unions in Primula are more sterile than crosses between some nearly allied though distinct species of plants.

We will not multiply quotations, as Sir John Lubbock's work is published in a portable form, and is obtainable at a reasonable price. What is more praiseworthy, too, is that its style is not highly technical, and readers who are in possession of but a limited knowledge of botany will be able to master its pages. As may be supposed from the title, only British flowers are dealt with, but many of those named have been acclimatised all over Australia, whilst an acquaintance with the peculiarities of the species named will enable local botanists to pursue their investigations with respect to the fertilization of native plants—a branch of study concerning which, if I remember rightly, there exist no literature—without much difficulty.

Remarks on the Flora of the Australian Alps,

WITH INTRODUCTORY NOTES ON THE

Geology and Meteorology of the Area.

By James Stirling, F.L.S.,

Member Royal Society Vict., Hon. Cor. Member Royal Society S.A.

[Continued.]

Geological Structure and Correlated Facies of Vegetation.

Part I.—Phanerogamia.

The greater part of the area is composed of Palæozoic rocks, the Mezozoic formations being absent, although covering large areas to the south-west. The Cainozoic formations have been referred to Pleistocene, Pliocene, and Miocene deposits. The Palæozoic and Cainozoic systems may be divided into two main classes, the sedimentary and igneous, each characterized by more or less peculiar facies of vegetation.

SEDIMENTARY ROCKS.

The oldest formations at present known in the Australian Alps are the Lower Silurian sediments and their metamorphosed representatives, the crystalline schists. These rocks are all inclined at high angles, and are invaded by numerous igneous products of later age. Resting upon them unconformably are isolated patches of Devonian formations; while between the latter and the Miocene sediments there is a complete hiatus.

LOWER SILURIAN.

The Lower Silurian include a vast recurring series of bluish slates, mudstone, claystones, coarse and fine grits, sandstones, quartzites, principally in the Mitchell, Ovens, and parts of the

Mitta-Mitta and Hume river-source basins to the north of the main watershed-line and the Mitchell, part of the Tambo, and the Snowy River tributaries, to the south of it. As previously remarked, the erosion in these areas, covered by the Silurian rocks, is very great, resulting in high ridges and deep, narrow valleys. These surface contours produce hygrometric conditions most favourable to an exuberance of shrub and arboreous vegetation over certain areas; for, in the shaded slopes of lofty ridges the most luxuriant forms are found.

A brief description of the prevailing species of arboreous vegetation which abound in the moist glens of these shaded sub-alpine littoral slopes may prove interesting. There are seen in great luxuriance robust forms of *Aster argophyllus*, *Senecio Bedfordii*, *Atherosperma moschatum*, *Panax sambucifolius*, *Lomatia ilicifolia*, *Pittosporum bicolor*, *Pomaderris apetala*, *Acacia decurrens*, *Drimys aromatica*, *Fagus Cunninghamii*, whose dense sap-green foliage contrasts pleasantly with the charming festoons and canopy of snow-white blossoms of the *Clematis aristata* by which it is frequently covered. High above the tallest forms of dense arboreous shrub vegetation gigantic Eucalypts rear their lofty heads. Among these magnificent crowning gems of the vegetable kingdom *Eucalyptus globulus*, *E. amygdalina*, *E. Gunnii*, *E. Sieberiana*, *E. pilularis*, *E. viminalis*, *E. goniocalyx* are the most prevalent species. Fringing the trickling rivulets, and revelling in the damp or moist atmosphere are large tree-ferns —*Dicksonia Billardierii*—whose light emerald-green fronds harmonize well with the more sombre sap green arboreous shrubs, as *Hedycarya Cunninghami*, *Coprosma histella*, and *Zieria Smithii*, with which they are intermingled. On the slopes are gregarious forms of *Daviesia latifolia*, *Eriostemon trachyphyllus*, *Correa Lawrenciana*; growing thickly on steep, but more open, grassy slopes, is seen *Hakea eriantha*; and towards the top of the spurs, at heads of gullies, *Lasiopetalum dasyphyllum*, *Pultenæa daphnoides*, *Pomaderris betulina*, and *Dodonæa viscosa*. On the flat tops of sub-alpine Silurian ranges, where there is any depth of soil and vegetable mould, are dense thickets of shrubs and undershrubs, as *Styphelia lanceolata*, of heath-like aspect. Many compositous shrubs, as *Aster stellulatus*, *A. microphyllus*, *Helichrysum rosmarinifolium*, *Senecio Australis* commingle with *Coprosma microphylla*, *Coprosma histella*, *Indigofera Australis*, *Goodia lotifolia*, *Anthocercis Eadesii*, *Solanum vescum*, *Acacia penninervis*, *Hovea longifolia*, and tall, straight-stemmed Eucalypts, as *E. viminalis*, *E. piperata*, *E. pauciflora*; on the more sandy, stony ridges, *E. macrorhyncha* and *E obliqua* prevail, and in the neighbourhood of sandstones and quartz conglomerates the following undershrubs:—*Styphelia juniperina*, *S. virgata*, *Epacris impressa*, with flowers of every tint between scarlet and white—*E. paludosa*, *Brachyloma daphnoides*, *Acacia juniperina*, *A. vomeriformis*, *Daviesia buxifolia*, *Persoonia confertiflora*, etc.

The herbaceous vegetation includes most species common to the whole area, under similar climatic conditions.

This and the following are regarded, and probably with justice, as Lower and Upper Silurian; although it must be borne in mind that it is only in a few localities that fossils have been found from which the geological age has been already determined. The stratigraphical position, however, of these sedimentary deposits in respect to the Middle Devonian formations leaves little room for doubting the age of the formation to which they belong, independently of their lithological resemblance to rocks of Silurian age found elsewhere.

UPPER SILURIAN.

This formation, which, along with the Lower Silurian series, has been subject to great foldings, metamorphic agencies, and subsequent powerful denudation, is found in certain schists, shales, conglomerates, etc., towards the Macallister-River valley, and the slates, calcareous shales, and marble-beds of the Limestone River. The vegetation of these areas does not differ materially from that occurring on the Lower Silurian rocks, under similar climatic conditions, unless quite locally, where the calcareous bands occur—the soils decomposed from these lime-bearing rocks yielding an abundance of grasses and herbaceous plants, and fewer shrubs than the soils decomposed from the slates and sandstones.

METAMORPHIC SCHISTS.

The metamorphosed Silurian rocks consist of various mica schists, argillaceous schists, gneiss, quartzitic schists, and gneissose rocks passing into metamorphic granite, the whole intruded upon and intersected by numerous igneous dykes, felstones, diorites, diabase, and porphyrites of later age. The passage from unaltered or partially altered Silurian slates and sandstones to their completely metamorphosed equivalents, the crystalline schists, is in most places so gradual that the vegetation of one area passes over into the other without much apparent change in the general facies. The Metamorphic areas present, on the whole, more undulating contours and well-grassed moderately-timbered woodlands. The soils in the flats and river margins—rich in phosphoric acid and potash, derived from the decomposition of the aluminous mica-schists and igneous dykes—are generally fertile. Among the timber-trees which are characteristic of these areas *Eucalyptus Gunnii* and *E. pauciflora* are largely distributed over the open pasture lands, ascending also on the upland areas to alpine heights.

The densely glossy-foliaged *E. Stuartiana* and *E. stellulata* have their habitats on damp alluvial flats, and, although very prolific on the Metamorphic areas, are by no means restricted thereto: the depth of soil, of whatever kind, and the conditions of humidity and moisture, govern their distribution and growth. Similarly, *E. globulus and E. amygdalina* are found on the south-

ern shaded slopes or on rich flats both on the Metamorphic and Silurian areas. On the dry stony ridges *E. macrorrhyncha* is plentiful, and on dry gneissic areas *E. hemiphloia* is prolific.

Near Omeo-Plains, on the argillaceous mica-schist, a peculiar species, *E. pulverulenta*, is found along with many forms intermediate between this species and *E. Stuartiana*. So far as I can judge, the differential characters are clearly due to differences of habitat, *E. pulverulenta* occuring in dry northern or rocky slopes and *E. Stuartiana* prevailing on the moist flats: the intermediate forms occur at both situations.* The shrub-vegetation margining the principal streams, in the Mitta-Mitta basin particularly, include the handsome *Grevillea ramosissima* and other Proteaceæ, as *G. parviflora*, *Hakea microcarpa*. The principal leguminous shrubs include *Hovea longifolia* in its most robust form, *Acacia lunata*, *A. siliculiformis*. The remaining shrubs comprise several endemic forms, as *Bertya Cunninghami*, *Micrantheum hexandrum*, *Eriostemon ozothamnoides*, *Eriostemon Crowei*, *Aster myrsinoides*, *Aster alpicola*, *Kunzea peduncularis*, *Leptospermum lanigerum*, *Westringia senifolia*, *Prostanthera phylicifolia*, *Solanum aviculare*, *Styphelia montana*. On the undulating grassy ranges (the crests of the spurs), where there is much arenaceous schist, are some fine flowering shrubs, as *Mirbelia oxyloboides*, *Grevillea alpina*, *Daviesia corymbosa*, *Acacia myrtifolia*, *Lomatia longifolia*, *Comesperma ericinum*, the heath-like *Cryptandra amara*, the spiny *Discaria australis*, *Pimelea glauca*; on shaded hill-sides *Exocarpus stricta*, *Veronica Derwentia*, *Gentiana saxosa* are abundant: on the opposite rocky northern slopes *Leptomeria aphylla*, *Brachyloma daphnoides* and the decumbent *Styphelia serrulata*, *S. humifusa* predominate. On the open, grassy hills compositous herbs are common, the most abundant species being common alike to the whole area. The following, however, may be mentioned:—*Brachycome radicans*, *B. diversifolia*, *B. ciliaris*, *Calotis scabiosifolia*, *Cotula Australis*, *Cotula alpina*. Among Umbelliferous plants *Oreomyrrhus andicola* presents striking characters in comparison to the same species found under different climatic conditions, as at the summit of Mount Kosciusko. The grasses on the Metamorphic areas are largely commingled with exotic forms, which are replacing the endemic species to an extraordinary extent in certain localities, notably in the neighbourhood of agricultural settlements, as at Omeo and Omeo Plains. These metamorphic areas, having been largely used for pastoral purposes during the past 40 years, are as a rule richer in foreign forms of vegetation than other geological formations; and it is evident that immigration is rapidly taking place from these pastoral and agricultural settlements, as centres, into the recesses of the surrounding mountains, so that in a few years many exotic forms will have supplanted the native vegetation.

* The transit of these two kinds of Eucalypts into each other has first been pointed out by Baron von Mueller in his Eucalyptography.

(*To be continued*).

Oology of Australian Birds.

By A. J. Campbell.

SUPPLEMENT.—PART I.

68. Tanysiptera sylvia—(White-tailed Kingfisher). *Locality*—Queensland and New Guinea. ** *Egg*—Round, white; texture of shell fine, and surface somewhat lustrous. Length, $12\frac{1}{4}$ lines; breadth, $10\frac{3}{4}$ lines.

— Pardalotus xanthopygius—(Yellow-rumped Diamond-Bird). *Locality*—Victoria, South and West Australia. ** *Egg*—Roundish, pearly white, surface a little glossy. Length, 7 lines; breadth, 6 lines. Breeding season, September to November.

This lovely little Pardalote is an inhabitant of the Mallee country. Three seasons ago I detected it drilling holes in the flat hard ground in the scrub. My brother, Mr. W. R. G. Campbell, of Nhill, followed up the cue, and this season was successful in taking for the first time a nest with four eggs. Subsequently I succeeded in taking another. The drill in the earth extended 23 inches in an oblique direction. At the termination was a cavity thickly walled with interwoven strings of soft Mallee bark. This nest was perfectly round, with side entrance leading into the drill, or little tunnel. It is marvellous how this little creature could construct such a wonderful nest some two feet under ground without the aid of daylight.

224. Acanthiza pyrrhopygia—(Red-rumped Acanthiza). *Locality*—Victoria and South Australia. **Egg*—Apex rounded, smaller end contracted; ground color warm white, speckled over with purplish and chestnut-red, the markings inclining to form a patchy zone around the apex. Length, $7\frac{1}{2}$ lines; breadth, $5\frac{3}{4}$ lines.

In the Mallee country this bird's nest is generally hung in a thickly-entwining parasitical creeper known as the Mallee vine (*Casoytha melantha*).

303. Glyciphila fasciata—(*pectoralis*)—(Fasciated Honey-eater). *Locality*—North Australia and Queensland. ** *Egg*—Long oval, slightly compressed towards the smaller end. Ground color white, the markings being like those on *Maluri* eggs—spotted with reddish brown, especially about the larger end. Length, $9\frac{3}{4}$ lines; breadth, 6 lines.

Mr. George Barnard, who favored me with specimens, states that in Queensland these Honey-eaters build generally over water in the hanging branches of the Melaleuca.

Note.—Eggs marked thus * not described by Gould but from the Author's collection. Those marked thus ** not previously described.

— PTILOTUS CASSIDIX—(Helmeted or Leadbeater's Honey-eater). *Locality*—Victoria. ** *Egg*—One clutch of two was beautifully proportioned in shape and of a delicate flesh-colored tint, mediumly marked, particularly about the larger end (but not in the form of a zone) with variously-sized spots of deep chestnut or pinkish red; a few dull lilac markings appeared as if under the shell's surface. In a second clutch the ground color was much lighter and markings less in number. The specimens much resembled the eggs of *Ptilotis leucotis*. Length, 11¼ lines; breadth, 8 lines.

The nests were suspended by their rims in overhanging branches of hazel (*Pomaderris apetala*) and constructed of matted strips of bark from stringy-bark saplings (*Eucalyptus obliqua*) and lined with a soft cotton-like material and hair. Exterior dimensions of nest, 3½ inches deep by 3½ inches across the mouth.

Some authorities state that the habitat of this bird extends to South Australia, but I think it is only limited to the great forests in the south-east portion of Victoria.

The first "Camp-out" of the Field Naturalists' Club at Lilydale on the 9th November, 1884, will be immortalised by revealing to Science for the first time the nest and eggs of the rarest and most beautiful of all Australian Honey-eaters. In a patch of hazel scrub I knew the birds existed. For several seasons I made attempts but failed to discover their breeding-place. The "Camp-out" having formed themselves into parties, I piloted the oologists to the hazel-patch, which was hardly entered before the honor fell to Mr. W. Hatton of detecting the first nest of the Helmeted Honey-eater. It was situated about 20 feet high, suspended to an outstretched branch of a hazel-tree overhanging the creek. With what ecstasy we ascended the tree! The pretty bird still retained possession. With Mr. Hatton's assistance I all but had my hands on the coveted prize, when, without a moment's warning, crash went the tree by the roots, and all—the two naturalists, tree, bird, nest, and eggs—went headlong into the stream beneath. Alas! we thought, farewell to the eggs of *Ptilotus cassidix*. *So* near, and yet so far. But imagine our astonishment, after dragging ourselves out of the water and removing the fallen *debris*, to find the nest and eggs intact. Many thanks to the poor bird which bravely stuck to its nest until overwhelmed by the falling foliage.

412. PLATYCERCUS BARNARDI—(Barnard's Parrakeet). *Locality*—New South Wales, Victoria, and South Australia. ***Egg* Roundish-oval, white. Length, 1 inch 2 lines; breadth, 10¾ lines.

426. PSEPHOTUS HÆMATOGASTER—(Red-vented Parrakeet). *Locality*—New South Wales, Victoria, South and West Australia. * *Egg*—Round, white, shell thin. Length, 11 lines; breadth, 10 lines.

I have noticed this parrakeet abundant about the Kerang Plains. It retires to the belts of timber to breed, depositing sometimes as many as 10 eggs in a hollow tree.

429. PSEPHOTUS PULCHERRIMUS—(Beautiful Parrakeet). *Locality*—Queensland and New South Wales. ** *Egg*—White, with a little lustre; not quite so round in form as the known eggs of the same genus. Length, 11¼ lines; breadth, 9 lines.

The Beautiful Parrakeet in some parts of Queensland resorts to old deserted ant-hills to breed.

512. OCHTHODROMUS BICINCTUS—(Double-banded Dottrel). *Locality*—Australia, Tasmania, and New Guinea. **Egg* Similar to that of the Hooded Dottrel in shape, size, and character of markings, with the exception of having a greenish-tinged ground color instead of a pale stone. The markings, which are of a very dark brown or black, are spotted and fancifully streaked over the whole surface. In some specimens the markings form patches about the apex. Length, 1 inch 4½ lines; breadth, 1 inch.

I have not heard of these eggs being taken in Australia, although they may yet be discovered in Tasmania. The eggs here described were taken by Mr. T. H. Potts from the Rakaia river-bed, New Zealand.

GALLINULA TENEBROSA—(Sombre Gallinule). Additional remarks:—

With the assistance of my friend, Mr. R. A. Poole, of Metung, Gippsland, I have been enabled to record a few interesting facts concerning this water-hen.

In the most beautiful of all the lakes—Lake King—there are several arms or brackish creeks running a quarter of a mile or so into an elevated sloping shore clothed with timber and thick scrub and margined with ti-tree or Melaleuca and sedgy flags. These creeks afford a serene and natural retreat for several pairs of Gallinule. In the smallest creek, about 12 yards from where Mr. Poole moors his boats, and about 100 yards from his dwelling, two pairs of birds have taken up their quarters and have become very tame, so that Mr. Poole experienced no difficulty in observing some of their habits. They have been there for the last three seasons. He kindly forwarded me a pair of eggs, one of which was figured in "Nests and Eggs of Australian Birds," *vide* No. 567. However, our greatest Australian ornithologist took exception to the figure. This season the old nest was reconstructed; and the strangest part of the affair is that the two pairs each laid 8 eggs in it, although the task of incubating the combined batches appeared to devolve upon one pair only. Mr. Poole kindly secured a pair from each set. One pair was similar to that already described by me, while the other had stouter ovals, ground color of a warm stone, and with the markings of reddish brown, much larger, and in the form of large patches here and there.

Removing the eggs in no way inconvenienced the birds,—in fact it was rather the reverse, because one bird had much difficulty to, or could scarcely, cover the whole 16 eggs. In about three weeks most of the remaining eggs were hatched, the chickens being attended to by both pairs of old ones.

The breeding season appears to be during the months of November and December, and probably January.

Last Christmas-tide I visited the locality accompanied by another field naturalist. In a neighboring creek, "in the cause of science," we rudely disturbed their wanton quietude by shooting a brace of birds and by taking a nest containing 11 fresh eggs. The eggs were of a type between the two sets from Mr. Poole's nest, being longish ovals slightly compressed towards the smaller end, and of a dullish grey stone color mediumly marked with round spots of purple and purplish red. Dimensions, 2 inches by 1 inch 4 lines.

The nest was situated a few feet from the shore in a clump of ti-tree. It was heaped up one foot from the surface of the water and constructed of dead flags and Melaleuca twigs, and lined with square patches of the paper-like bark of the same tree. It was a foot across the top, with the interior a few inches deep. Mr Poole's nest was similarly placed but entirely composed of dead flags.

The Gallinules have not such a happy lot as may be expected in these romantic sedgy margined creeks. There is a troublesome water-rat which keeps their ranks reduced by destroying many eggs and young. During our trip we shot one in the very act of robbing a nest. It proved to be of the species known as the White-bellied Beaver-rat (*Hydromys leucogaster*)—a perfect monster.

Note.—Specimens of the foregoing were exhibited before the Field Naturalists' Club of Victoria 12th January, 1885.

PROCEEDINGS OF SOCIETIES.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Field Naturalists' Club of Victoria was held at the Royal Society's Hall on Monday evening, 12th January. The President, the Rev. J. J. Halley, occupied the chair, and there was a large attendance of ladies and gentlemen.

Among the correspondence was a letter from the Chief Secretary's office, stating that in compliance with the Club's request special instructions had been issued to the police respecting the use of shanghais in the public parks and gardens of Melbourne and suburbs.

Messrs. A. L. Lalor and W. Swan were elected members of the Club, and several ladies and gentlemen were nominated for membership,

A paper on the Fungi of Gippsland was promised by Mr. H. T. Tisdall, of Walhalla.

It was decided to write to the Commissioner of Trade and Customs in support of the retention of the longer close season for quail.

An excursion to the Zoological Gardens, under the guidance of Mr. D. Le Souef, was arranged for Saturday, the 24th inst.

The following papers were read :—By Mr. C. French, another of his series of papers on the Orchids of Victoria. In this he described and exhibited dried specimens of nine species of the genus Prasophyllum. By Mr. Watts, Notes on specimens of Coccidæ, received from the Postal Microscopical Club of Adelaide. By Mr. S. M. Reader, Introduction to a list of the Phanerogamous plants of Studley Park, in the course of which he stated that 58 natural orders and 271 species were represented in the Park, as far as he had been able to observe, of which about 67 species had been introduced. The list is to be published in the "Naturalist." Several notes on occurrences were read by members.

The following were the principal exhibits :—By Mr. D. Best, Australian Coleoptera, family Buprestidæ; by Mr. A. J. Campbell, rare shell (*Triton australis*) from Portland, also nine species of Victorian birds' eggs; by Mr. G. Coghill, Native Orchids in bloom (*Cryptostylis longifolia* and *Dipodium punctatum*) from Boroondara, together with nest and eggs of Spine-bill Honey-eater (*Acanthorhynchus tenuirostris*); by Master E. Dombrain, egg of Wandering Albatross (*Diomedia exsalans*); by Master C. French, native woman's hair from Kimberley, N.W. Australia; by Mr. C.

French, dried specimens of nine species of Orchids of the genus Prasophyllum, in illustration of his paper; by the Rev. J. J. Halley, curious abnormal growth of Native Yams (*Microseris Fosteri*); by Mr. A. Coles, Nankeen Night-heron (*Nycticorax tenuirostris*) and timber-feeding Lepidoptera; by Mr. R. Hall, Victorian birds' eggs; by Mr. H. Kennon, fine specimen of coral repaired by polyps; by Mr. J. Leadbeater, pair of Australian fur or eared Seals (*Euotaria cinerea*); by Mr. T. A. Forbes Leith, fifty species of English and Australian Birds; by Mr. F. M. Reader, plants from Studley Park; by Mr. O. A. Sayce, 14 species Tertiary marine Fossils from older Pliocene beds at Cheltenham; by Mr. D. Le Souëf, Australian birds — Owl (*Strix scops*) and spotted Bower-bird from New South Wales; also portions of elephants' teeth; by Mr. T. Lukey, Native Bread from Ringwood, and collared Sparrowhawk (*Accipiter cirrocephalus*); by Mr. F. Spry, Victorian Lepidoptera; and by Mr. E. T. Symonds, a Sombre Gallinule (*Gallinula tenebrosa*) from the Gippsland Lakes.

After the usual conversazione the meeting terminated.

THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

FIELD NATURALISTS' SECTION. — EXCURSION.

One of the best teams and largest coach belonging to Messrs. J. Hill & Co., of this city, was placed at the disposal of the members of the Field Naturalists' Section of the Royal Society of South Australia, and their friends, on New Year's Day, and punctually at 9 o'clock in the morning the coach rolled away from the Town Hall in the direction of Norton's Summit. The day was fine, and the great heat of the sun was to some extent reduced by the clouds. On arrival at the Rock Tavern, the gentlemen descended from the coach and made their way to the Scenic Hotel at Norton's Summit on foot, while their conveyance with the ladies went round by the road. On arrival at the hotel, a halt of ten minutes was made for the purpose of giving the horses a "breather," an opportunity highly appreciated by some of the stouter members of the party. The journey being resumed, the coach followed the main road for a little way, and then turned off up a steep incline, in the direction of Uraidla. At this point the gentlemen were again requested to dismount and walk, and at the end of a couple of miles, when the coach found level ground, the party rejoined the vehicle. The Hon. Secretary, who had arranged a programme involving such an amount of walking exercise, was here the object of sundry cursory remarks from several adipose males. However, about fifteen minutes later Uraidla was reached, and the whole party dismounted, and were met by Mr. Grasby, of Oakbank, and Mr. Wilson, of Uraidla, who courteously placed their services at the

disposal of Mr. J. G. Otto Tepper, F.L.S., the leader of the excursion, as guides through the bush.

After following a track for about a mile a halt was sounded, and an *al fresco* meeting was held, Mr. W H. Selway, jun., presiding. Mr. V. Lawrance, J.P., and Mr. Wilson were elected members of the Section. To the latter a hearty vote of thanks was passed for his services so kindly volunteered, and the meeting closed. The ladies and gentlemen then found their way by a rough and precipitous path to the foot of a waterfall at the head of a beautifully romantic glen, and here an interval of an hour was spent for lunch.

After lunch Mr. Pickels endeavoured to secure one or two photographic views of the scenery and the members of the Section, and was very successful. Shortly after two o'clock the ramble was commenced, and on the way attention was directed to the undulated foliation of the slates and quartzitic grits, wherever exposed in the rocky walls bordering the deep gullies along which the road lay, and which was produced by lateral pressure. The talcose shales generally occupy the lower portions of the hillsides, while the quartzites dominate the ridges, which are usually occupied by the stringybark-forests. It was pointed out that the configuration of the country, inclusive of almost equi-distant secondary lateral gullies, was due to erosion by the agency of rain upon strata of different densities. The formation was the same as that formerly observed at Crafers and the neighbourhood of Mount Lofty, which was composed of rocks of pre-Silurian age, concealed mostly by soil formed by their disintegration, so far as known, devoid of fossils.

There was very much that was interesting in the botanical features of the trip, and Mr. Tepper indicated that as the elevation above the level of the plain increased the vegetation changed considerably in character, although none of the species seemed to be very restricted in their *habitat*. Near the foot of the rise the Peppermint tree (*Eucalyptus odorata*) was met with, and was found at a height of upwards of 1,000 feet above sea level,. where *E. leucoxylon*, or white gum, took its place, and continued to an altitude of about 1,300 to 1,400 feet; which in its turn was succeeded at that elevation by the two stringy barks (*E. obliqua* and *E. capitellata*), which were both in flower. In the stringy bark level were found in flower the *Leptospermum myrsinoides*, white, about half an inch in diameter. The flowers are closely adherent to the stem of the shrub, and are now very abundant throughout the higher part of the hills. The *Gompholobium minus* is a plant only seen in flower at this time of the year. It is generally yellow, and very much like a "native tare" (*Kennedya prostrata*); but there is only a single terminal flower on each branch; of this variety a brilliant red flower was also found. The curious *Candollea serrulata* was rather common, and a great many were amused, instructed, and some-

times startled with the rapid jerk of its highly sensitive ripe style, when touched with a straw. A considerable number of specimens of the beautiful yellow and red tubular-flowered climber, called *Marianthus bignoniaceus*, was collected. One or two flowers of *Aster Sonderi* were found, the flower of which is about two inches across, pure white, growing upon a stem about two feet high. *Aster Huegelli* was found in two colours (purple and white) rather plentifully. *Helichrysum scorpioides*, a yellow everlasting, bearing single terminal flowers, was found everywhere upon the hills, growing at an elevation of about 700 feet and upwards. The beautiful Lobelia-like *Comesperma calymega*, with its brilliant ultramarine spike of flowers, was obtained by several of the party. In some of the highest elevations there still remained a number of the exquisite blue *Brunonia Australis*, looking somewhar like the Forget-me-Not. The *Pultenæa villifera*, with yellow, papillonaceous flowers was rather abundant, and a few late specimens of the Orchid *Dipodium punctatum* were found upon the highest ridge. The pretty *Grevillea lavandulacea* was also abundant. This was was found from the highest points almost down to the level of the sea. The two sedges, *Lepidosperma carphoides* and *L. filiforme*, were found early on the road leading to Norton's Summit. The *Eryngium rostratum*, with its handsome blue flowers hidden almost in the curious spiny head of foliage, was noticed by a few of the members. Just beyond the summit the attention of every passenger was challenged by the beautiful large whitish flower-heads of *Pimelia octophylla*, which reached a height of about two and a-half feet; *P. glauca* was also found. In the bed of the creek, at the foot of the waterfall, were noticed some grand specimens of *Veronica Derwentia*, about six feet high, with conical spikes of white flowers several inches in length, and with handsome, long, light green lanceolate leaves. In the same place was discovered *Epilobium tetragonum var. pallidum* with its long pale pink petals. The ferns *Lomaria discolor*, *L. capensis* and the *Maidenhair* (*Adiantum æthiopicum*) were quite plentiful in the same locality, and were setting their spores, as was also the *Osmanda* (*Todea*) *barbara*. Amongst a large number of plants in fruit, mostly common, were *Dariesia corymbosa*, *D. ulicina*, and *D. brevifolia*; *Stackhousia sp.*, *Dillwynia ericifolia*, *Xerotes sororia*, and two other species (one with very narrow linear leaves appeared to be scarce), *Carex cæspittosa*, and a species of *Cladium*. Many kinds of alien or introduced plants were noticed, especially the *Taraxacum officinale* (*Dandelion*), and at the waterfall the *Mimulus moschatus* or musk-plant seems to be very common.

Shortly after 4 the party arrived at the coach and regained their seats, and about half-past 6 o'clock arrived again at the United Service Club-Hotel, possibly wearied, but yet delighted at having spent a day at once so interesting and profitable.

THE LINNEAN SOCIETY OF NEW SOUTH WALES.

The monthly meeting of this Society was held in the Society's House, 54 Phillip-street, on Wednesday evening, 31st December, 1884. The President, C. S. Wilkinson, F.L.S., &c., was in the chair.

The following gentlemen were present as visitors:—W. H. Caldwell, Esq., B.A.; C. E. Smith, Esq.; James Mosely, Esq.; Alex. Hamilton, Esq.

George Wall, Esq., of Sydney, was duly elected a member.

The receipt of various donations was announced.

Papers were read as follow:—

1. Occasional Notes on Plants Indigenous in the immediate neighbourhood of Sydney. No. 8. By Edwin Haviland.

The subject of this Paper is the Plant *Wahlenbergia gracilis* of the order Campanulaceæ. The author explains the apparent absence of stamens in the mature flower by the fact that the anthers, which deposit their pollen in most cases before the opening of the bud, are immediately afterwards lost by the rupture of the thin portion of the filament. The flower is not fertilized by its own pollen; the stigmatic lobes remaining closed until the pollen deposited on the style has been carried away by insects, but then opening to receive the pollen of other flowers.

2. The Geology of Physical Geography of the State of Perak. By the Rev. J. E. Tenison-Woods, F.G.S., &c.

The principal formation is granite, surrounded and overlaid by schistose and slaty rocks of high geological antiquity. Above these are found slates and limestones, generally in isolated outliers, giving evidence of great and long-continued erosion. This is also testified by the extensive tracts of drift and alluvium, derived from the older rocks, and containing large deposits of stream tin, which have been worked from a very remote period. No lodes have, up to the present time, been explored by the miner, who has confined himself entirely to alluvial workings; and the portions of the country thus utilized are, in the author's opinion, of very small extent in comparison with the whole area of tin-bearing land.

3. Note on an apparently new parasite affecting sheep. By R. von. Lendenfeld.

In several localities sheep were affected by a disease, similar in appearance to epithelial cancer, which appeared

on the feet behind the hoofs and on the lips. The histological investigation shows, that the Rete Malphigii is inflamed and the papillæ attain a very large and abnormal size; the outer layer of the skin and the horny epithelium are very much thickened, and it is apparent that between the horny layer granular masses, apparently parasites, are disposed, in which nuclei can be detected. The author supposes these to be an amœba, and to cause by irritation the hypertrophy of the epithelium. The sections were exhibited under the microscope, the specimens were hardened with chromic acid and stained with picric-acid-carmine.

4. On the Temperature of the Body of *Ornithorhynchus paradoxus*. By N. de Miklouho-Maclay.

The result of some observations on the temperature of the *Ornithorhynchus* is here given, showing it not to exceed 40° C. or 76° Fahr. Previous observations made by the Baron had shown that the temperature of the body of the Echidna was at least 5° Fahr. higher than of the other Monotremes.

Mr. W. H. Caldwell, B.A., exhibited several specimens which he had recently obtained in Queensland, showing the stages in the development of the Monotremes from the laying of the egg to the hatching.

Mr. J. Mitchell, of Browning, exhibited a large number of Silurian fossils collected by him in the neighbourhood of Browning. They consisted of a variety of Molluscs, Corals, and about sixteen species of Trilobites. Amongst the Trilobites are *Phacops caudatus*, *P. longi-caudatus*, *P. encrinurus punctatus*, and *P. Jamesii* (?), *Calymene* (*Lenaria* (?), *Harpes ungula*, *Staurocephalus Murchisonii*, *Bronteus*, and several of the genus *Acidaspis*, one of which attained a considerable size. The molluscs included representatives of *Pentamerus*, *Orthoceras*, *Avicula*, *Strophomena*, &c.

Mr. Macleay exhibited a specimen of *Ophiophagus elaps*, a venomous snake of the Indian region, and the largest known species of the venomous Colubrine snakes. He had received it from the Rev. J. E. Tenison-Woods from Perak. The specimen measured 142 inches in length, but the species had been known to obtain a length of 170 inches. As its name implies it preys on other snakes, and its venom is so deadly that it is said to kill a man in three minutes and an elephant in a couple of hours.

Mr. Gervase F. Mathew, F.L.S., of H.M.S. Espiegle, exhibited four boxes containing a collection of many

hundred lepidopterous insects, which he had obtained during his last cruise on the South-east Coast of New Guinea. The collection contained a few Micro-lepidoptera, but by far the greater part of it consisted of Diurnal Butterflies of the most gorgeous hues and of wonderful variety.

Dr. Cox exhibited some fine samples of a Mushroom grown at Potts' Point on an artificial bed. The spawn (Mycelium) of these Mushrooms was obtained from a clump of bamboos, and was placed in the bed in July last. The mushrooms have, when half expanded, a strong white membrane reaching from the pileus to the stipes, and when this breaks the mushroom expands. Professor Stephens considered that the Agaric shown belonged in all probability to the sub-genus *Amanita*, and that they were, to say the least, suspicious as articles of diet.

Dr. Cox also exhibited and presented to the Society for safe custody a dried specimen of a plant recently described by Baron Sir F. von Mueller from the mountain region of the Clyde River, and named by him *Eriostemon Coxii*. The plant is believed to have valuable medicinal properties.

Mr. E. P. Ramsay, F.R.S.E., exhibited for Mr. E. G. W. Palmer a native Bees' Nest which had been obtained in the neighbourhood of Smithfield. For the last seven years it had been suspended from a branch of a pear tree in Mr. Palmer's garden, and a quart of honey had often been obtained from it, but during the last winter a caterpillar formed its cocoon in the only aperture and so effectually closed it that all the bees were killed.

Drawings were exhibited of some fossil bones which Mr. R. D. Fitzgerald, F.L.S., had received from Lord Howe's Island. The bones had been forwarded to Sir Richard Owen, and are believed to be those of two species of extinct lizards, probably allied to the gigantic horned *Megalania* and *Notiosaurus*, which have been found in the Pleistocene deposits in Queensland and New South Wales.

THE ROYAL SOCIETY OF NEW SOUTH WALES.

MICROSCOPICAL SECTION.

The last meeting for the present session of the microscopical section of the Royal Society of New South Wales was held on Monday evening, Mr. Hirst in the chair.

Mr. Alexander Durrand, of the Quekett Microscopical Society, London, was introduced as a visitor. Several beautiful slides of spicules of sponges and gorgonia collected and mounted by him were shown with Mr. Pedley's microscope.

Mr. Wiesener exhibited a collection of very choice slides, selected by Wheeler, of London, consisting of test slides, micrometer rulings, polariscope objects, pathological preparations, double-stained insects, &c.

Dr. Morris exhibited a "Pellucida" prepared with a film of pure metallic silver, and mounted as a dry object, also with Balsam. The object-glass was one of Powell and Lealand's new $\frac{1}{4}$-inch water immersion, and the resolution of both these slides was exceedingly clear, and confirming Dr. Morris' principle of enabling low-angled lenses to compete with the new high-angle oil-immersion objectives. The use of pure silver, having a refractive index of 2·3, is the latest result of Dr. Morris' protracted series of investigations, and may be considered superior to all other methods of preparing the highest test diatoms, on account of its permanency and simplicity. The method of preparation is as follows:—The diatom-valves are placed on the cover-glass, dried, heated to redness on a platinum foil, and then attached diatoms uppermost to a glass slip. The two silver-reducing solutions are poured on in equal volumes, and allowed to remain from half to one minute, and as soon as the grey appearance is seen, instantly distilled water is poured over, whereby the deposition of the silver film is checked; drain dry, heat on a mica slip over a flame until a yellow appearance comes, and the slide is now permanently fixed, so that the water or oil may with impunity be used on it, and no deterioration results from age. The solutions are placed as follows:—A: 1dr. nitrate silver to 1oz. of water; add sufficient ammonia until precipitate is nearly re-dissolved; add 12oz. water. B: 1dr. nitrate silver to 1oz. of water; pour in boiling solution of 48dr. of Rochelle salts to 48oz. water; boil for ten minutes, and filter when cold.

NOTES, MEMORANDA, &c.

The following extract is from the *Argus* of 15th Jan.:—

"The *Townsville Bulletin* (Queensland) records a peculiar case of death from the stings of jelly-fish. It seems that Frederick William Smith, a boy 11 years of age, about half-past 7 on the morning of the 30th December, went into the shallow water of a creek to bathe. Shortly after, he was seen by Mr. John Kelly, of Ross Island, walking in about 3 feet of water, crying and stiking his hands against his thighs. Mr. Kelly at first thought the boy had cut his foot with a bottle, but noticing that after going a few yards the boy fell down, Kelly ran to the spot and found the deceased lying dead in about 3 feet of water, with a large number of jellyfish all over his body, though not more than three minutes had elapsed from the time when he first noticed him. So numerous were the jelly-fish, that while Mr. Kelly was removing the body from the water his own arms were severely stung, necessitating after-treatment to reduce the swelling. The deceased was seen by Dr. Ridgley, who gave it as his opinion that death resulted from the stings of the fish."

Though the severe effects of the stings of the Medusæ have been often depicted, we have not previously heard of a death having been ascribed to them, nor indeed is it at all certain that the fatal effects in the case cited above were directly attributable to the cause stated. One writer says that the pain occasioned by contact with a single Medusa was such as almost to cause fainting, and such may have been the case in the present instance, death afterwards resulting from drowning, though it is equally likely that owing to the number of the jelly-fish the fatal results may have been directly due to their stings. We have passed through a continuous shoal of these creatures extending from Sandridge more than half across to Williamstown, and when they are about in such numbers it would be advisable for bathers to exercise particular caution. The hydroid zoophytes are in general too insignificant in size to be injurious, but Semper mentions a Plumularian, found in the Pelew Islands, which is as high as a man, with a stem an inch in diameter, and which possesses considerable urticating power, the effects of its sting being felt for some hours.

The New Zealand *Journal of Science* for November is mainly occupied by Captain Hutton's Annual Address to the Philosophical Institute of Canterbury on "The Origin of the Fauna and Flora of New Zealand," and a continuation of Mr. T. H. Potts' paper on "The Oology of New Zealand." Captain Hutton's address is in continuation of that for last year, and the conclusions which he has reached are thus summarized :—

"New Zealand, which formerly existed as the southern part of a continent extending through Australia to India, was isolated from Australia towards the close of the Jurassic period, but was attached to a South Pacific Continent, and received a stream of immigrants from the north. None arrived from the South because Fuegia was not then in existence. In the upper cretaceous the land shrank to a size considerably smaller than at present. In the Eocene, elevation took place and New Zealand extended outwards in all directions, but remained isolated from other lands. Plants and animals came in both from the north and from the south. In the Oligocene and Miocene periods New Zealand was, except for a short interval, a cluster of islands, but was upraised once more, and obtained more immigrants from North and South during the Pleistocene; after which subsidence occured, and the land throughout the South Island and the southern part of the North Island sank considerably below its present level during the Pleistocene period."

Mr. Potts' paper is very valuable to ornithologists, giving remarkably full particulars of the nests and eggs of New Zealand birds. The author is to be commended for giving not only the scientific and popular name of each bird, but also the native name or names. The number includes several shorter papers on different subjects by Mr. W. M. Maskell, Mr. C. H. Robson, Dr. D. Sharp, Dr. R. von Lendenfeld, &c. Mr. Robson's paper is on the subject of the New Zealand frost-fish, which is remarkable for its extraordinary habit of committing suicide by deliberately swimming on shore in frosty weather. Mr. Robson says :—

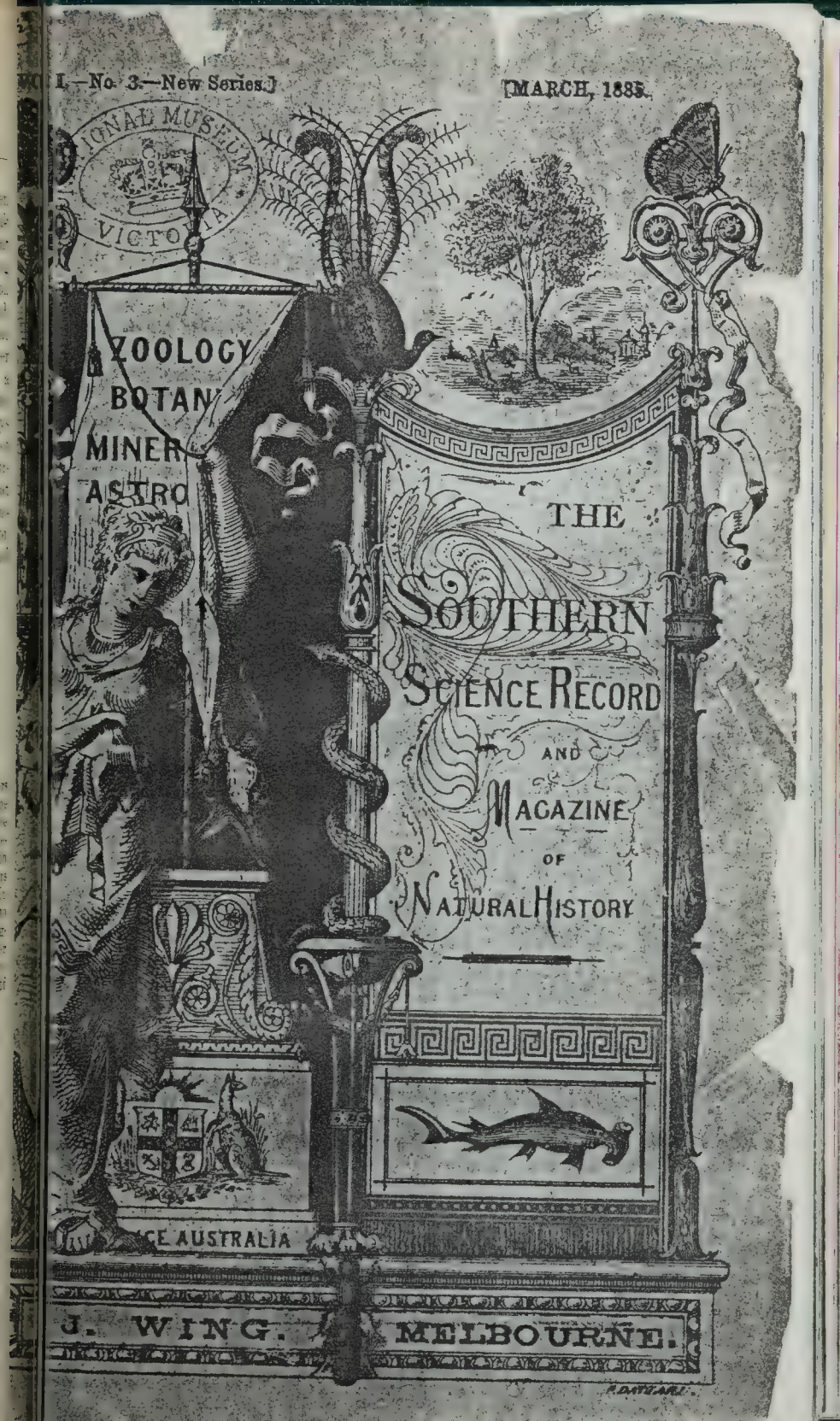
"As far as my experience goes, it comes on shore only during frosty weather, when there is little or no wind, and most commonly at night. . . . . As a rule the frost-fish comes on shore at this place about dawn, but frequently after sunrise, and usually with the tide quarter-ebb; it swims on top of the clear water strongly in a normal position, with its head directed to the shore, and continues so to advance till the water becomes too shallow for it to swim further, when its compressed shape causes it to fall on one side; it then begins to spring into the air, often 3 feet or more, with its head always directed shorewards, till the receding tide leaves it high and dry. When jumping, as above

stated, it frequently comes down bent like a C, and as it is then gasping, this may have led the fishermen at Purakanni to think that it was trying to bite its tail, the more so from the fact that the said tail is often bleeding, by beating on the sand during the dying struggles of the fish. In a paper published in Vol. VIII. of the Transactions of the New Zealand Institute I stated, and now repeat, that I have frequently with a stick turned the frost-fish from the shore while it was in sufficiently deep water to swim well; and that after swimming from the beach for a short time, it invariably turns round and comes deliberately on shore. I have repeated this experiment many times, and always with the same result. I can also state positively that it is not driven on shore by any visible enemy, nor does it go there in pursuit of prey of any kind. All the frost-fish obtained by me at Clifford Bay were adults in fine condition, fat, strong, and seemingly in perfect health. I do not pretend to give any reason for their coming on shore, and only state the facts as I observed them."

NOTE AND QUERY.

ARE YOUNG SPIDERS FROLICSOME?—I ask this question in case others may not have met with a similar experience to that which recently came under my notice. I was standing beside an old brick wall, into one of the crevices of which streamed some of the beams of a summer sun, when I became aware of small objects darting about in the glare of the sunlight which peered into the crevice. On a closer inspection I observed two baby-spiders engaged in what can only be described as a game of "hide and seek." In the genial warmth of the sun-ray (which they evidently seemed thoroughly to appreciate) they appeared to be engaged in a regular "romp," by turns dodging behind projecting parts of the brickwork, and alternately running after each other. On reflection I could form but one conclusion—that these infantile spiders were engaged in a little frisky enjoyment after the manner of young kittens.—ALPHA.

I.—No. 3.—New Series.] [MARCH, 1885.



Definitions of some new Australian Plants,

By Baron Ferd. von Mueller, K.C.M.G., M.D., Ph.D., F.R.S.

[Continued.]

Capsella Andraeana.

Annual, dwarf, erect; stem as well as branches, flowerstalks, and stalklets beset with short papillular hair; leaves short, linear, blunt, entire, glabrous; racemes short; flowers minute; sepals soon spreading; petals white or yellowish, not or little longer than the sepals; filaments partly dilated at the base; anthers yellowish, cordate-roundish; stigma sessile; fruit small, ellipsoid- or globular-ovate, turgid, glabrous, not divided nor dilated at the summit, on a stalklet of usually the same length; valves subtlely one-nerved, not keeled nor much compressed; septum lanceolar; seeds generally four in each cell, ovate-roundish, compressed, brown-yellowish, margined by indurated through moisture much expanding mucus.

Between the Lachlan and Darling-River; H. Andrae.

In some respects allied to *C. pilosula*, in others to *C. humistrata*.

Pittosporum Wingii.

Leaves of almost herbaceous texture, on very short stalks, ovate- or elongate-lanceolar, acuminate, hardly or slightly recurved at the margin, beneath prominently penni-nerved and as well as the branchlets brownish-silky tomentose; corymb umbelliform, solitary, short-stalked or almost sessile; sepals velvet-hairy, narrow-lanceolar, gradually pointed; corolla about one-third longer than the calyx, its tube widened upwards, shorter than the bluntish and not much spreading lobes; anthers fully half as long as the filaments, many times longer than broad; ovary brownish-silky; capsules not large, rather turgid, almost globular or somewhat depressed, velvet-hairy; valves two, hard; funicles thick and very short; seeds several, from garnet-color turning brown-black, somewhat viscid.

On high rocky ranges near Rockingham-Bay.

From Bentham's brief description in the "Flora Australiensis" I, 112, I was led to assume that this was *P. rubiginosum*; accordingly I described it as such in the Fragm. Phytogr. Austr. VI, 167, the fruits of Cunningham's plant then not being known. But having since obtained an authentic leaf-specimen of *P. rubiginosum* from the great Kew establishment, I find identical with it specimens gathered on the Daintree-River (W. Hill), Trinity-Bay (Fitzalan) and Johnston-River (Berthaud), and thus am able now

from good material to point out, that *P. rubiginosum* differs from the species above recorded anew, in generally larger, more verticillate-crowded leaves of thinner quite papery texture with but scanty indument, in often conspicuously pedunculate and not rarely thyrsoid inflorescence, in scattered-hairy sepals, in petals about three times as long as the calyx, cohering for about two-thirds of their length into an almost cylindric tube and being pointed at the much-recurved summit, in filaments more than twice as long as the anthers, in larger almost ovate-cordate fruits, longer than broad, broader towards the base than towards the somewhat acute summit, of deep yellow color, in thinner valves connate towards the base and only sparsely hairy outside, in a sudden short narrow basal constriction of the fruit, also in generally more numerous and more viscid seeds, not verging into a renate form. The comparison of the flowers of *P. rubiginosum* was rather misleading, as they are considerably larger and much less numerous ; the petals are white even when dry, while those of *P. Wingii* are dark-colored in that state, and may therefore fresh be of a different color.

P. Wingii in some respects approaches also *P. revolutum.*

This dedication of the now re-described Pittosporum is to the gentleman, who by the issue of the "Southern Science Record" under great sacrifices and with indomitable energy has much contributed in late years here locally to the advancement of natural history, both zoological and botanical.

Remarks on the Flora of the Australian Alps,

WITH INTRODUCTORY NOTES ON THE

Geology and Meteorology of the Area.

By James Stirling, F.L.S.

Member Royal Society Vict., Hon. Corr. Member Royal Society S.A.

[Continued.]

MIDDLE DEVONIAN.

The sedimentary rocks of this formation embrace the Marine limestones of Bindi, Gillingal, in the Tambo River valley, some limestones and shales at Tabberabera, in the Mitchell River valley, the Buchan limestones, and some calcareous shales and limestones high up on the flanks of the Cobberas Mountains, filling mere pockets in the surface of banded quartz porphyries, which form the probable site of that Palæozoic volcano. These limestone formations are here noted for the gently-swelling surface undulations and the open, grassy, park-like aspect they

present. No more charming landscape of mountain scenery exists in the Australian Alps than some of these areas. Bindi in the Tambo valley is, perhaps, the most picturesque of all. "Here the limestones have been gradually moulded, by rain, frost, and heat, into gently-swelling hills, which sweep upward from the hollow of the basin in smooth green slopes, and cling up on the rude and rugged flanks of the mountains of granite, quartz, porphyry, and indurated slates, which hem in nearly on all sides the beautiful park-like area. The contrast between the gentle curves of the lightly-timbered slopes and green hills of Bindi and the surrounding frame of mountains is heightened by the rugged peaks and escarpments of Mount Tambo, rising up among the ever-green Eucalyptus forests, which clothe that mountain."

The arboreous vegetation, which lends a charm to the area, consists of scattered groups of *Casuarina quadrivalvis*, *C. suberosa*, *Acacia melanoxylon*, *Acacia dealbata*, *Exocarpus cupressiformis*, *Bursaria spinosa* (which here attains its greatest luxuriance, with a trunk over a foot in diameter); *Banksia marginata* and, at the lower levels, densely glossy-foliaged forms of *Eucalyptus Stuartiana*, *E. Gunnii*, and others. Among the native grasses, which yield such a rich verdure during Spring, are representatives of *Poa*, *Panicum*, *Dichelachne*, *Anthistiria*; the smaller herbs are chiefly Compositæ, and do not differ from the general character of the species to be met with at similar elevations in different formations throughout the area. As the limestone areas have been in pastoral occupation for a number of years, many exotic forms have been introduced, and flourish on the flats and along the water-courses.

Among the Upper Devonian are the thick-bedded sandstones, conglomerates, thin yellow shales, etc., of Mount Tambo, on the Main Dividing Range; and the shales, grey flags, conglomerates, sandstones, etc., in the Macallister and Mitchell River-source basins; and in the Mitta-Mitta valley are great masses of conglomerates superior in position to masses of compact, blue limestone, as at Wombat Creek and the Gibbo River. The vegetation of the Upper Devonian areas (apparently) depends more on the physical features than on the prevailing constituents of the rocks.

The localities where the quartzose sediments prevail are eroded into deep and precipitous valleys and tabular ridges, and where the sediments are interstratified with igneous rocks the features are those of grassy terraced hills, lightly timbered. In the steep defiles on the Mitchell River, at lower levels, umbrageous arboreous forms of Pittosporum, Acmene, Acacia, and other genera are covered with numerous creepers, as *Clematis aristata*, *C. microphylla*, etc.; the river flats are frequently covered with dense undergrowth, interwoven with the native brambles (*Rubus rosæfolius* and *R. parvifolius*). The scrubs on the ridges and the Eucalyptus-vegetation differ very little from that on the Silurian areas, under similar climatal conditions.

CAINOZOIC FORMATIONS.

These embrace Pleistocene, Pliocene, and Miocene deposits resting on the denuded edges of Palæozoic rocks. The Pleistocene consists of alluvium which makes up the fertile flats of the valleys. The Pliocene embraces river-clays and gravels, which underlie the alluvium and also the auriferous wash of existing river-terraces. The Miocene deposits consist principally of beds of white laminated clays containing impressions of fossil leaves, ferruginous bands of conglomerate, generally auriferous, partly exposed on the spurs high up above the beds of the present rivers, and overlaid by immense struts of tertiary basalt, which form the Miocene lava flows, as at Dargo and Bogong High Plains.

The vegetation of the Pleistocene and Pliocene areas varies with the elevation above sea-level, and in the former depends largely upon the depth and quality of the soil as well, whether such be derived from the decomposition of adjacent mica-schists, Silurian slates and sandstone, granitic rock, marine limestones, tertiary or older basalts, etc. The only characteristic forms of vegetation which inhabit these areas are paludinal, the arboreous and shrub-vegetation being governed largely by Meteorological conditions.

The most common paludinal species are those enumerated in the following list, those marked with an asterisk ascending on upland flats to alpine heights :—

Ranunculus aquatilis	J. prismatocarpus
R. rivularis	Scirpus polystachyus*
R. parviflorus*	Hypoxis hygrometrica*
Nasturtium terrestre*	Cladium Mariscus
Polygonum minus	Mimulus repens
Epilobium tetragonum*	Gratiola Peruviana*
Lythrum salicaria	Limosella aquatica
Myriophyllum pedunculatum	Mentha laxiflora
M. elatinoides.	M. australis
Lobelia simplicicaulis	M. gracilis
Convolvulus sepium	Lycopus Australis
Dichondra repens	Sparganium angustifolium
Luzula campestris*	Potamogeton natans
Juncus bufonius*	Carex pseudo-Cyperus*
Juncus communis	Agrostis quadriseta*

(As named by Baron von Mueller.)

LOWER DEVONIAN IGNEOUS ROCKS.

These rocks cover a large area at Mount Cobberas on the Main Divide and on the high mountains to the south of it, as at Mount Wombargo, and are known as the Snowy River porphyries, consisting of central masses of salmon-coloured quartz porphyries, the core of the ancient volcanoes, and surrounded by accumulations of felstones, lavas, agglomerates and ash, penetrated by dykes, and greatly altered by siliceous infiltration.

The vegetation of these areas is, in some places, peculiar. On the steep, rocky spurs of the Cobberas and Wombargo mountains the banded porphyries weather into a coarse gritty soil, which furnishes a scanty covering of wiry grasses and cyperaceæ, large areas are covered by stunted gum-scrub growing among larger forms of *E. Gunnii* and *E. pauciflora*, etc. Among the shrubs which inhabit the stony slopes, santalaceous plants are very abundant, notably *Choretrum lateriflorum*, *Exocarpus nana*, *Omphacomeria acerba*, and among Leguminosæ *Daviesia ulicina*, *Pultenæa juniperina*, *P. subumbellata* and *Dillwynia juniperina*; besides *Styphelia montana*, *Epacris heteronema*, *Grevillea Miqueliana*. On grassy flats, at the higher levels, fields of *Stylidium graminifolia* are characteristic features in the vegetation, where bright colors are uncommon. The following also occur in abundance at these stations:—*Pomesperma retusum*, *Euphrasia Brownii*, *E. antarctica*, and many herbaceous Compositæ; *Helichrysum lucidum*, *Podolepis acuminata*, etc. At the higher levels, above 5000 feet, the vegetation is not much affected by the geological formations, the shrubs margining the rivulets, and the herbs, etc., on the grassy plateaux, and growing from crevices in the highest rocks, being much alike on the porphyritic heights of the Cobberas, the granitic heights of Mount Kosciusko, the Silurian rocks on Mount Hotham, and the highest points of the basaltic plateaux —Bogong and Dargo High plains.

Associated with the metamorphic schists of the Mitta-Mitta basin are numerous intrusions of porphyritic granites and numerous igneous dykes, felstones, etc., which are probably of Lower Devonian age, having been exposed by extensive denudation. The vegetation on these areas is not locally very marked or distinct from that common to the metamorphic area.

UPPER DEVONIAN IGNEOUS ROCKS.

These consist for the most part of porphyries and melaphyres, interbedded with the stratified rocks, being contemporaneous lava-flows altered by chemical action, as at Snowy Bluff in the Mitchell River-basin, although it is probable that the basic rocks at the Snowy Bluff are diabase porphyrites; and some intrusive porphyries adjacent to the Middle Devonian marine limestones at Bindi. So far as I am aware, the igneous rocks of Upper Devonian age have very little, if any, influence on the general facies of the vegetation where they occur.

TERTIARY.

These embrace the great sheets of basalt which form the elevated plateaux overlying the Miocene river-beds, as at Dargo, Bogong High Plains, Gelantipy, and Gibbo table-lands. Covered with snow during the winter months, the higher of these areas form splendid pasture-lands during summer. Rocky-crested undulatory ridges divide richly-grassed open valleys covered with

many endemic grasses ; on the slopes, at lower levels, many shrubs find a congenial soil and atmosphere under the shade of small Eucalypts, principally *E. pauciflora* ; among these *Pimelea ligustrina*, *Bossiæa bracteosa*, and gregarious masses of *Drimys aromatica* are the most characteristic. On the open slopes towards the margins of source-runnels, which trickle through the dense beds of Sphagnum, are seen heath-like patches of *Helichrysum baccharoides* and *Baeckea Gunniana*. On the whole the species found growing on these basaltic highlands differ very little from those found on other formations at similar elevations, except in the proportion of non-woody to arboreous species, *i e.*, Gramineæ, Cyperaceæ, and various herbs, are more abundant on the basaltic highlands than on the other geological formations.

GRANITES.

The true age of most of the granitic rock-masses is a matter of some uncertainty. It is not improbable that many of these apparently primary rocks are, in reality, but the completely metamorphosed equivalents of the Lower Silurian rocks, although many intrusive granites and granite-porphyries which are found within the area are of plutonic origin and possibly of later age.

The principal granitic masses at the higher altitudes are those at Mounts Bogong and Brothers north of the Main Divide, Mount Kosciusko, and on the ridges near Mount Selwyn and Mount Baldhead, &c., south of it. The low-lying granite-areas include those at Marengo and Wombat Creek in the Mitta-Mitta valley, and those at Dargo, Mitchell-River valley, Swift's Creek, Tongio, etc., in the Tambo-River valley. The vegetation of the highest granitic elevations is scarcely different from that on the other formations, a few endemic shrubs excepted, as *Kunzea Muelleri*, *Eriostemon ovatifolius*, and *Grevillea australis*, which are perhaps more characteristic of these granite areas than of other classes of rocks. The physical features, however, are strongly marked, the contours more rounded than the Silurian sediments, or Trappean rock-masses. On the rounded, grassy slopes of the low-lying granitic areas the following trees and shrubs prevail :—*Eucalyptus melliodora* at Dargo ; *E. hemiphloia* at Tongio, in the Tambo valley ; *E. amygdalina* and *E. stellulata* on the flats at both areas : on the points of rocky spurs *Brachychiton populneum* is found : on the open ridges *Acacia dealbata*, *A melanoxylon*, *Casuarina quadrivalvis*, *Banksia marginata*, *Exocarpus cupressiformis* are plentiful ; and along the river-flats robust forms of *Hymenanthera Banksii*, *Bursaria spinosa*, *Pliaganthus pulchellus*, etc. The most prominent non-woody plants are included in the genera Brachycome, Haloragis, Helichrysum, Anthistiria, and Danthonia.

(*To be continued.*)

The Leipoa Ocellata.

By the late F. W. Andrews.

[Read before the Field Naturalists' Section of the Royal Society of South Australia, 3rd February, 1885.

In the month of November, 1883, I was camped at some rock water-holes in the mallee scrub a few miles from Mooneric, in the Gawler ranges. I was on the look-out at this place for some specimens of the young birds of the Native Pheasant (*Leipoa ocellata*), and fortunately two natives came and camped near the water-holes one night and went out next morning hunting for eggs, or, as they call them, "Peepe." They returned in the evening with 14 or 16 eggs, and I traded with them for half-a-dozen; three were good, but the rest had been rather too long in their native incubator, and contained young ones in a forward state of development. I found that the old blackfellow was going out again the next morning at daylight, and obtained his promise that he would call for me at my tent and let me go with him. I did not trust to his word, however, but got all ready for an early start. I was going over towards his "wurley," when I saw him making off through the scrub. I called to him, and he waited for me, and we then started together. It was a hot morning, and I had to walk my best to keep up with him. He kept going round one lot of bushes and then another in an opposite direction. I found afterwards that this was done to throw me out of the straight track to the nest, as he was afraid of my doing just what I was cautiously trying to do, that was to shoot the old birds. After about two and a half miles of quick hard walking we came to some rising ground with very thick scrub; the blackfellow suddenly stopped, picked up a small stick and threw it into the bushes in front of him. This was also done to frighten the old birds away, as I found we were only a very short distance from the nest. The nest was very artfully concealed in the scrub; the mound was three feet in height and eight or nine in diameter, much resembling a large ant heap. The old native whom I accompanied found his nests by certain land marks and points in the back ranges. We did not obtain a sight of the old birds, as the noise we made walking through the scrub gave the alarm, and as they traverse the intricacies of the scrub with ease and celerity they were out of any danger. The old blackfellow now commenced to open out the middle of the mound to look for the eggs. He was provided with a small handy wooden scoop with which he threw out a quantity of the middle of the nest, and then used his hands carefully feeling for "Peepe." The top of one soon showed, placed on end, and seven fine eggs were taken out of the egg circle. When the blackfellow took out the fifth egg it broke in his

hands; as he was lifting it out a fine young bird was there strong and ready to come out. I had to catch hold of it at once or it would have run off. When the shell broke it gave a scream that for the size of the bird was quite startling. The young birds leave the nest as soon as hatched, are very fat at this time, and in a few hours commence to feed themselves. White ants, seeds of different kinds, and insects, &c., form their food.

When roosting in the mallee, the old male birds may be heard just previous to dawn of day. The hen bird now retires to the nest to lay, after which the male bird repairs to the same place and afterwards assists the hen to scrape up around and into the nest the loose sand and vegetable matter disturbed by the female when working her way down to the interior of the mound where the eggs are laid. By dawn of day, or nearly so, they are ready to go out in the scrub to search for their day's food. Their tracks may very often be seen a long way from the nest. They lay about every third day.* Their eggs are very large for the size of the bird, each egg filling its abdominal cavity.

"In the second nest we visited, about a quarter of a mile from the first, the circle of eggs numbered 12† which, with those he had before procured, the blackfellow carefully wrapped up in fine grass; they were then packed in a "Noodlah," or bag made of kangaroo-skin, and slung over the shoulder with as much unconcern as to their breaking as if they had been stones. The thinness of the shell is well known to all in the bush. I obtained three or four more eggs from the native, hoping to get some more chick-pheasants, or, as they called them, "Baby-cheetah," or baby birds "Cheetah," being the North-west native name for birds. I was, however, disappointed, but the old man, having seen me skinning the young one at the nest, exclaimed—"What for you big one 'tooley-tooley,'" the expression meaning silly or foolish. But after I had finished stuffing the bird he appeared more pleased, and pronounced it to be "all the same like-um brother." He shortly after visited me again at my tent and fetched another young bird nicely cleaned and dried. This I paid him for in tobacco, tea and sugar, and thus got a good pair of specimens. I was very anxious to obtain some more, as they were very interesting as duplicate exchanges with other museums, but they moved their camp and took the next lot to the head station. Three of the young birds they obtained alive from the eggs are

* "The bird lays two eggs a-week, or one every third or fourth day."

† "Two or three inches of dry loose sand are thrown over the leaves, then a tier or layer of four eggs [Gould states eight] is deposited, placed perpendicularly on the smaller ends. The four eggs are in the form of a square, four or five inches apart. An inch or two more sand, and another tier is placed opposite the interstices of the sub-tier, and so on till the complement is reached,—three or four tiers amounting to sixteen eggs."—A. J. Campbell, "Victorian Naturalist," Vol. 1.

now in the Zoological Gardens in Adelaide, and, as may be seen, they are growing handsome and hardy.

When I obtained the young bird just taken from the shell I washed it well in plenty of water after it was killed, and carefully removed all blood and mucus. I hung it up by the back to drain dry, the wing feathers having more the appearance of pieces of wire than anything else, each feather being covered with a very fine membrane, which burst open as the feathers dried, and in about two hours they were all puffed up and the chick appeared as a full-fledged bird, the tail only being partially developed.

These birds are now getting very scarce about their old haunts, the sheep now running loose over the large fenced-in paddocks having driven them away; consequently collecting is now very hard work, as all kinds of birds and animals are driven away in the same manner.

The temperature of the nest when the eggs were taken was reckoned to be about 85° ‡ or perhaps a little higher—artificial incubators being 103°. The nests are cleaned out some time before laying, left open to dry, and afterwards filled up to ferment or sweat, ready for the laying season.

The Protection of our Native Birds.

By A. J. Campbell.

[Read before the Field Naturalists' Club of Victoria 9th February, 1885.]

This is a subject of national importance, and essentially within a field-club's province.

The Anglers' Protection Society instruct and advise the Government from time to time in piscatorial matters. Lately the Senators of the United States of America, recognising the usefulness of such clubs, appointed a commission consisting of delegates from the leading Entomological societies to enquire into and report upon a certain insect plague. Therefore it is a fit and proper proceeding for our Field Club to take upon itself the liberty of bringing under the notice of the Administrator of the "Game Act" certain anomalies that exist in the protection of our indigenous birds, in addition to others which should be protected. Towards this end I humbly beg to place at the Club's disposal any

‡ "The temperature of the sand about the eggs, by Fahrenheit's thermometer, indicated 93 deg., being 30 deg. hotter than the surrounding atmosphere." A. J. Campbell, "Victorian Naturalist," Vol. I.

knowledge I possess in this particular department of our natural sciences which I have been studying for years.

However there are many items to be taken into careful consideration. First, our original "Game Act" was passed nearly 21 years ago, when the colony was, comparatively speaking, young and not so much was understood, regarding the habits of our native birds, as at present. It may be of interest to some to learn that the original "Act" was created 20th April, 1864, for little over 3 years, consequently it expired 18th June, 1867. The present "Act," which is a *fac-simile*, with the exception of being perpetual, came into operation 6th September, 1867.

There is a circumstance that greatly interferes with our birds, and to which they do not appear, like the birds of Europe or America, to be able to adapt themselves, viz. :—the alteration of the physical features of the country by the advance of civilisation and cultivation Then there is the havoc made with indigenous forests, —their natural resorts. Our land administrators seem to alienate our valuable timber lands without framing the slightest regulation against their wanton waste. Another instance, the reclamation of many swamps cannot but seriously affect numerous members of the aquatic tribe by demolishing their breeding haunts.

Rabbits over-run large tracts of our colony. Various modes are adopted for their destruction—one extensively used is poisoned grain, which is devoured by some of our beautiful birds. It was only recently I heard of a poisoned locality strewed with carcases of rabbits intermingled with a few birds. Therefore it would appear, taking all things into consideration, that our birds have a hard struggle for existence when may be added amongst their enemies the droves of "pot-hunters" who rove over the country at holiday times and who blaze away at anything that resembles a feather—from a tom-tit to a jackass.

Our "Game Act," be it said, is almost a dead letter. Whoever hears now-a-days of prosecutions under that law although it is transgressed against almost every other day (Sundays included) during close season? Such transgressors are decidedly blamable in the first place, but in the second the police authorities, who, as a rule, shamefully and openly neglect this law of our land. Of this I possess abundant evidence, but shall cite only one case. A flock of five Emus (a noble bird fast becoming extinct) accidentally passed a certain township. Away went every available horseman and dog in full chase. The poor Emus very soon licked the dust in view of the remaining inhabitants and the *police*.

To simplify the subject I have carefully drawn up a tabulated statement showing the indigenous birds protected under the "Victorian Game Act," birds proposed to be proclaimed, and indicating how these birds are protected in the adjacent colonies. From our stand-point as naturalists here is another string to the bow of Federation. Where is the use of a colony passing an

enactment that it shall not be lawful to kill or capture a scheduled bird when you may with impunity step across the border and destroy that bird? Or you may go to that strip of disputed territory —"No Man's Land"—between Victoria and South Australia, and blaze away as long as powder and shot will last. An incident of this nature came under my own observation. In 1877 I happened to be officially stationed on the River Murray, near Wentworth, New South Wales. It was close season on the Victorian side, while, by some oversight by the New South Wales statesmen, their Game Act had lapsed. One day the Victorian trooper accosted a person on his territory with a double-barrelled fowling-piece and a fat bag of ducks. He said, "My fine fellow, I've got you this time." "No, you don't," replied the other, with a comical facial expression; "They're New South Wales ducks; I swear I followed them across the river."

In the tabulated statement I have preserved the order and common names in the Club's published list of Victorian birds, which, if individual members would study it would greatly assist them in comparing the statement. Of the 390 mentioned on the Club's list only 39 are protected by law. We now propose proclaiming about 200 additional species. It may be argued if the birds are duly proclaimed not every one can discern the difference between a Podargus and a Corcorax. Well every person should possess sufficient knowledge of public law to keep out of its clutches. The Public Library and Museum are always open where may be studied the beautiful plates or specimens of all our native birds.

Of the birds already protected it is proposed to alter the close season in two instances, viz. for the Lyre-bird and Quail, by extending the beginning and curtailing the end of the season for the first-mentioned bird and *vice versa* for the other. In a paper I had the honor of reading before this Club, 8th September, 1884, it will be remembered that I proved conclusively that our Lyre-birds commenced to breed the month prior to the prohibited season, and I see no reasonable cause why they should be protected later than the end of December. With regard to Quail, what happened lately will be still fresh in our memories, how a deputation waited upon the Hon. the Commissioner of Customs to request that the close season for Quail might be abridged, and how the *Argus* columns contained numerous letters from experts denouncing such a proposal, and stating if any alterations were made it should be towards extending not curtailing the prohibited season. Then followed a large and influential anti-deputation of sportsmen, naturalists, &c., who interviewed the Commissioner. After hearing the other side that honorable gentleman prudently allowed matters to remain as they are for the present. There is no doubt that Quails are late breeders. In this colony the Painted Quail or Varied Turnix commences about the end of

September or beginning of October. The Stubble and Swamp Quails commence in November or December, terminating generally in January. I have observed birds sitting at Christmas time. Many of my country friends can attest to the same occurrence. Only this season a person informed me that during Christmas week he had flushed a Swamp-Quail from her nest in his garden. It is certainly evident that many birds are not fit to be shot by the 1st February, therefore it is proposed to extend the close season another four weeks, thereby also assimilating it to that of New South Wales.

Taking a glance over the new birds to be proclaimed the Hawks head the list. Here we may probably meet with a little opposition, as these birds are generally looked upon as vermin, but I can assure members who are not acquainted with their habits that they are not vermin, but vermin-destroyers. They are nowhere abundant now consequent upon a continued war waged against them as supposed evildoers. Suppose a Hawk does swoop down and a farmer lose a prize rooster or a fat duck now and again what is the loss to the incomparable good performed by that bird in destroying such destructive vermin as snakes, rabbits, rats, mice, &c. Is a laborer not worthy his hire? It may be a pigeon-house is rudely disturbed by a beautiful Gos-hawk, but our favorite domestic cat may often produce more mischief. Some of the smaller members of the *Raptores* family only hawk for insects, &c., such as the lovely Letter-winged Kite and Kestrel, in fact there is some mention of introducing the Kestrel into New Zealand as a vermin-destroyer.

Amongst true farmers' friends may be reckoned the Owls, but these nocturnal fivers, like the Hawks, are a persecuted race, although they are of inestimable value as vermin-killers. The great mice plague, which over-ran the Western District last year, may be partially attributed to the extinction of the natural enemies of such vermin. Amongst these enemies foremost stand the Owls. It is rather a remarkable coincidence that in the Wimmera district, where the mice and rabbit scourges are rampant, there is a marked scarcity of both diurnal and nocturnal birds of prey. The Vermin Board Conference which met lately resolved to commence to-morrow united and simultaneous action towards the extermination of rabbits in the colony. Another resolution was that the native cat, tiger cat, domestic wild cat, and iguana should be declared natural enemies of rabbits and protected from destruction. But a great error has been committed in totally overlooking the greatest natural enemies of the troublesome rodents, viz:—the Hawks and the Owls.

We now pass on to the numerous useful insectivorous birds, such as Night-jars, Swallows, Kingfishers, &c. Some 36 species were figured on a descriptive chart of insectivorous birds which were to have been protected by law. The chart was issued some

TABULATED STATEMENT—Showing List of Indigenous Birds protected under the Victorian "Game Act," Birds proposed to be proclaimed under that Act, and indicating what Birds are protected in the adjacent Colonies.

NOTE.—Names marked thus * proposed to be proclaimed. Close Season from August 1 to December 20. Names in italics subsequently struck out by a Special Sub-Committee of the Field Naturalists' Club of Victoria, appointed to consider this Statement.

NAMES.	VICTORIA.	NEW SOUTH WALES.	SOUTH AUSTRALIA.	TASMANIA.
	Close Season.	Close Season.	Close Season.	Close Season.
* *All members of the Hawk family (except Wedge-tailed Eagle)*	...	...	...	...
* Owls	...	...	...	...
* Podargus or Mopokes	...	...	1 July—30 Nov.	...
* Night-jars	...	...	" "	...
* Swallows	...	Swift only. 1 Sept.—28 Feb.	" "	...
* *Bee-eater*	...	...	" "	...
* Great Kingfisher, or Laughing Jackass	...	1 Sept.—28 Feb.	" "	...
* All other Kingfishers	...	...	" "	...
Magpie or Common Crow-shrike	1 Aug.—20 Dec.	1 Sept.—28 Feb.	" "	The whole year
* *All other Crow-shrikes*	...	...	Except Black Magpies. 1 July—30 Nov.	...
* All members of the Graucalus family	...	...	" "	...
* Grallina or Magpie Lark	...	...	" "	...
* Thick-heads	...	...	" "	...
* Thrushes	...	...	" "	...
* Shrike-tit	...	...	" "	...
* Fly-catchers and Fantails	...	1 Sept.—28 Feb.	" "	...
* Robins	...	" "	" "	...
Lyre-birds	1 Aug.—31 Jan. Proposed alteration. 1 July—31 Jan.	" "	...	...
* Coach-whip Bird	...	...	1 July—30 Nov.	...
* Wedgebill	...	...	" "	...
* Warblers and Wrens		1 Sept.—28 Feb.	" "	...

* Ephthianuras	...	...	,,	,,	...
* Larks, and those known as the Pipit and Cincloramphus	...	1 Sept.—28 Feb.	1 July—30 Nov.		...
* *Finches*	...	...	,,	,,	...
* *Bower-birds*	...	...	,,	,,	...
* *Oriole*	...	...	,,	,,	...
* *Wattle-bird or Honey-eater*	...	1 Sept.—28 Feb.	...		1 Aug.—23 May
* All other Honey-eaters	...	,, ,,	1 July—30 Nov.		...
* Tree-creepers and Sittellas	...	...	,,	,,	...
* Cuckoos	...	...	,,	,,	...
* Swamp or Ground Parrakeet	...	...	Except Rosella. 1 July—30 Nov.		...
Wild Pigeons and Doves	1 Aug.—20 Dec.	1 Sept.—28 Feb.	,,	,,	1 Aug.—10 Feb.
Mallee Hen	,, ,,	,, ,,	,,	,,	...
Quail, and all birds known as Quail	1 Aug.—31 Jan. Proposed alteration. 1 Sep.—28 Feb.	,, ,,	,,	,,	1 Aug.—30 Apl.
Emu	14 June—20 Dec.	,, ,,	,,	,,	1 Aug.—10 Jan.
Bustard or Wild Turkey	1 Aug.—20 Dec.	,, ,,	,,	,,	...
* Plovers or Peewits	...	,, ,,	1 Aug.—30 Nov.		1 Apl.—10 Jan.
* Southern Stone Plover or Curlew	...	,, ,,	,,	,,	...
* All other kinds of Plover	...	...	1 July—30 Nov.		...
* Avocet and Stilts	...	...	,,	,,	...
* Ibis and Spoonbills	...	...	,,	,,	...
Crane or Native Companion	1 Aug.—20 Dec.	1 Sept.—28 Feb.	,,	,,	...
* All Cranes, such as Herons, Egrets, &c.	...	...	,,	,,	...
Bittern	1 Aug.—20 Dec.	...	,,	,,	...
* Land-rail	...	1 Sept.—28 Feb.	,,	,,	...
* All other members of Rail family, Porphyrio, Coots, &c.	...	...	Except Porphyrio. 1 July—30 Nov.		...
Black Swan	14 June—20 Dec.	1 Sept.—28 Feb.	,,	,,	1 Apl.—10 Jan.
Wild Geese (all kinds)	,, ,,	,, ,,	,,	,,	,, ,,
Wild Duck of any species	1 Aug.—20 Dec.	,, ,,	1 Sept.—31 Dec.		,, ,,

years ago by the Educational Department for use in the State Schools. But, strange to say, with one exception, none of the birds have been yet proclaimed.

Robins and others of the gayer-plumaged varieties should be also protected against the unnecessary slaughter caused by their beautiful feathers being highly prized by "foolish fashion" for adorning the costumes of the gentler sex.

In placing Finches, Parrots, &c., under law, it must be borne in mind in what respect it may affect dealers and others, because such birds are becoming general favorites in our aviraies, and the fifth section of the "Act" provides a penalty not exceeding five pounds for every head of native game taken during the period of prohibition.

Much more might be stated, if necessary, about many other interesting birds, but what little has been mentioned I trust may commend itself to the Club in the interests of our indigenous "feathered friends."

PROCEEDINGS OF SOCIETIES.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of this Club was held at the Royal Society's Hall on Monday evening, 9th ult. Mr. D. Best occupied the chair, and about fifty members and visitors were present.

A letter was read from the Bendigo Science Society asking the Club's co-operation in getting the protection of the law extended to magpies, magpie larks, curlews, and laughing jackasses. Copies of a paper read before the Society in support of the protection of these birds were also forwarded for the perusal of members.

The hon. Librarian acknowledged the receipt from Dr. Usher, of Ballarat, of copies of his Zoological and Botanical Charts for students.

Mrs. C. A. Topp, Dr. MacGillivary, Messrs. Donald Campbell, W. Ferguson, — Nicholson, and Jno. Smith were elected members of the Club; and five ladies and six gentlemen were nominated for membership.

Papers for future meetings were promised by—the Rev. A. W. Cresswell, "Notes on a Trip to Griffith's Point;" by Messrs. Lucas and Gregory, "An overland Journey to Wilson's Promontory;" and by Mr. C. French, "Orchids of Victoria, Part 7."

Papers were read as follow:—1. By Mr. Tisdall on the "Fungi of Nount Baw Baw," in which he described about twelve species of the genus *Agaricus*, and the paper being accompanied by water-color drawings (natural size), with magnified sections and parts, enabled the members present to easily follow the writer's remarks The writer concluded with general directions as to the selection of edible fungi. 2. By Mr. A. J. Campbell "On the Protection of Our Native Birds," in which he suggested slight alterations in the close seasons for Lyre-birds and Quail, and the extension of the protection of the law to about 200 additional species of native birds. His remarks caused considerable discussion, more especially with regard to magpies and parrots, whilst some extracts were read from the paper from the Bendigo Science Society, by Mr. Nancarrow (also a member of this Club), giving his views on the subject. In conclusion, Mr. Campbell gave notice that he would propose at the next meeting, that a deputation wait upon the Commissioner of Customs to request him to alter the schedules of the Game Act as suggested.

The chairman drew attention to the approaching annual *conversazione*, and urged members to make an early start in the preparation of exhibits.

The following were the principal exhibits:—By Mr. F. G. A. Barnard, Larva of moth *Chelopteryx Colsi*; by Mr. A. Coles, five South American birds, and pair of Queensland Cuckoos; by Mr. J. E. Dixon, sixty species of Victorian Lepidoptera, and six species of Neuroptera; by Mr. C. French, paradise plumes, lady's dress, and native adzes from New Guinea; by Mr. H. Kennon, stone and iron axes from New Zealand; by Dr. Lucas, eggs of iguana from Pakenham; by Mr. F. M. Reader, plants from Studley Park (*Leguminosæ-Compositæ*), rare plants from Scotland, and different stages of fungus, *Polyporus* (*Resupinaria*) *velutinus*, *Fries*.

After the usual conversazione the meeting terminated.

THE MICROSCOPICAL SOCIETY OF VICTORIA.

The usual monthly meeting of the above Society was held at the College of Pharmacy, Swanston-street, on Thursday, 25th February, the President, Dr. Ralph, occupying the chair.

Letters were read from Mr. H. Shillinglaw, thanking the members for their assistance at the Annual Conversazione of the Pharmaceutical Society; and from Mr. J. Wing, calling attention to the new issue of the "Southern Science Record."

The Secretary acknowledged receipt of the current numbers of the "Victorian Naturalist," the "Bulletin de la Société Belge de Microscopie," the "Quarterly Journal of Microscopical Science," the "Microscopical News," the "American Monthly

Microscopical Journal," the "Journal of the Quekett Microscopical Club," the "Journal of the Royal Microscopical Society," and the "Proceedings of the Linnean Society of New South Wales;" also the "Northern Microscopist," Vol. I, the "American Quarterly Microscopical Journal," Hassall's "Microscopic Anatomy of the Human Body," and Beale's "How to work with the Microscope," the last-named being a donation from the President.

Mr. Barnard presented 12 slides of Micro-Fungi, mounted dry and named. A set of Polarizing apparatus, the purchase of which had been ordered at last meeting, was laid on the table.

Mr. W. Bowen, of Collins-street, was duly elected a member of the Society.

Dr. Ralph read some notes descriptive of a recent visit to Griffith's Point and its neighborhood, and exhibited a number of interesting specimens in illustration, comprising mollusca, ascidians, zoophytes and Bryozoa, algæ, &c.

THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

An ordinary meeting of the members of this Society was held on the evening of the 3rd ult. Dr. Whittell presided, and there was a good attendance. After the formal business had been disposed of, the Chairman referred to the resignation as a member of the Council of Dr. Haacke, and said he held out strong hope, from the fact of his having returned to the colony, that Dr. Haacke might take the position again. At any rate they might think it advisable not to fill up the vacancy until they had Dr. Haacke's views before them. On the motion of the Rev. W. Howchin, seconded by Dr. Mayo, it was decided to hold over the appointment for a month.

Several interesting geological and other specimens were exhibited. Dr. Cleland showed specimens of coral found on the surface of a plain fifteen miles north-west of Farina. The Rev. Mr. Howchin said that Mr. Jones had told him that specimens of what he supposed to be cretaceous formations came to the surface in that locality. [A piece of rock from Hergott Springs, showing impressions of various mollusca, was handed round.] Mr. J. G. O. Tepper exhibited a specimen of Australian Geeko, commonly found under the bark of trees, and a species of Oenothena, also a number of minerals from Leigh's Creek.

The Assistant-Secretary (Mr. A. Molineaux) reported that the lessee of the late Sir George Kingston's estate at Marino has informed him that he had missed a great number of peaches from some of the trees in the garden lately, and, suspecting that opossums were destroying the fruit, he had placed steel traps beneath the trees. The next morning a native spotted cat was

brought in (the Dasyurus), which he opened and examined, and was surprised to find its maw filled with masticated peach pulp. He afterwards examined others caught in the same manner, and always found the pulp in their stomachs. This was a new fact in natural history.

A paper on "New or Rare South Australian Insects" was handed in by Mr. J. G. O. Tepper. The first insect, provisionally called *Callops Smeatoni*, was described as a small beetle, of steel-blue colour, with short scarlet stripes on the margin of the wing-cases, and extraordinary-shaped antennæ, the second and third joints being enormously larger than the remainder. It scarcely exceeds one-tenth of an inch, and lives on *Leptospermum myrsinoides*, a myrtaceous shrub. The second is a most minute beetle. Mr. Tepper knew of its size being less than an ordinary pin-hole. The body-segments exhibit unusual proportions, the breastpart or thorax being much larger than head and abdomen together. It was found on *Aster axillaris*, a herbaceous shrub on the hills. The third insect is the wattle gall moth, which appears to be the cause of those fruit-like masses on the common golden wattle (*Acacia pycnantha*), a tiny creature, measuring half an inch with outstretched wings. The latter are grey, with seven or eight darker transverse bands. Figures of all the above, partly of natural size, partly greatly enlarged, as drawn by the author from the specimens examined, accompanied the short descriptions and remarks about the habits of the insects. A hymenopterous insect was also figured, supposed to live parasitically upon the larva of the Gall Moth. Mr. Tepper also exhibited a fresh specimem of *Drosera binata*, lately found by him in a moist gully of the Mount Lofty Ranges, not far from town. The species is one of the most formidable of this insectivorous genus, being able to catch and digest flies and other insects half an inch in length, by means of its glandular hairs. Special attention was directed to the fact that the leaves, which had been immersed in water for some time, had commenced to bud and produce numerous small leaflets, evidently intended as young plants, thus converting the leaf into a stolace or creeping stem.

The Hon. Secretary (Dr. W. L. Cleland) read a paper by the late Mr. F. W. Andrews on the "Nidiology of the *Leipoa ocellata* (native pheasant)."

Mr. Samuel Dixon read a paper on "Some Indigenous Shrubs of South Australia suitable for Fodder." Mr. Dixon acknowledged that he had been greatly assisted in the preparation of the paper by Professor Tate, and said that instead of dealing with the herbs and grasses, which are popularly looked on as comprising our only stock-foods, he wished to make some practical remarks upon a number of plants—usually shrubs and small trees—which constitute a most important part of the food of sheep and cattle, especially in the drier and more arid portions of South Australia, and some of which are found widely

spread through northern districts, and extending to the eastern and western boundaries. He wished to assist in spreading a knowledge of the advantages of preserving and increasing the growth of a class of stock food, which suffers but slightly from droughts. Very heavy losses had arisen from sheepfarmers being misled as to the food-qualities of the scrubby vegetation. For instance, many of the scrubby plants of the Murray scrub are excellent fodder. Some day he hoped the real practical importance of botany would be better understood by our rulers, whose frequent mismanagement of our Crown Lands would doubtless be somewhat improved if they had a real acquaintance with and knowledge of the history of those plants whose growth and abundance constitute the main value of the lands for which they pass enactments. He proposed to mention first those plants which are common around Adelaide and in our moister climates, and afterwards to describe those belonging to more arid regions, but which are well worthy of preservation wherever they will grow.

FIELD NATURALISTS' SECTION.

On Saturday, January 24, the third excursion of the summer session of this Section of the Royal Society took place. About forty ladies and gentlemen, members of the Section and their friends, assembled on the Nairne platform at the North-terrace Railway Station, and left by the 10 minutes past 1 train for Ambleside in specially reserved carriages.

On arriving at the rendezvous the party was met by Professor Tate, F.G.S., F.L.S., &c., and several resident members, and a start was made for the banks of the River Onkaparinga. On entering the paddock adjoining the railway line the Hon. Sec. (Mr. W. E. Pickels, F.R.M.S.) sounded a "halt," and a meeting was held, Professor Tate presiding. Four new members were elected, and the Hon. Secretary announced that the leadership of the party for the afternoon would be vested in Mr. E. Guest, of Balhannah, who had come over for that purpose. The business of the meeting being concluded, Mr. Guest led the way northwards, followed by the majority of those present, while a few on "photographic deeds intent" wandered in an opposite direction. In spite of the heat and the lateness of the season the district was rich in botanical specimens, and large collections were made by ardent students, beginners among whom found their labours lightened and their knowledge increased by the information given by Professor Tate and Mr. J. G. O. Tepper, F.L.S.

Among the plants found were *Opercularia ovata*, *Mentha gracilis* and *Australis* (Australian native mint), *Hypericum japonicum*, *Alternanthera triandra*, *Brachycome graminea*, *Epilobium tetragonum*, *Polygonum minus*, *Myriophyllum variifolium* and *elationoides*, *Potamogeton crispus*, *Helichrysum rutidolepis*, and *Potentilla anserina*. This last is said only to be found in this

immediate locality. The tall shrubs by the riverside—*Bursaria spinosa*, *Leptospermum lanigerum*, and *Acacia retinoides*, were in full flower; and the European mint and *Lythrum salicaria*, the latter resplendent with its purple flowers, were eagerly gathered.

Of the sedges collected the most remarkable were *Cyperus lucidus* and *textilis*, *Juncus planifolius* and *prismatocarpus*, *Scirpus inundatus* and *Carex cæspitosa*. Of grasses the tall *Poa cæspitosa* was found in fruit, together with the rough-stemmed *Edinopogon ovatus* and *Eragrostis Brownii*, and the graceful *Ehrharta stipoides*. On the railway line was seen in flower *Hemarthria compressa*, and along the river the introduced *Lolium perenne*. Varieties of the aquatic plant *Triglochin procera* were obtained in full fruit.

The party followed the course of the Onkaparinga under the railway bridge, and a short distance beyond, until about half-past 4. At a quarter before 5 the party left Ambleside laden with spoil, and arrived in Adelaide shortly after 6.

The fourth of the summer excursions of this section of the Royal Society was made on Saturday afternoon, February 16th. As the journey was intended to be short, the members assembled rather later than usual at the North-terrace Railway Station, and in a specially reserved carriage proceeded to Largs Bay. On arrival, Mr. J. G. O. Tepper, F.L.S., presided over a nominal business meeting, at which two new members were elected. He then introduced to the company Mr. W. T. Bednall as the gentleman who had kindly consented to undertake the arduous duties of professorial leader for the afternoon. Mr. Bednall explained that the weather had scarcely been conducive to the chance of finding many good marine specimens, but by careful search the members might add something valuable to their collections. He pointed out that the *Venus scalarina* (the common cockle) was the predominant shell in this locality, its distribution being very local and confined from Largs Bay to about a mile south of the Semaphore. From there southwards this shell was replaced by another sand-living bivalve, the *Mactra polita*, only a very few specimens of which were taken. Mr. Bednall then suggested a number of other varieties of shells that might be found; but, as he intimated at first, the result of the searching was not particularly interesting. The afternoon was evidently not the one of six that the naturalists might have to spend upon the same seashore before success would reward labor and patience.

After being advised to collect the sand and small shells which would be found in little heaps, and to dry it for examination under the microscope, when there would probably be discovered beautiful specimens of small shells, diatoms, foraminifera, and corallines, the party took a northerly direction along the beach, and on reaching Largs Bay Fort a number of those

present more interested in the defences of the colony, or discouraged by their scientific researches, stayed by the way to watch the manœuvring of the gunners.

During the journey Mr. Tepper explained that there was a distinction between the submarine flowering plants and seaweed. The plants *Cymodocea antarctica* and *Posidonia australis*, found in such large quantities on the beach, were commonly mistaken for algæ (seaweed). The difference shown in the appearance of the seaweed and the seaplant was very marked A good specimen of *Halophila ovalis* and some others were shown, but nothing worth mentioning was found in algæ, probably because the attention of the members seemed to be confined to the shells. Very few specimens were taken alive, but a fairly good collection was made of *Triton Quoyi*, *Nassa fasciata*, *Columbella lincolnensis*, *Natica conica*, *Sigaretus zonalis*, *Conus rutilus*. *Bittium turritella*, *Mactra pura*, *Hiatula biradiata*, *Arca lima*. Only broken specimens of *Pecten australis*, *P. bifrons*, and *P. laticostatus* were obtained. *Solemya australis* were uncommonly abundant, but small and in parts only. *Phasianella bulimoides* (pheasant shell) were rather scarce. Mr. Mollineux obtained one of these alive, which he explained had, by the appearance of the shell, evidently at some time been attacked by a stingray, but eluded the enemy. The shell had been broken, and had grown again with an additional patch on the outside, which was not an unfrequent occurrence. Much interest was imparted to the excursion by little dissertations upon the habits of land and marine life, in many cases a very complete comparison being made. After a very profitable and enjoyable walk, extending some distance beyond the Fort, the company returned in time to take the 6 o'clock train back to Adelaide, well satisfied with the results of the excursion.

THE LINNEAN SOCIETY OF NEW SOUTH WALES.

ANNUAL GENERAL MEETING.

The Annual General Meeting was held in the Society's House, 54 Philip-street, on Wednesday evening, 28th January, 1885, the President, C. S. Wilkinson, Esq., F.L.S., in the Chair.

The President delivered an address upon the Pleistocene period and its influences upon the present distribution of the Fauna and Flora of Australia. He gave also a short review of the work of the Society during the past year.

On the motion of Dr. MacLaurin, a unanimous vote of thanks was accorded Mr. Wilkinson for his valuable Address.

The Treasurer, Hon. James Norton, M.L.C., reported on the financial condition of the Society, showing a credit balance of £77 11s. 3d.

It was resolved, on the motion of Mr. Macleay, that the Annual Subscription for all members hereafter joining the Society shall be Two Guineas, without Entrance Fee. Also, upon the motion of Mr. Griffin, that ladies may be admitted upon election as Associates of the Society, with all the privileges of Ordinary Members except the right to attend the Monthly Meetings, at the reduced subscription of One Guinea, without Entrance Fee.

The following gentlemen were elected Office-bearers and Council for 1885:—President: Professor W. J. Stephens, M.A., F.G.S. Vice-President: Rev. E. J. Tennison-Woods, F.L.S., F.G.S.; Dr. James C. Cox, F.L.S., &c., C. S. Wilkinson, F.L.S., F.G.S. Honorary Secretaries: Hon. William Macleay, F.L.S.; E. P. Ramsay, F.R.S.E. Hon Librarian: William A. Haswell, M.A., B.Sc. Hon Treasurer: Hon. James Norton, M.L.C. Council: John Brazier, C.M.Z.S.; Dr. Thomas Dixon, J. J. Fletcher, M.A., B.Sc.; J. G. Griffin, C.E., &c.; Edwin Haviland, Esq.; Hon. P. G. King, M.L.C.; E. Meyrick, B.A.; P. R. Pedley, Esq.; H. R. Whittell, Esq.

THE MONTHLY MEETING

Was then held, the President, Professor W. F. Stephens, .A., F.G.S., in the chair.

r. T. W. David, B.A., F.G.S., of the Mines Department, was introduced as a visitor.

The following were elected members:—Mr. E. G. W. Palmer, Burwood; Mr. Arthur J. Mills, Burwood; Mr. Alexander Hamilton, Guntawang, N.S.W.; Mr. Smithurst.

The receipt of several donations was announced.

The following papers were read:—

1. A Monograph of the Australian Sponges. Part IV. The Myxosponigæ. By R. von Lendenfeld, Ph.D.

In this paper the Australian species are described. (The author partly adopts the view of Sollas regarding the separation of the Halisareidæ and Gumminæ.) The structure of Bajalus, a new genus of Halisarcidæ, is described. The subdermal cavities are remarkably developed. Amœboid wandering cells were found in a dense layer beneath the outer skin. Gland cells are described. Sexual products mature only in the innermost part. The gastral cavity serves as a marsupium. The anatomy of *Chondrosia Ramsayi*, n.s., *Chondrilla papillata*, n.sp., and *cortica*, n.sp., shows some points of interest. Peculiar subdermal cavities are described in the former. The two latter possess a special cortical skeleton.

The classification used is the following:—

II. Ordo. Myxospongiæ.—(Haeckel.)

Sponges without Skeleton or with Polyactinellid Flesh spicules.

I. Subordo Myxinæ—(Von Lendenfeld.)

Myxospingæ, with structureless mesodermal ground-substance. Exceptionally few and distant fibrila. Identical with Halisarcinæ, O. Schmidt.

8. Familia Oscarellidæ.—(Von Lendenfeld.)

Myxinæ, with spherical ciliated chambers, for Halisarca lobularis, O. Schmidt, Oscarella Vosmær. No Australian species.

9. Family Halisarcidæ.—(Von Lendenfeld.)

Myxinæ, with sac-shaped elongated ciliated chamber. New genus Bajalus. 1 species.

II. Subordo Gumminæ.—(O. Schmidt.)

Myxospongiæ, with a fibrilous mesodermal ground-substance.

10. Familia Chondrosidæ.—(F. E. Schulze.) Characters of the Suborder.

I. Sub-Familia Chondrosinæ.—(Von Lendenfeld.) Chondrosidæ without flesh spicules. 1 species.

II. Sub-Familia Chondrissinæ.—(Von Lendenfeld.) Chondrosidæ with flesh spicules. 4 species.

2. The method of Section Cutting, with some improvements. By R. von. Lendenfeld, Ph.D.

In this Paper the author gives a very detailed description of this method, and adds some small improvements. The author combines Cadwell's and F. E. Schulze's methods of preventing sections from curling up.

3. *Amœba parasitica.*—A new Parasitic Protozoan infesting sheep. By R. von Lendenfeld, Ph.D.

The author dwells in this Paper on the interesting parasite which he exhibited at the last meeting of the Society. He has since succeeded in breeding the parasite artificially in an Aquarium, from the scurf of a sheep affected by the disease. The Amœba which has been thus produced is described.

4. The Meterology of Mount Kosciusko. By R. von Lendenfeld, Ph.D.

In this Paper the author dwells on the meteorlogical results of his recent expedition to that mountain. He shows that there is more aqueous precipitation on the plateau than at any meteorological station in New South Wales or Victoria. He notices the unprecedented amount

of dew caused by the low (below zero) nocturnal temperature in those regions. Permanent snowfields, the remains of drifts, are found there (37° S.), 1500ft. lower than homologous snowfields in the European Alps (48° N.), a fact which shows that Australia, although a hot and dry Continent, makes no exception to the rule of greater cold and greater moisture in the southern hemisphere.

5. The Glacial period in Australia. By R. von Lendenfeld, Ph.D.

The author gives the results of his recent expedition to the central part of the Australian Alps in this paper as far as they bear on the above question. He ascended the two highest peaks in Australia, and found on the plateau which surrounds them undoubted glacial remains in the shape of rèches moutonnées in many places above 5800 ft. He concludes that Australia was affected by a glacial period at the same epoch as New Zealand, but that owing to the lowness of the mountains (only 7256 ft. the highest peak) the low latitude and the warm and dry winds from the interior, the glaciers attained but small dimensions and only covered an area of about 100 square miles. He considers it probable that no other glaciers existed in Australia at the time, as even those on the highest elevation of the continent were so small.

6. On the Proteaceæ. By the Rev. W. Woolls, Ph.D., F.L.S.

The author refers to the wide distribution of this order in Europe during the Tertiary period, as evidenced by fossils, which bear a close resemblance to forms now existing in Australia, though Bentham nevertheless was of opinion that a great many Australian species must have originated in this geographical region. The order extends from S. Africa to S. America, and so northwards even to Japan. It is, however, principally Australian, and has for its metropolis the extra-tropical districts of the western coast. Next in richness and variety of form comes New South Wales, the countries to the north and south showing a very rapid diminution in the number of species. The Australian distribution of the order is further discussed, and the economic value of certain species is pointed out.

7. On a New Snake from the Barrier Ranges. By William Macleay, F.L,S., &c.

The description is here given of a species of *Furina* to which the specific name of *Ramsayi* is affixed. Some

specimens of it were exhibited, as well as specimens of *Vermicella, Typhlops*, and *Delma*, from the same locality.

Mr. Whitelegge exhibited a large collection of fossil ferns from the Hawkesbury and Wianamatta beds, mounted as transparent objects for the microscope. It is remarkable that the tissues of these plants have remained almost unaltered and perfectly elastic and pliant through the vast periods during which they have been preserved.

Mr. Tenison-Woods exhibited two very small stone axes or "kelts," from the Murrumbidgee, supposed to have been used for ceremonial purposes; a canoe ornament from Florida, Solomon Islands; a wooden figure of a mammal (Cuscus ?) from the Louisiade Archipelago; and several fine stone axes from New Guinea, the Louisiades, Solomon Islands, New Zealand, and Australia.

The President exhibited some of the "pug," or mixed clay and wash dirt which is being worked in the Caledonian claim, near Gulgong. This material is found filling up the ancient caverns and tunnels of a mass of crystalline Devonian (?) limestone, excavated under conditions of rainfall and drainage totally different from those now existing. It contains large quantities of iron and manganese in small grains, and also in lumps of considerable size. The gold is said to be coarse, or nuggetty.

He also exhibited specimens of *Macadamia ternifolia*, or Queensland nut, in illustration of Dr. Woolls' paper.

NOTES, MEMORANDA, &c.

"The Catalogue of the Australian Hydroid Zoophytes," by W. M. Bale, is published for the Trustees of the Australian Museum, Sydney, and like the former volume of the series (Mr. Haswell's Catalogue of the Malacostraca), is intended to provide the student with a succinct account of all that has previously being done towards elucidating the history of the Australian members of the group. There is a brief introduction, in which the structure of the Hydroida is described, and the terminology explained, with notes on the literature and distribution of the Australian species. The total number of species (exclusive of some which are very doubtful and insufficiently described) is 124, of which the author describes over 80 from personal observation. 24 of these are new, and about as many were first described by the same author in a former paper. Of the previously-known species more detailed descriptions are given, and a number are figured for the first time. Of those species which have not come under the author's notice the full descriptions of the original authors are quoted, with copies of their figures. Mr. Bale has been fortunate in receiving from Mr. Busk drawings of most of the species described in the "Voyage of the Rattlesnake," and a number of these are reproduced in the present work. There are 19 plates of microscopical figures, 15 of which are from camera lucida drawings by the author, the remainder being copied from Busk, Kirchenpauer, Thompson, and other writers on the Hydroida. The zoophytes are unfortunately not figured in their natural size. No new genera are mentioned, but the characters of several are modified. It is pointed out that the genus Sertularia is not always limited to one pair of hydrothecæ to an internode, as stated by Allman, but that in many species the internodes nearest the stem bear from two to five pairs of hydrothecæ each, while those near the tips of the pinnæ support only one pair each. The genus Thuiaria is distinguished not so much by the presence of a number of calycles on each internode as by their being in two distinct series, without any paired arrangement. The genus Aglaophenia is taken to include those species in which the gonangia are borne on "nematocladia" or pinnules more or less modified for protective purposes, whether these pinnules are combined to form a "corbula," or scattered along the branch, while Halicornaria comprises those species only in which the gonangia are borne on the stem or on unaltered pinnæ. The genus Antenella of Allman is considered as a mere form of Plumularia, on the ground that in some Australian species of that genus the simple (or Antenella) forms are found

growing in the same colony as the ordinary pinnate shoots. The author says that the same thing constantly occurs in a small species of Halicornaria. Several species formerly considered distinct by the author are now cancelled, as the result of the examination of fresh material. *Sertularia pumiloides* (Bale) is united with *S. minima* (Thompson), *Plumularia indivisa* (Bale) is found to be the stemless form of *P. campanula* (Busk), *Aglaophenia McCoyi* (Bale) is shown by the occurrence of intermediate forms to be a variety of *A. divaricata* (Busk), and *Aglaophenia* (*Halicornaria*) *Thompsoni* (Bale) is found in the same manner to be a robust non-parasitic variety of *H. longirostris* (Kirchenpauer). *Sertularella simplex* (Hutton) is given as a synonym of *S. polyzonias* (Lin.), a cosmopolitan species. Among the more remarkable forms which have not previously been accurately figured or described are *Idia pristis*, *Pasythea quadridentata*, &c. A second species of the genus *Lineolaria* is described, and it is stated that in *Plumularia filicaulis* (Poeppig), though the trophosome consists of simple or pinnate erect shoots, the gonangia are flat on one side and closely adnate to the supporting object, as is in the case with the whole hydrosoma of Lineolaria. *P. filicaulis* is peculiar in habitat, being known so far only from the southern coast of Australia, and the Bay of Talcahuano, Chili. The remarks on distribution tend to show that while the Hydroid Fauna of the North-east coast has very little affinity with that of any other region, that of the South-east is less peculiar, a number of its species being found in other parts of the world, notably in New Zealand. The author of the present work follows Mr. Hincks in dealing only with the "Hydroid Zoophytes" proper, that is to say, omitting those Hydroida in which there is no fixed polype-stage, or in which none has been discovered, but we think it is to be regretted that the author has not seen his way to include the whole order.

The Trustees of the Australian Museum are undoubtedly rendering valuable service to students by publishing these manuals of the Australian Fauna, and we hope to welcome the next of the series at no distant date.

We have received from Mr. James Stirling, F.L.S., a copy of his "Notes on the Meteorology of the Australian Alps," read before the Royal Society of Victoria on the 11th December, 1884. It gives the results of a great number of observations made by the author and others, and is a valuable contribution to our knowledge of a subject which has not been so extensively studied as it should be.

We have received the report of the Royal Society of South Australia for 1883-4, with the transactions and proceedings, including Papers on Geology by Mr. James Stirling, F.L.S., Mr. Samuel Dixon, and Professor R. Tate; on Entomology, by Mr. E. Meyrick, B.A., and Mr. J. G. O. Tepper, F.L.S.; on Botany, by Mr. Tepper and Professor Tate; and on the Red Glow, by Mr. C. L. Wragge, F.R.G.S., and Mr. W. A. Jones. The Society is shown by the report to be in a very satisfactory position, financially and otherwise, and it has during the year extended its sphere of usefulness in several directions, notably in the formation of a Field Naturalists' Section, the excursions of which have been attended by a large number of ladies and gentlemen. A Postal Microscopical Section has also been established.

The New Zealand Journal of Science for January is to a great extent occupied by reports of meetings, and other miscellaneous matter. There is also a biographical notice of Professor Hutton, with a photographic portrait; Notes on some Mineral occurrences at Dusky Sound, by Professor G. H. F. Ulrich; and a paper on Moas and Moa-Hunters, by Mr. W. M. Maskell, the latter being a review of a paper on the same subject by M. de Quatrefages.

I.—No. 4.—New Series.] [APRIL, 1885.

Definitions of some New Australian Plants.

By Baron Ferd. von Mueller, K.C.M.G., M.D., Ph.D., F.R.S.

(Continued.

Sida Spenceriana.

Dwarf: branchlets, leaves, stalks and calyces closely covered with orbicular silver shining densely ciliated scales; stipules linear-setaceous; leaves from a roundish verging to an ovate form, irregularly denticulated; peduncles thread like, one-flowered, much exceeding the leaves in length, soon glabrescent; lobes of the calyx almost deltoid; fruitlets rather numerous, broader than high, much compressed, obliquely ovate, short pointed at the summit, prickly at the back, narrowly reticulated at the sides, hardly or tardily dehiscent, not surpassing the calyx in length; seed slightly downy.

At Yappunyah and Thargumindah, close to the Paroo-River; Mrs. F. Spencer.

An only specimen obtained without flowers. Leaves $\frac{1}{2}$-$1\frac{1}{2}$ inch long, flat, on stalks of moderate length. Flowerstalk about 4 inches long, jointed near the summit. Fruit bearing calyx not half an inch wide. Fruitlets nearly $\frac{1}{6}$ inch broad, almost flat.

These characteristics may require modifications from future examination of ampler material. The species is clearly allied to *S. corrugata*, but remarkable for its scaly vestiture and much elongated peduncles; the fruitlets are more numerous, thinner, suddenly short pointed and prickly, in which latter respects our new plant comes nearer to *S. echinocarpa*, differing however much in indument, great length of flower stalks and larger fruitlets not very conspicuously surpassed by the calyx, nor forming a very depressed total fruit.

Styphelia costata.

(*Leucopogon costatus*, F. v. M. coll.)

Branchlets numerous, mostly spreading, glabrous; leaves small, from a lanceolar verging into an ovate or cordate form, short-stalked, of thick consistence, equally green and somewhat shining on both sides, curved spreading, gradually attenuated into the bluntish summit, claspingly bent inward, slightly ciliolated, otherwise glabrous, longitudinally strongly five nerved, the veins between the outer nerves and margin also prominent and ascending; flowers small, crowded at the summit of the branchlets, not numerous; bracteoles rhomboid-cordate, somewhat cymbiform, not

fully half as long as the ovate-lanceolar sepals, and as well as these shortly and densely ciliolated also slightly downy; corolla small, white, its tube hardly as long as the calyx, the lobes densely bearded; anthers conspicuously tipped; style very short, as well as the ovary glabrous.

In the South-eastern part of Kangaroo-Island; O. Tepper.

This species seems well marked in the small series of "Striatæ," to which it belongs; it comes nearest to *S. striata*, which has however much straighter and flatter leaves, less pointed, not dilated gradually towards the base, with less curved nerves, of which the lateral ones are not so far from the summit of the leaf passing into its margin: the flowers are also more numerous and their sepals more blunt. In fruit the two plants may prove also different, that of *S. costata* not being known. *S. striata* extends eastward to the vicinity of Eucla.

Remarks on the Flora of the Australian Alps,

WITH INTRODUCTORY NOTES ON THE

Geology and Meteorology of the Area.

By James Stirling, F.L.S.

Member Royal Society Vict., Hon. Corr. Member Royal Society S.A.

[Continued.]

Fossil Flora.

PLIOCENE.

An examination of the Fossil Flora, in its relation to existing species, affords striking evidence of the great changes which have been in operation during the past; and there can be no doubt but that the facies of the ancient flora must have been singularly different from that now prevailing, and the climate very much warmer, when sub-tropic genera or forms allied to sub-tropic genera, now found in the Pliocene drifts of the present river-valleys, as *Platycoila Sullivani* (F. v. M.), *Spondylostrobus Sayeri* (F. v. M.), *Celphyina McCoyi* (F. v. M.), flourished *in situ*. The finding of similar fossils in the Pliocene drifts of Queensland is also an evidence of a continuity of similar vegetation extending throughout S.E. Australia to the tropics.

MIOCENE.

The plants which have left their impressions on the clays in the ancient river-beds, now overlaid by immense sheets of basalt, also bear witness to the tropical character of the endemic Flora

during Miocene times. Among these *Tæniopteris* (Brongn.) *striata* (M'Coy), *Cinnamoneum polymorphoides*, the latter closely resembling some lauraceous plants of the European Miocene tertiaries, and two species closely allied to Miocene forms from the Arctic regions—*Lastræa Dargoensis* (M'Coy) and *Sclesburea Dunrayii* (M'Coy)—are most abundant.

UPPER DEVONIAN.

Among the Upper Devonian flags at Iguana creek, in the Mitchell-river source basin are found remnants of a cryptogamic flora, including such forms as *Archæopteris Howitii* (M'Coy), *Sphenopteris Iguaniensis* (M'Coy), and *Cordaites australis*.

EXOTIC FORMS OF VEGETATION.

The occurrence at the highest altitudes of a number of European and Asiatic extra-tropical forms is noteworthy, as pointed out by Baron von Mueller 30 years ago, in official reports; although it is not improbable that most of these exotic forms have immigrated to their habitats during comparatively recent times.

The following occur at the highest elevations:—

Alchemilla vulgaris	Epilobium tetragonum
Luzula campestris	Carex Buxbaumii
Trisetum subspicatum	Cardamine hirsuta.

At lower levels up to 4000 feet are:—

Geum urbanum	Prunella vulgaris
Picris hieracroides	Geranium pilosum
Lotus corniculatus	Juncus communis
Ranunculus aquatilis	Barbarea vulgaris
Nasturtium terrestre	Spergularia rubra
Lythrum salicaria	Arabis glabra
Ranunculus parviflorus	Veronica serpillifolia
Carex pseudo-Cyperus	Polygala Sibirica
Carex pumila	Carex breviculmis.

Along mountain tracks, in the neighbourhood of pastoral settlement some of the following are supplanting the native vegetation:—

Hordeum murinum	Typha angustifolia *
Briza minor	Hypericum japonicum
Holcus lanatus	Juncus bufonius
Poa annua	Solanum nigrum
Dactylis glomerata	Cladium Mariscus
Lolium perenne	Anthoxanthum odoratum
Bromus sterilis	Potamogeton natans
Vicia sativa	Plantago lanceolata
Rumex acetosella	Hemarthria compressa

* This ubiquitous plant is the "Do-ra" of the Kurnai, which was one of their staple farinaceous foods, and which plays a part in their secret ceremonies.

Capsella bursa-pastoris	Lagenophora Billardieri
Selene gallica	Spiranthes australis
Polygonum aviculare	Polygonum strigosum
Lolium perenne	Verbena officinalis
Cryptostemma calendulacea	Polygonum minus

It is interesting to note that many of these forms have been recently discovered in the mountains of Morocco, Northern Africa, shewing their extended geographical distribution.

CORRELATION OF THE FLORA.

Of the 583 species of Phanerogamous plants, noticed by me in the Australian Alps and Tasmania, 50 are truly endemic ; the remainder, excluding some 89 species restricted to the Australian Alps and Tasmania, have a wide territorial range over different parts of the Australian continent The following are the endemic species at present known to me, and represented in my herbarium : —

Restricted to elevations above 4000 feet. :—

Ranunculus anemoneus	Aciphylla simplicifolia
Muelleri	gladialis
Millani	Oreomyrrhis pulvinifica
Eriostemon ovatifolius	Orites lancifolia
trymalioides	Pimelea alpina
Colobanthus Benthamianus	Antennaria uniceps
Scleranthus mninaroides	Brachycome nivalis
Pultenæa tenella	Abrotanella nivigena.
Acacia Dallachiana	Lobelia gelida
Kunzea Muelleri	Plantago stellaris
Azorella Muelleri	Prostanthera decussata
Seseli Harveyanum	Danthonia robusta.
algens	

Distributed between 2000 and 6000 feet :—

Eriostemon phylicifolius	Carex echinata
lamprophyllus	Bæckea crenatifolia
ozothamnoides	Persoonia confertiflora
correifolius	Grevillea Miqueliana
Oxylobium alpestre	Aster melagophyllus
Bossiæa bracteosa	alpicola
Acacia pravissima	iodochrous
alpina	adenophorus
Euphrasia antarctica	Gnaphalium Traversii
Styphelia Macræi	Carex hypandra
Trochocarpa Clarkei	Agrostis Muelleri
Carex cephalotes	Agrostis nivalis

It will be seen, by referring to the above lists, that the Compositæ, Leguminosæ, Rutaceæ, Umbelliferæ contain the greatest number of species, and the shrubs and the herbs are in nearly equal proportions.

The distribution of the genera and species, now occurring in the Australian Alps, over the entire continent, and Tasmania, exhibits the following numerical components :—

Tasmania	194 genera	and 394	species
South Australia	175 „	and 265	„
Queensland	165 „	and 218	„
Western Australia	104 „	and 124	„

Thus a greater specific identity exists between the Phanerogamic flora of Tasmania and the Australian Alps than with any other area in the Australian colonies.

FLORA OF THE HIGHEST ALPS.

As the vegetation of the highest altitudes depends more on the meteorological conditions prevailing there, than on the geological formations, the characteristic types being similar for all elevations above 6000 feet, a description of the prevailing species in the Flora of Mount Kosciusko, the highest mountain in the series, will serve to some extent as a guide to all the rest.

Ascending a steep spur on the northern flanks of this important mountain, we note that the Eucalypts, which comprised many different species at sub-alpine habitats, are restricted at an elevation of 6000 feet to three forms of low growth, viz., *E. Gunnii* and *E. pauciflora* on the ridges, and the umbrageous *E. Stuartiana* on the upland flats. These species form the low forests, which first mark a change in the vegetation. Here, in the moist atmosphere, which the shade of these timber-trees produces, are seen in all their luxuriance many endemic shrubs, the most prominent being *Oxylobium alpestre, Aster megalophyllus, Aster myrsinoides, Pimelea ligustrina, Bossiæa bracteosa* and *Gaultieria hispida.* Among herbaceous plants the var. alpina of *Craspedia Richea* is very noticeable along with a large form of *Podolepis acuminata*, the widely diffused *Linum marginale*, and the Wahlenbergia of the lower levels the latter two species differing from their lowland congeners in the deeper blue of the flowers and more pubescent leaves. Along the margins of small watercourses, near large beds of sphagnum, are gregarious forms of *Callistemon salignus* var. *Sieberi Kunzea pedunculoris, Bæckea Gunniana* and species of Styphelia and Epacris. On the damp wooded flats *Dianella Tasmanica* is very abundant, its racemes of blue flowers and large blue berries forming an agreeable contrast with the rich yellow and brown tints of the Oxylobiums and the blue to white of the asters and *Brachycomes.* Ascending from these sylvan woodlands at 6,500 feet elevation, the alpine character of the flora and scenery becomes marked, the Eucalyptus vegetation being restricted to a var. pruinosa of *E. pauciflora*, forming a low, stunted, gnarled and dense scrub, separated by open moorland flats, on which decorative alpine herbs predominate, as *Aciphylla Simplicifolia, Aster celmisia, Oreomyrrhis pulvinifica,*

Sciobalbra Benthamianus (in moss-like tufts), etc. Ascending a grassy slope composed of a thick sward of *Poa cæspitosa* and *Danthonia robusta*, and climbing to the summit of an immense outcrop of granite (in the crevices of which the solitary alpine Cruciferæ *Megeia alpina* occurs) the first full view of the summits of Mount Kosciusko is seen, and well it repays the toilsome ascent. Stretching away for miles to the northward are a series of rugged, rocky heights, masses of columnar or tabular granite rising castle like from the verdant slopes and easy undulations of the open valleys which separate them. Large patches of snow on their southern sides mark the sites of the maiden-glaicers, and form a charming contrast with the fields of bright yellow and purple alpine flowers in the hollows near them; here and there, miniature lakes, occupying depressions in the valleys give character to the landscape, which, during midsummer, is one of exceptional beauty; the rarity and clearness of the air; the clear mild azure of the sky; the tints of the alpine flowers: with the grey to brown colours of the rugged rocks rising in wild grandeur from the verdant slopes and snow-masses, and the varying tints of blue, which are produced by the receding tier upon tier of mountains in the dim distance; all combine to fascinate the beholder and produce a scene which indeed requires but "to be seen to be felt." In glancing with botanical eye along the northern flanks of the mountain, it is seen that the stunted form of arborcous vegetation *E. pauciflora* reaches a higher elevation on these slopes than on the southern flanks; and by measuring these limits with the aneroid we find that on the northern side to be 6,800 feet, and on the southern 6,600 feet. On the rocky-crested spurs proceeding from the highest peaks, but at lower levels, are noted various endemic shrubs clinging to the rocks in dense, matted, decumbent masses.

(*To be continued.*)

Some Indigenous Shrubs of South Australia Suitable for Fodder.

By S. Dixon.

Read before the Field Naturalists' Section of the Royal Society of South Australia, 3rd February, 1885.

Bursaria spinosa.

A very common bush, named from the supposed likeness of its heart-shaped seed-vessels to the pods of Shepherd's purse, and from a few thorny spines much better deserves its second name. The flowers are small and white in large panicles, and most abundant during summer. In the South-East it grows to be a small tree, with larger leaves than is ever found this side of the Murray. Sheep eat it as soon as the grasses dry up, and where abundant it makes a good "stand-by," and is of great value in late seasons. Its spines prevent its being eaten out. It stands pruning well, and would be serviceable as an ornamental hedge to cottage gardens.

Pomaderris racemosa.

This is another common bush in the moister districts, and seldom exceeds two feet in height, with an abundant foliage of smallish roundish leaves. The flowers are inconspicuous, in small clusters, and the leaves, when chewed or soaked, are found to be slightly mucilaginous; this explains the fondness sheep have for this plant. It always seems fresh and green, and stands stocking well.

Pittosporum phyllæroides.

A small tree with whitish bark, with drooping narrow leaves, flowers small and scented, seed vessel before opening is coated of a bright orange colour, highly resinous, and its flavour is rather disagreeable, but sheep are exceedingly partial to its foliage, and when one succeeds in pulling down a branch the rest make a rush to partake of such a dainty, and owing to this the species is likely to be exterminated, although originally very common on the limestones of Port Lincoln and the Murray River.

Casuarina quadrivalvis.

The sheaoak so common around Adelaide. All stock devour this tree. In many parts the ground if fenced off would be covered with the young trees, and if after the [illegible] sheep were admitted only during the winter they would be prevented from growing too high.

shore-collecting and dredging at Griffiths' Point and Phillip Island, which were highly recommended as good localities for specimens of marine zoology.

3. "Darwin on Australia," by Mr. A. H. S. Lucas. This paper comprised a critical examination of the chapter on Australia in Darwin's "Voyage of a Naturalist." Mr. Lucas held that Darwin's rather hasty conclusions on the Fauna and Flora of Australia had done much to limit and discourage biological research in these colonies.

4. Mr. C. French read some extracts from a review in the "Gardener's Chronicle" of 24th January, of Miller's "Dictionary of English Names of Plants," and called the attention of members to the importance of discouraging the use of local and bush names (often absurd and generally misleading) for Australian plants. He drew attention to this review as clearly and vigorously stating the chief "objections to the use of popular names for other than popular purposes."

The following were the principal exhibits of the evening:— By Mr. E. Bage, fungi, parasitic on larva of New Zealand Swift Moth (*Hepialus virescens*), also Kauri gum ornaments from New Zealand; by Mr. A. J. Campbell, fossil fruit found ninety feet below the surface at Ballarat, also egg of Reef Heron (*Demiegretta sacra*), taken from a rocky islet off Tasmania, being the first recorded instance of this bird being attached to the avi-flora of Tasmania; by Mr. E. M. Cornwall, two rare Longicorn beetles (*Tryphocaria* sp.); by Rev. A. W. Cresswell, geological specimens from Kilcunda, and marine specimens from Griffiths' Point, Western Port; by Mr. J. E. Dixon, fossil crabs and barnacles from dredgings of river Yarra; by Mr. C. French, two war-drums from New Guinea, and rare butterfly (*Ogyris genoreva*), from North Queensland; by Master C. French, orchid (*Prasophyllum Archeri*), grown by exhibitor; by Mr. R. Hill, whip-snake from India, and water-snake from Fiji; by Master R. Hill, recent entomological captures; by Mr. T. A. Forbes-Leith, pair of red-capped robins with nest and eggs, Stormy Petrel (*Procellaria pelagica*), Cape Pigeon (*Daption capensis*), Short-tailed Petrel (*Puffinus brevicaudus*), and Fairy Prion (*Prion Ariel*); by Mr. D. Le Souëf, black Cobra, Scorpion, and Centipede from Malay States, pearl-shells from Thursday Island and West Australia; by Mr. H. Kennon, Marine Algæ from Flinders, Western Port Bay, also English fossils; by Mr. W. H. Passmore, minerals from South Australia; by Mr. F. M. Reader, Plants from Studley Park (*Candolleaceæ-Plantagineæ*, also different stages of growth of fungus (*Polyporus-Mesopus-rudis, Berk*); by Mr. F. Spry, case of Victorian Lepidoptera.

After the usual conversazione the meeting terminated.

THE ROYAL SOCIETY OF VICTORIA.

The annual meeting of this Society was held in the Royal Society's Hall on the evening of the 6th ult. Mr. R. L. J. Ellery presided, and there were about 30 members present.

The report of the Council for 1884 stated that—

"The termination of another year found the Society in a position of great posperity in regard to the number of members and associates and its financial condition, but unfortunately much less than the average of scientific activity had been displayed by the members during the year. The number of papers contributed had been small, and although several of them were of considerable importance to the progress of science in the colonies, the volume of transactions would not exhibit the amount of work which might naturally be expected from so large a Society including so many members of high scientific attainments. During the year there had been elected 12 new members, 1 corresponding member, and 4 associates. The Society now numbered 19 life-members, 112 ordinary members, 36 country members, 7 corresponding members, 9 honorary members, and 71 associates, making a total of 254. The council regretted to announce the loss by death of the following members and associates—viz., Mr. W. C. Watts, Mr. J. F. Bailey, Rev. J. I. Bleasdale, Mr. W. Detmold, Mr. W. Gillbee, M.R.C.S., and Mr. E. Davy, M.R.C.S. During the year there had been received for the library 64 volumes and 552 parts of scientific publications issued by learned and scientific bodies in all parts of the world, and in exchange the Society had forwarded the annual volume of transactions to 149 institutions of a similar character. Vol. XX. of the Society's transactions was issued to members in June, 1884. Vol. XXI. would be ready for distribution in April next. During the year, in addition to the annual conversazione, the Society held nine meetings, at which the following papers were read: —March 13.—Mr. G. F. Griffiths, 'On the Evidences of a Glacial Epoch in Victoria During Post-miocene Times.' Mr. J. Stirling, F.L.S., 'The Phanerogamia of the Mitta Mitta Source Basin,' part II. April 17.—Hon. Dr. Wilkie, 'On the Determination of Small Circular Arcs, by means of the Cycloid.' May 8.—Mr. W. W. Culcheth, C.E., 'Shingle on the East Coasts of New Zealand.' June 12.—Mr. Lockhart Morton, 'Suggestions for the Reduction of Excessively High Temperature in Ships and Buildings.' Mr. G. H. Ridge, 'Experiences of the barque W. H. Besse in the Java Earthquake.' July 10.—Mr. R, E. Joseph, 'Notes on Fire-alarms.' Mr. MacGillivray, M.A., M.R.C.S., 'Description of New or Little-known Polyzoa,' part VII. August 14.—Dr. Curi, F.L.S., 'Cave Paintings in Australia.' Mr. T. Wakelin, B.A., 'An Inquiry into the Cause of Gravitation.' October 16.—Mr. A. W. Howitt, F.G.S., 'Supplementary Notes on the Diabase Rocks of the Buchan district.' November 20.—Mr. MacGillivray, M.A., M.R.C.S., 'Note on the

Mode of Reproduction of the Ornithorhynchus'; 'Description of New or Little-known Polyzoa,' part VIII. December 11.—Mr. E. Davy, M.R.C.S., 'On the Extinction of Waves at the Entrance of Harbours.' Mr. J. Stirling, 'Notes on the Meteorology of the Australian Alps.' "

The following report of section A was appended: —

"During the year 1884 11 meetings were held. The attendance at the meetings and the interest taken in the work was very encouraging. The chief local event which came under notice of the section was the Engineers' Exhibition, under the auspices of the Engineers' Association, which furnished many interesting topics for discussion. The papers read and discussed gave evidence of careful thought and accurate observation on the part of the members. The following is a list of the chief papers which were read and discussed :—'Underground Telegraphs,' Mr. J. H. Fraser, C.E.; 'The Strength of Timber," Mr. G. R. B. Steane, C.E.; 'The Web of Plate Girders,' Mr. J. H. Fraser, C.E.; 'Indicator Diagrams,' Mr. C. W. M'Lean, C.E.; 'Speed Regulators,' Mr. J. Booth, C.E ; 'The Strength of Cast and Wrought Iron Beams,' Mr. J. H. Fraser, C.E.; 'Accurate Chainage,' Mr. Steane; 'Boiler Explosions,' Professor Kernot.

The balance-sheet showed the receipts for the year to have been £759 16s. 8d., and the expenses £312 13s. 11d., leaving a bank balance of £446 17s. 0d.

On the motion of Mr. R. E. Joseph, seconded by Mr. C. R. Blackett, the report and balance-sheet were unanimously adopted.

The election of officers for the ensuing year resulted as follows: — President, Professor W. C. Kernot; Vice-Presidents, Messrs. E. J. White and J. Cosmo Newbery; hon. Secretaries, Messrs. G. W. Selby, jun., and A. Sutherland; hon. Librarian, Dr. J. E. Neild; Council, Mr. Ellery. Mr. Rudall, Dr. Jamieson, Mr. Rosales, Dr. Louis Henry, and Mr. G. S. Griffiths.

The President said the meeting was aware that Dr. Davy, who had rendered such valuable service to science at the first introduction of electric telegraphy, had died in straitened circumstances, leaving his wife and children unprovided for. A fund had been initiated for their benefit, and the treasurer would now make a statement concerning it.

Mr. Moore, treasurer, said the amount to the credit of the fund was £112 4s., to which would be added £20 voted by the Society. A grant of £100 had been made to Dr. Davy before his death by the Government, on the recommendation of the Society. The best mode of applying the money collected would be a matter for deliberation by the council.

Mr. Ellery, in retiring from the chair, said it was his wish to make room for a younger man. He had now held the position of President for 20 years, and he could not help thinking that that was too long a period for one man to occupy the chair. In

retiring he was proud to leave the Society in a more prosperous position than it was in when he first assumed the reins. He was now making way for Professor Kernot, a man they all respected, and who would worthily preside over the Royal Society of Victoria. (Applause.)

Professor Kernot thanked the council for electing him to the presidency, and expressed a hope that the coming year would be one of great prosperity, that the meetings would be well attended, and that the discussions would be both useful and profitable.

Dr. Neild, as one of the oldest members of the council, congratulated Professor Kernot on his election to the presidency, and assured Mr. Ellery that he carried with him on his retirement from the chair the admiration and the good feeling of every member of the Society. (Applause.)

After some routine business the meeting terminated.

ENGINEERING SECTION.

At a meeting of the engineering section of the Royal Society, held at the hall, Victoria-street, on Wednesday evening, 25th ult., Professor Kernot, President of the Society, gave a brief outline of the development of the steam engine. The old engines, he said, were usually of large size, working at low velocity at low pressure, relying largely on vacuum, and increasing the speed by means of pulleys and cogwheels. The general tendency of modern practice, on the contrary, is towards high speed direct-acting engines. Since the work done is the product of the force exerted into the distance over which it is exerted, it follows that the greater the speed at which a machine can work the less will be the stress on the parts and the lighter the parts can be made. At the present time two lines of investigation and experiment are being followed :—1. Single-acting engines represented by the Brotherhood, Westinghouse, and many other types. 2. Double-acting engines, represented typically by the Porter-Allen engine. The Westinghouse, the most modern of single-acting engines, has two cylinders, with cranks 180deg. apart. The centre line of the cylinders runs clear of the shaft in such a way that on the steam stroke the connecting rod is nearly in the centre line. Thus little friction is caused in the cylinder by the obliquity of the connecting rod. On the return stroke, when no work is being done, the obliquity is considerable. Owing to this feature, again, there is mathematically no dead point, and practically there is none on account of the high speed. It is a proof of the remarkable performances of this engine that one has run for five months at a rate of 500 revolutions per minute, with only two stoppages of 15 minutes each. The Porter-Allen engine is a slight modification of the older double-acting engines, and its chief feature is the great care bestowed on the balancing of its parts, the weight of which cannot be altered without diminishing the efficiency of the

engine. Edison has largely employed these engines for working his dynamos, and one of them has been known to run for three months at 350 revolutions per minute without stopping. The chief contention of the advocates of the single-acting engines is that all their parts are in compression, and that the wear and noise must be at a minimum. This latter point does not seem to be realised in practice, owing probably to the inertia of the rapidly moving parts. On the other hand the supporters of the double-acting system aver that there are really only two parts which can suffer much from wear, viz., the pins of the connecting rod, and on the fitting of these they bestow great care, besides attending very carefully to the proportions and balancing of the moving parts. Their strong point is that double as much work can be got out of a double-acting as out of a single-acting engine. All things being considered, it seemed probable that it was to the double-acting system we must look for the best results in the future.

A short discussion followed the reading of the paper.

THE MICROSCOPICAL SOCIETY OF VICTORIA.

The ordinary meeting of the Microscopical Society was held on Thursday, 26th ult., in the College of Pharmacy, Swanston-street, the President, Dr. Ralph, occupying the chair.

The Secretary acknowledged receipt of a number of scientific journals and other publications, also of a set of polarizing apparatus.

Mr. C. R. Blackett gave an account of the methods in use for detecting adulteration in milk, with illustrative experiments. The address was very interesting and instructive, and was much appreciated by the members present.

Mr. A. H. S. Lucas read some notes on the odontophores of Victorian Mollusca, and described those of several species, the dentition of which was previously unknown.

THE LINNEAN SOCIETY OF NEW SOUTH WALES.

FEBRUARY MEETING.

The monthly meeting of this Society was held in the Society's House, Phillip-street, on Wednesday evening, 25th February 1885., the President, Professor W. J. Stephens, M.A., F.G.S., in the chair.

Messrs. W. G. Harrison, Sydney Olliff, Ogilby, and Dr. Coppinger were present as visitors.

Messrs. Ogilby, Australian Museum, and Dr. Coppinger, H.M.S. Nelson, were duly elected as members of the Society.

The receipt of a number of donations was acknowledged.

The following papers were read:—

1. On some Reptiles from the Herbert River District, Queensland. By William Macleay, F.L.S., &c.

Five new species are here described, *Hemiba pieta*, and *Tetradactylus guttulatus* of the Family Scincidæ, and of Ophidians *Nardoa crassa Tropidonotus ater* and *Hoplocephalus assimilis*.

2. Notes on certain Ceylonese Coleoptera, described by Francis Walker. By Sydney Olliff, Esq.

In these notes Mr. Olliff, who had examined Mr. Walker's types in the British Museum, endeavors to clear up the synonomy of the Clavicorn Families. The name *Isana* was proposed for the *Trogosita rhyzophagoides* of Walker, which cannot be referred to any known genus. In form it resembles *Lipaspis*, but is characterised by the presence of a scutellum.

3. On the flight of Birds. By R. von Lendenfeld, Ph.D.

In this paper the author comments on the recent ingenious conclusions of Müllenhaff, and also gives an explanation of the mode in which birds like Vultures, circling in the air, can rise without flapping their wings.

Mr. C. S. Wilkinson exhibited some Fossil bones which had been recently obtained from the coral sand rock on Lord Howe Island. Amongst them was an almost complete skull somewhat resembling that of the Horned Lizard *Megalania prisca*, from the Pleistocene deposits on the Darling Downs, Queensland.

Mr. Wilkinson also exhibited specimens of Shells of oysters found in the beds of clay and sand at a depth of 40 feet below the surface, in sinking the new shaft of the Bullock Island and Wickham Coal Company near Newcastle. Mr. Brazier identified this oyster, which must have been 12 inches in length, as a large form of the *Ostræa edulis*.

Dr. J. Cox exhibited other specimens of the *Ostræa edulis* from Port Jackson, and found firmly attached to a bottle. He pointed out the great difference between this oyster, which will not keep for more than a day, and the English native oyster, and suggested that they are of separate species. Mr. E. P. Ramsay mentioned that the same oyster in South Australia keeps well for many days, and was of opinion that they were the same as the *O. edulis* of England.

Mr. Ramsey exhibited a Fossil phalanx of *Palæorchestes*, from Wellington Caves, from the size of which he calculated

that the animal must have stood about 15 feet high. Also some Devonian shells and corals from the same district, in which the lime had been replaced by silica, and which had been cleared from the matrix by the application of muriatic acid.

Dr. Cox also exhibited a plant (undetermined) in cultivation by Mr. Scholtz, of Hunter-street, in which the flowers had been succeeded by bulbils as in *Fourcroya gigantea*. Also a large femur of *Dinornis robustus* from Christchurch, New Zealand.

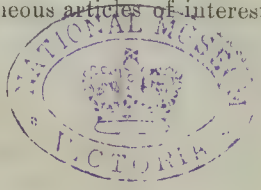
Mr. Masters exhibited very large and heavy wooden swords from Herbert River, Queensland, resembling boomerangs in shape, together with unusually wide Hielemans or shields from the same district. Also a waddy or club, with the head thickly set with hobnails.

Mr. Hirst exhibited a centipede (*Heterostoma*) 10 inches long and about $\frac{3}{4}$-inch broad, from the Herbert River.

Dr. von Lendenfield exhibited a series of Photographs from Mont Kosciusko, showing the various ways in which the granite rocks are broken down in that locality, partly by frost, and partly by ordinary weathering.

The President drew attention to a singular case of germination of the seeds of an orange within the uninjured fruit before its removal from the tree. The testa was broken, the cotyledons enlarged, free, and green, and the plumule and radicle well developed.

We have received the "New Zealand Journal of Science" for March, which contains a summary of three lectures on Botanical Evolution by Mr. G. M. Thomson, F.L.S.; a continuation of Mr. Potts' paper on the Oology of New Zealand, and a number of miscellaneous articles of interest chiefly to New Zealand readers.



Description of two hitherto undescribed Papuan Orchideæ.

By Baron von Mueller, K.C.M.G., M.D., Ph.D., F.R.S.

Appendicula Chalmersiana.

Stems slender, somewhat compressed, leaves almost membranous, elliptical, minutely pointed close to the blunt summit; racemes terminal, many-flowered, bracts longer than the stalklets, membranous, ovate, acute, soon reflexed, sheaths of the calyx as long as the lobes, hemi-ellipsoid, lower lobes semi-lanceolate-deltoid, as long as the upper one, inner lobes almost ovate and slightly shorter, labellum ovate-cuneate, free transverse keel close to the base, otherwise smooth, the terminal lobule roundish-blunt, the lateral lobules almost obliterated, gynostemium at the summit acutely two-pointed.

On mountains near Port Moresby; Rev. James Chalmers

Leaves broader than those of *Appendicula penicillata*, the only one as yet recorded as Papuan, racemes much longer with less crowded flowers, callous appendix of the labellum not cylindrical nor penicillar, but consisting of two vertical almost upward-narrowed plates

From the Fijian and Samoan *A. bracteosa* our new species differs already in the inner calyx lobes (or petals) being rather narrower not conspicuously broader than the others, also in the occurrence of the normal callus at the base of the labial lobe.

Several of the Sundaic species need yet more accurate definition; none however seems identical with ours: the flowers of which appear to be white.

Genostoma cryptochilum

(Sect. *Achilum.*)

Leaves large, oblong, strap-shaped, blunt, unilaterally crowned at the summit; racemes glabrous, several from a common stock, alternate, constituting an ample panicle, each bearing several flowers; bracts very short, semivaginate-deltoid, stalklets about as long as the flowers; tube of the calyx slender; lobes very red; the three outer oblong-lanceolar, all gradually narrowed at the base and free: the paired inner lobes ovate-spatular, rather longer than the rest: total labellum (labial lobe) hollow curved, club-shaped-cylindrical, the lateral lobules reduced to minute slot-cuticles somewhat decurrent to the distant very small semilanceolar revolute membranous middle lobule, the labellum thence on curved into a spur-like more turgid end, the whole about one-third shorter than the other calyx lobes, gynostemium much shorter than the labellum; the two double pollen masses ovate-globular, affixed to a proportionately short caudicle.

In south-eastern New Guinea; Rev. James Chalmers

Leaves (transmitted apart) 8-11 inches long, towards the middle nearly an inch broad, only slightly keeled probably flat when fresh. An only panicle seen about a foot long, spreadingly branched. Bracts soon bent downward. Sepaline and petaline lobes of the calyx $\frac{1}{4}$ of an inch long, five-nerved; turgidity of the labellum almost ovate, parallel-nerved; middle lobule about one line long, forming almost an opercular scale slightly above the middle of the whole labellar organ, no divisional plate within the spur-like portion of the labellum; fruit bearing calyx-tube gradually wider towards the summit, but not turgid. Ripe fruit not obtained.

This species is as handsome as it is structurally remarkable, differing from all other members of the genus in the extreme minuteness or almost obliteration of the labellum, and in having the so-called spur (or mentum) continuing the labellum itself and not turning into a direction opposite to the point of insertion of the labellum; the latter consists therefore almost entirely of the spur, only its starting portion being slit anteriorly, and the middle lobule being homologous to the ordinary ventral spur-scale of Cleistostoma, its direction in bud being also centripetal. The sectional characteristic might almost be raised to generic value.

Remarks on the Flora of the Australian Alps,

WITH INTRODUCTORY NOTES ON THE

Geology and Meteorology of the Area

By James Stirling, F.L.S.,

Member Royal Society Vict., Hon. Cor. Member Royal Society S.A.

[Continued.]

Flora of the Highest Alps (*continued*).

Among these, *Helichrysum rosmarinifolium* and *Hovea longifolia* of the lower levels are seen, but strikingly altered, so much so as almost to rank as distinct species; the same remark applies to *Pimelea axiflora*, which, however, prevails on the open, less rocky slopes. Ascending on the rocky spurs up to 7000 feet are dwarfed forms of the following: *Oxylobium ellipticum*, *O. alpestre*, *Prostanthera cuneata*, *Exocarpon oxylifolius*, *E. hymifolioides*, *Pimelea alpina*, *Boronia polygalifolia*, some species of *Styphelia*, *Orites lancifolia*, *Grevillea australis*, *Kunzea Muelleri*, *Baeckea linifolia*. On the grassy slopes, up to 7,100 feet, the beautiful white-petalled *Ranunculus anemoneus*, *Aster colmisia*, the yellow *Helichrysum bracteatum*, *Helipterum incanum*, and *Aciphylla glacialis* vie with each other in the luxuriance of their forms, and afford

pleasing contrasts with the patches of rose-flowered *Euphrasia Brownii*, etc. The thick turf formed by the matted stems, of *Danthonia robusta*, *Poa caespitosa*, *Prionium subspicatum*, and the ubiquitous *Luzula campestris*, which clothe the slopes, gives place in the grassy flats irrigated by the melting snows to many small herbs, including *Ranunculus Muelleri*, *R. Gunnianus*, *R. Millani*, *Viola stroloba*, *Oreomyrrhis pulvinifica*, *Trocella Muelleri*, *A. dichopetala*, *Abrotanella nivigena*, *Plantago stellaris*, *Hydrocotyle hydrocotyles*, *Stackhousia pulvinaris*, *Cotula alpina*. On the grassy depressions, along the crests of the hughes' ridges, are dense masses of compositous herbs, as *Leontopodium catipes*, *Erigeron pappochromus*, *Helipterum incanum*, and, growing from crevices in the rocks, beautiful forms of *Brachycome nivalis*.

The Phanerogamic Flora of the Australian Alps includes many heterogeneous elements, and thus it presents some interesting botanical features, among which may be mentioned the Antarctic character of the endemic alpine species, and their affinity with the Tasmanian flora (as pointed out first by Baron von Muellier). This identity of species may be fairly said to unite these now isolated alpine areas, to some extent, into one botanical region, or would, at least in some respects, suggest a community of origin; and, although there are no apparent proofs of a continuity of land surface uniting Tasmania to Australia proper during Tertiary times, yet a comparison of the sequence of the great rock masses in both areas would certainly suggest that Tasmania forms part of the Australian continent geologically. With reference to the date of the introduction of the present endemic alpine species, this may, I think, be safely centred in the glacial movements which took place in the Southern Hemisphere during Post-Miocene times. The presence of huge, waterworn, erratic boulders high up on the spurs in the Dargo and Mitta-Mitta river valleys; the rock strise on gneissose schists near Omeo; the large boulders grooved and striated, which are now undergoing decomposition in the ancient mountain tarns on the Livingstone Creek near Omeo, and other like evidences—all point to translocating agencies, which cannot be attributed to fluvial action. The enormous erosion by which the present river-courses have been cut thousands of feet below the level of the Miocene beds, is striking evidence of the effects of sub-aerial influences since Miocene times—a result which has, no doubt, been accelerated by the breaking up of the Pliocene glaciers. By the light which these glacial movements throw upon the subject, it is not difficult to understand how a tropic flora, extending during Miocene, or even early Pliocene, times throughout Eastern Australia, was gradually replaced by the present remnants of an antarctic flora at the higher elevations, and the mixed forms which prevail at subalpine habitats. During the refrigeration, which culminated in the glacial period, those tropic forms which

were able to accommodate themselves to the decreasing temperatures might survive as stunted varieties, which had differentiated under the changing climatic conditions, while a large number of genera and species, unable to withstand the intense cold, would doubtless perish.

The immigration and dissemination of Antarctic types would, in all probability, increase, in proportion to the extinction of many of the tropic types; and it is at least conceivable that co-mingling of species took place and that the cross-fertilization of an altered tropic with an antarctic species produced forms able to withstand greater extremes of temperature, and that prolonged periods of slowly changing climatic conditions might result in the differentiation of varieties so distinct from the original species as to claim true specific rank. The breaking up of the glaciers, and gradual raising of temperature to the present time, with the varying oscillations of land-surface by sub-aerial denudation affecting different geological formations in respect to ratios of denudation and erosion, etc., might also produce analagous effects, as, by immigration, the tropic or extra-tropic forms began to co-mingle with, or replace, the antarctic forms in the lowlands, until the latter became restricted to the higher elevations, where they now occur.

The presence of many extra-tropical northern species at the higher altitudes, is, no doubt, peculiar, although, as remarked by Sir J. D. Hooker, "if as complete evidence of such a proportionally cooled state of the intertropical regions were forthcoming as there is of a glacial condition of the temperate zones, it would amply suffice to account for the presence of European and Arctic species in the Antarctic and south temperate regions, and of the temperate species of both hemispheres on the mountains of intermediate tropical latitudes."* It is questionable, however, whether the date of the introduction of those plants, enumerated at pages 23 and 24 as occurring at the higher elevations, is really prior to the advent of the white race. It is a remarkable fact that these extra-tropical northern forms are rarely found in great profusion away from the sites of original tracks through the mountains, or in the neighborhood of pastoral settlement, and it is also noteworthy that distribution is now going on at a pretty rapid rate in consequence of increased agricultural and pastoral settlement. It must be borne in mind, however, that Baron von Mueller discovered many of these extra-tropical forms, such as *Alchemilla vulgaris*, far away from the sites of any existing tracks, and that alpine prospecting for gold did not take place until many years later. It is of course probable that migratory birds may have been influential in distributing seeds of some of these exotic forms prior to the advent of the white race, although this is a conjecture open to considerable discussion.

(Concluded.)

* Flora of Australia. VIII.

PROCEEDINGS OF SOCIETIES.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of this Club was held at the Royal Society's Hall on Monday evening, 13th April 1885. The President, the Rev J. J. Halley, occupied the chair, and about forty-five members and visitors were present.

The hon. Librarian acknowledged receipt of the following donations to the Club's library:—"Science Record," No. 5; "Report of Ballarat School of Mines," 1883; "Proceedings of the Ornithological Society of Vienna," "Supplement to Victorian Oology." Part I, by A. J. Campbell.

The hon. Secretary read the report of the sub-committee appointed to reconsider the list of Victorian birds proposed to be protected. It recommended that the following birds be struck out of the proposed list:—Hawks (except harriers), crow-shrikes (except magpies, at present protected), finches, bower-birds, orioles, wattle-birds, leather-heads, and parrots (except swamp or ground parrakeet). On the motion of Mr Gregory, the consideration of the report was postponed till next meeting, pending replies from other societies, &c.

The hon. Secretary read a short account of the excursion to Cuper Village, Brighton, held on the previous Saturday, which had been well attended, and the members present were lucky successful in their finds, the rare orchids *Eriochilus flabellatus* and *Pterostylis ophyta* being obtained in bloom.

The following ladies and gentlemen were elected members of the Club:—Mrs Beal, Mrs. C. W. Stanton, Miss E. C. Stanton, Messrs. A. Cammarth, J. P. Chevenix, R. A. Poore, and J. Russell, and Messrs S. and D. Cogbill, as junior members. Thirteen nominations were received for next meeting.

Messrs. A. J. Campbell and J. E. Pierce were elected to audit the accounts of the Club previous to the annual meeting.

Nominations for office-bearers for the year 1885-6 were then received, in each case the retiring office-bearers being the only persons nominated, except for hon. treasurer, for which Mr Bage was nominated instead of Mr Matthews. Three ladies and eight gentlemen were proposed as members of committee, viz.—Mrs Dobson, Mrs J. Stanton, Miss Campbell and Messrs. Beal, Dallis, Hill, Le Souef, Pierce, Topp, Watts and Woodward. Mr Beal gave notice that he would move at the annual meeting that the number of members of committee be increased from five to eight.

Mr. J. E. Prince, on behalf of Messrs. Field and Son, of Birmingham, presented the Club with a valuable microscope for the use of the members, for which a hearty vote of thanks was tendered to him.

The hon. Secretary announced that at the annual conversazione to take place on the 29th inst., lecturettes would be delivered by the Rev. A. W. Cresswell, M.A., on "The Extinct Animals of Australia;" and by himself on "Forms and Metamorphoses of Insects."

Papers were read:—By Messrs. Gregory and Lucas, "Notes of an overland trip to Wilson's Promontory," Part I. Mr. Gregory read the descriptive part and Mr. Lucas the Natural History notes of the journey between the Trafalgar Railway Station and Mr. Millis's station at Yanakie, about two-thirds of the distance travelled.

The following were the principal exhibits of the evening:—By Mr. G. Coghill, five orchids in bloom, obtained on excursion to Gipsy Village, viz., *Eriochilus autumnalis*, *E. fimbriatus*, *Pterostylis aphylla*, *P. nana*, and *Prasophyllum Archeri*; by Mr. C. French, 200 species of Australian Coleoptera, family Buprestidæ, nine orchids in bloom *Eriochilus fimbriatus* and *Pterostylis aphylla*; by Master C. French, carved Gourd, from New Guinea; by Mr. G. R. Hill and Masters Hill, Victorian Lepidoptera; by Mr. D. Le Souëf, living Glow-worm; by Mr. T. A. Forbes-Leith, five British Birds, Rock, Common Gull, Black-headed Gull, Curlew, and Oyster-catchers, also a pair of Opossum-mice; and by Mr. F. Reader, plants from Studley Park, (orders *Apocyneæ*, *Solanaceæ*).

After the usual conversazione the meeting terminated.

ANNUAL CONVERSAZIONE.

The Fifth Annual Conversazione of the Club was held at the Royal Society's Hall on Wednesday evening, 29th April, 1885, when there was a large assemblage of members and their friends, amounting to about 350 ladies and gentlemen.

The exhibits, though not so numerous as in former years, were of a very interesting and in some cases beautiful character, and were seen to much better advantage than formerly, owing to an improved arrangement of the tables, and of the space at the disposal of the Club. Amongst the exhibits, those of Messrs. T. A. Forbes-Leith, C. French, J. E. Gatliff, T. Worcester, W. Kershaw, D. Best, A. H. S. Lucas, D. Le Souëf, and Baron von Mueller and Mr. F. G. A. Barnard attracted special notice during the evening.

The first half-hour of the evening was spent by the visitors in inspecting the various exhibits, at the expiration of which they

assembled in the upper hall to hear the delivery by the President, the Rev. J. J. Halley, of the

PRESIDENTIAL ADDRESS.

LADIES AND GENTLEMEN, MEMBERS OF THE FIELD NATURALISTS' CLUB OF VICTORIA,—

"In the address, which custom assigns to the President of a Society like ours at its annual gathering, an opportunity is given for a deliverance on any great subject that may have agitated intellectual society, or work done may be reviewed, or suggestions for future operations may be advanced. But before I attempt to do my poor part in any one of these directions it must be mine to thank my fellow-members for the very high honour they have conferred upon me in unanimously and cordially electing me to be their President—an honour alike unsought and unwished for. Ladies and gentlemen, while I thank you for this honour, I think that you have made a mistake. Your President should be one who, in the arena of science, has won his knightly spurs like my learned predecessors, Professor M'Coy and Dr. Dobson, rather than one who pretends to be but an esquire, achieving no conquests for himself, but merely bearing arms after nobler combatants. I may, at any rate, congratulate our Club on the pleasant and prosperous year that now draws to a close. Our meetings have been always interesting and instructive, and sometimes specially so. Rare and costly specimens in all departments of natural history have graced our exhibitions. Papers not unworthy of more ambitious societies have been read, honest work in the field has been done, and we number in our guild 160 ladies and gentlemen.

"Nor need we fail to congratulate ourselves that, of the learned societies of Victoria, we have been the first to recognise that there are priestesses worshipping in the temple of Nature. Other societies have invited ladies to grace and add sweetness and lustre to annual gatherings, or occasionally, in a kind of superior patronising way, have arranged special evenings when more serious work was dispensed with, and curious or pretty things were shown or said, fitted to what was peculiarly deemed the taste of weaker intellects, but not only thus we meet on gala days in festive dress but to share with us in honourable toil, side by side to delve in intellectual mines—to make common explorations into undiscovered lands of science—to strive to make nature give up her secrets, recognising in the fullest sense a common inheritance and a common right. The roll of membership bears the names of 20 sisters of Science. With the higher education of women an accomplished fact, with the girls' college in this city distancing in matriculation honours all the boys' grammar schools and colleges, I am sure of this, that whether we men will or will not, sooner or later we shall have to open, without distinction of sex, the doors of all our intellectual

and scientific societies, and I trust that it will be our privilege, before many years have passed, to listen to this annual address delivered by one of the sisterhood of our guild.

"It is evident that this action of ours looks far beyond the mere admission of ladies to our meetings, and it is for this that I dwell upon it, for we cannot but recognise that it must play no unimportant part in what may be called, "the domestication of science." We may be thankful that at last, however inadequately, natural science forms a part of the curriculum of most of our higher schools. The more common phenomena of nature are, at any rate, investigated and explained, the principles are more or less discussed. Collections of fauna or flora are common in our homes. Microscopes are found in nearly all studies. The happy home is certainly the intelligent home—the home where each member is able to add something to the common stock of thought and knowledge, and, as has been said, "where the family does not consist of an ill-assorted aggregation of babies, great and small, dependent for their amusement upon some rattle of frivolity, or the chance of a stranger tickling them with a fashionable straw." The increase of our intelligent and happy homes has been brought about by the increase of our intelligent mothers and sisters. Cynics will, doubtless, say that the majority of our young men care far more for sport than science, for cricket than for conchology, for football than for floriculture, for rifles than for reflection; and that mothers must bring up girls to suit the taste of the market, whatever it may be—if the demand be for frivolity, frivolity must be produced, if for stupidity, stupidity must be forthcoming. We may hope that the cynic's sneer is fast losing its sting—that to demand frivolity, ignorance, or stupidity is getting to be at a discount; and to the women of our own day, members of our Club or not, we will quote the words of that great master of science, Sir Humphrey Davy, in an appeal to women made seventy-four years ago: "Let them make it disgraceful for men to be ignorant, and ignorance will perish: and that part of their empire founded upon mental improvement will be strengthened and exalted by time, will be untouched by age, will be immortal in its youth." Of all schools of knowledge after those of music, painting, and sculpture, natural science is best adapted for domestication. Some departments of intellectual investigation seem to adapt devotees to solitude rather than company; but the pleasure of a discovery in the world of nature is more than doubled by being shared, and the pathway to its mountain heights is made easy when travelled in company. In this colony of ours, with all its exuberance of youth, with all its free, wild life, with all its deification of manly sports, the domestication of Science will help to teach—

> That life is not an idle ore,
> But iron dug from central gloom,

And heated hot with burning fears,
And dipt in baths of burning tears,
And batter'd with the shocks of doom.

"We have fallen on utilitarian days. Societies have to show that they have a right to existence; a *raison d'être* is demanded from all. Our answer to the challenge thrown down, then, is, that we exist for the purpose of popularising science—of fostering a love for nature—not by the mere study of what other men have seen or the examination of theories propounded by the giants of our race—but for examination for ourselves in the field. Not that the study of books is to be neglected—none of us can afford to do that—but to use our book knowledge as a guide to our field investigations, and by actual observation for ourselves to verify or otherwise what books have taught us. In this learning we must be content to be patient, reverent, child like, not too hasty, from imperfect data, to jump to conclusions—nor yet, when we get undoubted facts, too conservative to give up any preconceived opinions or theories. Learning from our books, going into the field, observing, arranging, theorising, we shall need to understand how, on the one hand, to avoid the Scylla of wild speculation, and on the other hand the Charybdis of mere antiquated and worn-out belief. The more we learn the more modest we shall doubtless become; it is the tyros, not the veterans, who are sure about everything—the many times that we have to modify our opinions will teach us modesty of expression. But if we are true students of nature we shall never tire of listening to her teachings, for she will lead us into a veritable fairyland, and she will tell us wonderful tales. To her children nature is as Longfellow makes her in his poem on the birthday of Agassiz—an old nurse—and she sings to her children thus—

"'Come away with me,' she said,
Into regions yet unread,
And read what is still unread
In the manuscripts of God.'

And he went away, and away,
With Nature, the dear old nurse,
Who sang to him night and day
The rhymes of the Universe.

And whenever the way seemed long,
Or his heart began to fail,
She would sing a more wonderful song,
Or tell a more marvellous tale."

"The study of nature is no longer a hidden mystery, to be unveiled only to a few initiated ones. The days when the goddess was carefully hidden from the gaze of the common people, guarded by priests, jealous lest any save themselves should behold the Deity, have passed away. She has been unveiled, and all who will may, by loving study, enter into the most secret recesses of the fane. Again, then, we affirm, the aim of our Club is, the popularisation and domestication of Science.

"I ask, next, what are the facilities afforded for the study of natural science in this colony of ours? The wisdom of the founders of institutions in this young land has been shown by the liberality with which provision has been made for the study of art and science. Our public library, our picture gallery, our botanical gardens, zoological gardens, and museums are the pride of our city, and a wonder to those who remember that not a century has passed since one was "first to sail into a silent sea," and barely fifty years since white men made a home where our stately city now stands. That these liberal terms were made none too soon is evidenced by the fact that there is hardly a literary or a scientific society of the old land that does not find its counter part here, and it is indeed to be hoped that Australians may not only hold their own in the cricket field, not only fight side by side on Africa's sands with England's sturdiest, fired by a noble, if, perchance, a somewhat wild ambition, but also win their laurels in the areas of literature, science, and art.

"As I have already intimated, the first need of a student is books—books to guide him in the way he wants to travel. With manuals dealing generally with scientific subjects or treating of great principles our private and public libraries are well supplied. Botanical and zoological text-books are not difficult to obtain, but what we do need is, books dealing specifically with the various departments of fauna and flora as they are found in this colony. This need was pointed out by my learned predecessor in this chair, Dr Dobson, who last year pleaded for a "Dichotomous Key to the Fauna of the Colony," and so well did Dr Dobson plead, and so wisely did he act, that the Government Botanist Baron von Mueller, readily undertook the preparation of such a key, and has, during the past year, given to it much attention, and hopes ere long to have it ready for publication. I understand that this key is to be made as useful as possible, in that it will be illustrated. Those of our members who make botany their study are to be congratulated on the prospect of so soon having their labors lightened.

"But what Baron von Mueller is doing for plants is much needed in all departments. Our students may find it very difficult to learn what objects have or what have not been described. A strange shell, or mollusc, or zoophyte is found, and there is nothing to tell if it be new to science or not; often even its generic place is hard to discover. What we need is monographs or catalogues. So far as one family is concerned, this want has been, during the past year, ably supplied by the publication of a catalogue of "Australian Hydroid Zoophytes." We are indebted for this immense help in the study of forms familiar on all our sea coasts to Mr. W. M. Bale, Secretary of the Microscopical Society of Victoria, and a member of our Club. Mr. Bale has described and figured nearly 200 forms, diligently searching previous records, and so presenting us with a catalogue

made up to date. The illustrations, so carefully and accurately framed, will enable, in connection with the descriptions, the observer to identify and name any of the forms that may come under his notice. An introduction of 40 pages gives a sketch of the most important features of the structure and life history of the Hydroid Zoophytes. We cannot, however, while congratulating the author on the useful and important work he has produced, but express our regret that the book bears the name of the "Australian Museum," rather than that of the National Museum of Victoria, and the imprint of Thomas Richards, Government Printer of Sydney, rather than that of John Ferres, Government Printer of Melbourne. It is hardly creditable that the bringing out of an important work on Natural History by a Victorian student should have been undertaken by the Government of another colony.

"Nor must I pass without notice a catalogue of the eggs of Victorian birds, by Mr. Campbell, together with a supplement. While Gould left little to do, so far as the birds of Australia are concerned, he was not able, from the comparatively short time he was in the colonies, to tell us much of the oology of our Aves. Now that students are directing their attention to life-histories, a knowledge of embryology has become a matter of great importance, and, in connection with embryology, oology is likely to assist in the elucidation of many mysteries. During the year Prof. M'Coy has been enabled to publish the ninth decade of the "Natural History of Victoria." The first of these decades bears date the 24th June, 1878, so that at the present rate we get the description, on an average, of fifteen forms a-year. Our mathematical friends will be able to calculate at what distant period the memoirs of our museum will be complete, and geologists may perchance dream as to what will be the state of our earth when the last plate shall be issued, and how many of the pre-sent living forms will then more fitly find a place in a palæontological record. As to the prodromus of the palæontology of Victoria, the last decade bears date 1st September 1881. Since that date many collectors of organic remains have been anxiously and patiently waiting for their description. It is much to be regretted that the able and learned professor, whose accurate knowledge none can doubt, is unable, from his numerous and important engagements, more frequently to issue these helpful and beautifully illustrated papers, for it can hardly be that the Government of so wealthy a colony grudges the sum required for their production. True students will, however, battle on with or without aid, and doubtless difficulties will only incite to noble effort.

"In this connection I cannot but mention the "Forest Flora of South Australia," by Mr J. E. Brown, Conservator of Forests in that colony. The size and beauty of the plates will charm all the lovers of our native woodlands. Nor must we forget our own modest manual of the Club's proceedings, "The Victorian

Naturalist," of which our first volume has been published, and in which will be found many papers of interest—a baby yet among such-like productions, but promising to grow bigger and stronger as members of the Club enrich its pages by their observations, and increase its circulation by their efforts.

"Passing from the literature of our subject, we come to collections of specimens alive or dead. The student of animal life can spend many pleasant hours in the zoological collection at the Royal Park, and if he has the good fortune to secure Mr. Le Souëf as his guide, philosopher, and friend, his pleasure will be doubled. Whatever blame may possibly, and only possibly, rest on the shoulders of the Acclimatisation Society of Victoria in respect of some of their introductions into the colony, nothing but praise can be awarded to them for the care and enterprise that have been shown in the collection and management of their gardens — gardens that will surely induce a love of natural history in the minds of young Victorians, but which also prove of great value to the student who wants to study the habits of beasts, birds, and reptiles. However skilful a taxidermist may be, he can never give to his skins the subtle and mysterious quiver of life, so that the student who wants to understand life and its history seeks to learn from living objects, and the gardens of the Acclimatisation Society meet a long-felt need.

"The wealth of our city in this direction has been added to by the opening of the aquarium in the Exhibition Building. It is true that at present but few species have been secured, and that whole classes of marine fauna, such as the *Actinopoa*, that make some of the tanks at Brighton, England, as gay as tulip-beds, are conspicuous by their absence, yet enough has been done, and well done, to show what the possibilities are, and doubtless the management, which has made so good a beginning, will not rest till the ichthyologist finds, not only something to amuse, but opportunity for grave study. The names of the inhabitants are well and conveniently set out on the tanks, but, for the sake of the many who have no knowledge at all of fish, it would be well, in cases where more than one species are in the same tank, to give a description, brief but clear, so as clearly to indicate which is which. It is amusing to listen for a little while at one of those tanks, and note the strange guesses made, and the stranger reasons given for the belief entertained.

"We have four museums, all of which demand attention, and render aid to the student of natural history, and should enable the collector to name most of his finds, and so put him in the way of studying correctly life-histories. In this way home collections will be more than pretty toys, and the aim of our Club, and the subject of our paper, will begin to be realised—the domestication of Natural Science.

"Of our National Museum, for its large collection and the admirable way in which the taxidermist has arranged many of

the groups of birds and animals, we have a just right to be proud. Having visited many of the natural-history museums, both at home and on the Continent, our own, I can safely say, in many respects, contrasts most favourably with these,—in some, carries off the palm for excellency. But there is here yet much to be desired, and a deputation from our Club waited on the trustees of the Library and Museums for the purpose of pointing out to them some requirements. I may mention them here:—

"1st. The first great need is more room. Treasures are there, but they cannot be found. Entomology is a favorite department of science in this colony, and the collections of insects are numerous. Some enthusiast, proud of his gatherings, makes his way to the National Museum to identify his species. He looks, and often looks, in vain. A few cases—many obsolete names—and yet the museum is rich in such gatherings, only they are stowed away. By the courtesy, indeed, of Mr. Keartland, they may be seen, but the many, I am afraid, do not know the amenability of our fellow-member. The same complaint may be made as to oology. It is believed there is a good oological collection somewhere, but where that somewhere is no ordinary visitor can find out. The Neuropsids of Australia form an interesting study, and our museum ought to contain a fairly complete series. But here, too, we look in vain. How beautifully reptiles may be preserved and mounted, and made, instead of repulsive, almost fit for drawing-room ornaments, visitors to the newly-established museum at Adelaide can testify. Without further illustration, what is chiefly needed at our National Museum is room—room for the arrangement especially of the fauna of Australia—that our museum may not be simply a lounging place for the nursemaids of Carlton, or a show for passing visitors, but a place where our students of nature can find the real helps they need. It has also been pointed out that in many cases the nomenclature is antiquated, and in some cases inconsistent.

"2nd. We ask that the overworked learned professor at the head of the museum should have given to him a staff of scientific assistants. Our idea is that, under Professor M'Coy, there should be a number of gentlemen, each one with the care of a department. We could not expect such a list of world-known men as form the staff of the British Museum, nor would it be necessary. There are plenty of young scientists who would be willing to be working hands, and who, under the direction of the professor, would be able to collect, classify, arrange, name, and, in addition, be able—not to waste time by chatting with idle *dilettanti* or answering foolish questions—but to put enquirers into the way of finding solutions to their seekings. No one man can do, or ought to try to do, everything. Our colony is rich enough, and the students of nature are many enough, to warrant such an arrangement. It would be ungenerous to blame an overworked man, yet it is intolerable that specimens should, in

the last two or three years (to my knowledge), have over and over again been sent to Europe for identification; of such specimens not a few proved new to science. We ought to be able in this colony, at any rate, to classify and name our own productions. With increase of room and increase of men the other needs mentioned by our deputation to the museum trustees could easily be met.

"Our second museum is the technological one at the Public Library, of which little need be said; it is very useful, so far as it goes. The ethnographical department bids fair to be of much use to those who desire to study Polynesian races—a department that should be much increased by the acquisition of specimens of the dress, arms, implements, and works of art of the aboriginal people of Australia and Austral Polynesia. Many races seem doomed to extinction; before it is too late let us preserve all we can that may teach us and those who come after us what sort of men they were.

"The last-born of our natural collections is the Economic Museum at the Exhibition Building. The danger of this new undertaking is that it should overlap, on the one hand, the National, and, on the other, the Technological Museums. To a certain extent this has already been the case. Conchological and paleontological collections should certainly find no place there, that is, if our museums are to be helps to study and not mere show-places. To be valuable, collections should be complete. The authorities of our various institutions should work together in harmony and with common purpose. Public money should certainly not be spent in gathering a few specimens at the Exhibition Building of shells, or fossils, or the like; and even presentations of such should be handed in to the National Museum. A student cannot afford time, if he needs to compare specimen with specimen, to run between the Exhibition and University Buildings. But an Economic Museum in itself is another and much needed help, not only to the scientist but to those who are called the practical men of the community—manufacturers, agriculturists, horticulturists, all need such an aid. Specimens of products, with their economic uses; complete sets of insects noxious to plants, such as have been prepared and placed there by our fellow-member, Mr. French; the admirable series of woods by Baron von Mueller; complete sets of fungi, classified as edible, harmless, poisonous; microscopic fungi hurtful to plants; insectivorous birds that all grain or fruit-growers should cherish and protect; sorts of grains or fruits suitable to the various soils of the colony, with specimens of such soils. These are but illustrations of what an Economical Museum should be; the only difficulty seems to be the drawing a line between the Technological and the Economic Museums, and I think we ought to deprecate the establishment of mere rival collections. We have not scientists enough to spare men in

different places to do the same work, and we have neither the wealth of money or time to spend in running from place to place in our pursuit of knowledge. To the botanist the Botanical Museum, under the care of the Baron von Mueller, offers all that he needs of the flora of Australia; while our Botanical Garden is not only a thing of beauty, but a live book adorned with Nature's own most magnificent paintings, in which those who walk may read and learn.

"I have been led thus to take up my time—not intentionally at first—in speaking of the helps we enjoy in this city for the demonstration of Science. Our one hundred and sixty members show that in this young land many minds are not shut to the wonders that Nature is ever ready to reveal to those who are willing to open their eyes and see. But with the aid we have—with a land full of unique forms—with many a life-history yet unwritten, the worshippers at Nature's altar should be increased many-fold, and to all and sundry who wish to do honest work in a humble and patient way our Club holds out a hand of heartiest welcome.

"Before I close my address I should notice one or two matters of public interest that have engaged the attention of the Club. In October last a deputation waited on the Minister of Lands with reference to the destruction of trees and shrubs in Studley Park. The result has been that increased vigilance has been given to the preservation of the park in its natural beauty. The Club also presented a petition to Parliament supporting the amended Game Act which has abolished swivel and punt-guns, by which such wasteful destruction of bird-life has been caused for years past on our lakes and swamps. A committee of our Club is also just now busily engaged in preparing a list of insectivorous game and other birds that, in their opinion, should be brought under the provisions of the Game Act.

"As loyal Australians we cannot but be glad that our land is receiving attention from naturalists in the old countries. The miserable description of its fauna and flora given by the elder Darwin, doubtless, as Mr. Lucas pointed out to us at one of our meetings, prevented much attention being paid to our natural history. The advent of Mr. Caldwell, and patient investigation into the vexed question of the reproduction of the Monotremata and Ceratodus, is a matter for congratulation. Biologists will be eager to learn all he has to tell us. We are glad, also, to welcome to this Colony so well-known a labourer as Mr. McAlpine, the newly-appointed lecturer at Ormond College, and congratulate the college on having obtained the services of so distinguished a man, and one who can make Science popular, and who is able to lecture on scientific subjects without the continual use of sesquipedal words.

"Ladies and Gentlemen,—While we congratulate ourselves on what has been done, let us ever understand what the true end of Science is. It certainly is not the mere gratification of fancies—the passing amusement of an hour. It is not simply to know. Lord Bacon's famous motto is one we might almost take as the motto of our Club—'The true end of Science is to enrich human life with useful arts and inventions.' And truly, by the patient study of life in all its forms we may, while adding to the sum of human knowledge, increase the sum of human happiness. I affirm that that man who helps to make the world cleaner and healthier, or who is able by patient investigation to add to the store of its common wealth, is truly an apostle of that divine kingdom that prophets and seers have foretold and sung of.

"In concluding my address, do not suppose that I think for one moment that our young men are ever to be looking through lenses, and that our young women are to do naught but classify animals. Nor do I suppose or wish that all evening parties should be turned into scientific conversaziones, that lectures should take the place of songs, and dances all give way to dissections. I only plead for an intelligent acquaintance with the phenomena of Nature, and some knowledge of the laws by which such phenomena are governed; that the conversation of intelligent people should sometimes rise above the idiotic meanderings of dreary commonplaces, and that blatant ignorance should not assume to be the philosophy of the day. Ladies and gentlemen of our Club, you are doing your part in no unimportant work. You are helping to bring in a time of knowledge that shall alike be useful and reverent. Our land is full of wealth. Rich mines of truth need patient investigation to compel them to yield up their stores,—hidden treasures are for those who learn the password. Let us learn to know that we may know to act."

The Rev. A. W. Cresswell followed with an interesting Lecturette on some of the larger Extinct Animals of Australasia, in the course of which he directed attention to the well-known laws governing the geographical distribution of animals, according to which every large continental division of the earth has a certain class of existing animals which are more or less peculiar to or characteristic of it, and also that the fossil remains of the animals found in the most recent Tertiary deposits of every such "Zoological Province" indicated a pre-existent group of animals of the same types as those now living there, but mostly on a very gigantic scale. The lecturette was illustrated by diagrams, and by skulls of recent animals.

Mr. F. G. A. Barnard (the hon. secretary) then delivered a Lecturette on "Insects, their Forms and Metamorphoses," and in an intelligible manner, aided by drawings made by himself, explained the position of the class *Insecta* in the animal kingdom, and its relationship to the other classes of the same sub-kingdom,

Annulosa. He described the metamorphosis, or change of form, in the three more or less complete stages through which every insect passes between its birth and its fullest development. The seven principal orders of insects were then referred to and their chief variations pointed out. Reference was also made to common insects of various types probably known to many people. At the close of his lecturette, Mr. Barnard declared his readiness to give any information in his power regarding the insects and *larvæ* and *pupæ* cases of moths and butterflies exhibited by him on that occasion.

Baron von Mueller moved a vote of thanks to the president and lecturers, and said that as one of the earliest naturalists in the colony it afforded him great pleasure to note the progress and general prosperity of the Field Naturalists Club of Victoria. A quarter of a century ago, from the chair now occupied by their president, he had prophesied the growth and increased popularity of the study of the Natural Sciences in this colony. He congratulated the president on the use of the happy phrase "the domestication of science." It gave him much pleasure to welcome such divines as Mr. Halley and Mr Cresswell amongst the students of Science: for the more he and others investigated the wonders of Nature the more impelled were they to recognise a First Great Cause.

Mr. A. H. S. Lucas briefly seconded the resolution, which was carried by acclamation.

RECORD OF EXHIBITS.

Following is a list of the principal exhibitors, with a detailed statement of their exhibits:—

D. Best, Fitzroy—6 Cabinet-drawers Australian Coleoptera, case of Victorian Birds.

F. G. A. Barnard, Kew—3 Cases of Victorian Insects, comprising representatives of each order, in illustration of his Lecturette; Living Ferns (Victorian), including—*Schizæa dichotoma*, *Gleichenia flabellata*, *Gleichenia circinata*, etc.

A. J. Campbell, Armadale—Case containing Nests and Eggs of Australian Birds, Apparetus for blowing Birds' eggs

Miss F. M. Campbell—Collection of fresh Fungi.

G. Cochill, Hawthorn—Victorian Orchids in bloom:—*Eriochilus autumnalis*, *E. fimbriatus*, *Pterostylis aphylla*.

A. Coles, Melbourne—Case of Australian Birds. Arctic Fox (mounted); Black Cock and pair of Red Grouse; Bird-skins from South of France; specimen of Fungus growing from the head of the larva of a moth.

J. E. Dixon, South Yarra—4 Cases of Victorian Fossils from the Pliocene, Miocene, Eocene, and Silurian formations.

C. French, Department of Government Botanist—Gold medal and diploma awarded at Amsterdam to Exhibitor for Entomological collection; Exotic Lepidoptera, including the Atlas Moth from China, Goliath Beetle, the largest species of beetle known, from West Africa, pair of Fijian Parrots (live); Caricatures of Members of F. N. Club, drawn by Mr P. Dautan (F.N.C.).

Master C. French, South Yarra—4 Cases containing Victorian and other Fossils, Minerals, and Shells; Native Weapons and Utensils from Fiji, New Guinea, and West Australia; two Victorian stone Axes.

Master G. French, South Yarra—Collection of Australian and other Seeds.

J. H. Gatliff, St. Kilda—5 Cases of Marine Shells, comprising 210 species of the genera Conus, Murex, Voluta, Cymba, and Melo.

Master W. H. F. Hill, Windsor—2 Cases of Victorian Lepidoptera, result of first and second year's collecting.

Master G. E. F. Hill, Windsor—2 Cases of Victorian Lepidoptera, results of first and second year's collecting.

E. E. Johnson, Northcote—Pelican and other Victorian Birds; Cat bird from Richmond River, Octopus from Mordialloc; red and white Coral from Fiji; Fossils, Stone from Pompeii, etc.

Hugh Kennon, South Yarra—Case containing Victorian and South Sea Island Shells, Weapons, Coral, etc.

W. Kershaw—Two cases Exotic Lepidoptera, and two cases of Australian timber-feeding Moths.

T. A. Forbes-Leith, Albert Park—Cage with ten Parrots; collection of 65 Australian Parrots; cases containing Native Cat and Kittens; White Goshawk (male) from Gippsland, (female) from Tasmania; glass shade with Opossum Mice; Gold and Silver Medals awarded to Exhibitor for Natural History Exhibits.

D. LeSouef, Royal Park—Two Victorian Tiger Snakes, venomous (live); Victorian Carpet Snake, non venomous (live); New South Wales Diamond Snake, non venomous (live); 4 Victorian Lizards, stumptailed and blue-tongued (live), New Zealand Lizard, tuatara (live); collection of Snakes from Malay Peninsula (in spirits); King Penguin from Macquarie Island; white Native Bear (mounted); Cuscus from New Guinea (mounted); *Strix scops*, the smallest of the Owls (S. Europe), etc.

A. H. S. Lucas, Albert Park—Collection of Victorian Sponges.

Dr. T. P. Lucas, South Melbourne—Rare Victorian Moths.

BARON VON MUELLER, Government Botanists' Department.—Model of the Murray River Lily (*Crinum flaccidum*), prepared by Mrs. Ann Tisbrell. Specimens in paper of:—1. *Rhododendron Teysmannæ*, a new species with very large white flower-bunches, discovered in New Guinea by Mr. Hunstein, (with wood-cut). 2. *Bikkia Bridgesana*, a splendid new species brought from New Guinea by Captain Bridge, R.N. 3. *Dipteranthemum Crosslandi*, a charming new Everlasting gathered in West Australia by Mr. Crossland, the flowers resembling some dipterous insects. 4. Some other new plants, described in the journal of the Victorian Field Naturalists' Club. Edible Fruits from New Guinea, viz., *Bassia Fenkinensis*, *Bassia coco*, *Bassia Maclayana*, *Pangium edule*, obtained by Mr. Miklucho-Maclay and the Rev. W. Gill. Leaves and Acorns of New Guinea Oaks, viz.:—*Quercus D'Albertisi* and *Q. Gulliveri*. Large Mexican Acorns of *Quercus Skinneri*. Publications, viz.: Eucalyptography, Plates of the forthcoming monography of Myoporinæ.

F. READER, Collingwood.—Two Books of minute Victorian flowering Plants; Collection of Victorian Lichens, including two new species.—*Lecanora leucaspida*, Knight, and *Pertusaria albescens*, Knight.

J. F. ROBERTS, York Nursery, Kew.—Exotic Orchids (in bloom).

G. ROSE, Windsor.—Case of Fossils and Minerals.

A. THIE, Richmond.—Ethnological Collection (on wall).

J. WISE, Collingwood.—Copies of "SOUTHERN SCIENCE RECORD" (new series).

T. WORCESTER.—Two Cases of Land Shells, containing many rare species.

A very enjoyable and instructive evening was spent by the members and their friends, and the proceedings were brought to a close at about half past 10 o'clock.

THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

FIELD NATURALISTS' SECTION. EXCURSION.

The fifth excursion of the summer session of the Field Naturalists' section of the Royal Society was made on Saturday afternoon, March 7th, to Bridgewater, Cox's Creek. The party left the railway station, North terrace, in specially reserved carriages, and arrived at Bridgewater at about half past 2. Here the party were met by Professor Tate, F.L.S., F.G.S. &c., who, on his way home to Dawsley, kindly arranged to accompany the members of the section on their excursion, and give them the benefit of his knowledge.

The party, under the leadership of Mr. George Collis, jun., took an opposite direction to that followed on the last visit to Bridgewater, and instead of going along the dam and up the creek proceeded down the stream. After travelling a little way by the road they took an oblique turn to the right, and then made their way with some little difficulty through the bush to the bed of the creek, along which they slowly walked for about a mile. The weather was beautiful, with occasional gentle breezes from the gullies.

Along the margin of the stream were seen huge ant-hills, the occupants of which were evidently busily engaged in preparing for the coming winter. Here and there was seen the pretty trailing creeper *Marianthus bignoniaceus*, and the native fuchsia, *Correa decumbens*, was in profusion. In addition to the ordinary red variety was found the yellow flowering one. This plant is only to be found on the Mount Lofty Ranges. In the neighborhood of the Onkaparinga, along the banks of the creek, was discovered *Gleichenia microcosa*, the handsome sedge, with its bright green foliage standing out in bold relief from the parched land. The blue-bell, *Wahlenbergia gracilis*, was found in abundance. The botanists of the party drew attention to this plant, which was exhibited at the last Royal Agricultural Show as a fodder plant. It is well known that if not poisonous this plant is at least very suspicious, and certainly most unwholesome. *Lobelia microsperma* was also noticed, and it was stated authoritatively that to this plant may be ascribed the death of much valuable stock. The white everlasting flower, Exodia, was in full bloom and very abundant. This flower is peculiar to the Mount Lofty Range and the South-East desert. The bright *Goodenia ovata* was very plentiful, and of botanical specimens, generally, valuable and interesting specimens were collected by the histological students.

The party eventually arrived at a romantic waterfall, into the basin of which the creek falls with some force. This basin is enclosed on three sides with high rocks, in one of which is seen the entrance to a cave; and the varying effects of the light and shade on the face of the pool, as witnessed by the party, were exceedingly effective. Mr. Collis took a photograph of this scene. A halt having been sounded, Professor Tate briefly addressed those present. After having referred to the botanical and entomological spoils which had been collected, he explained the geological formation of the country in which they had found themselves, and stated that the higher ground was composed of grits and friable sandstones, while the hard grits made up the valley bottoms. He called the attention of the members to the numerous "pot-holes" apparent on the face of the rocky beds forming the rapids, and explained that these were caused by stones being caught and retained by the eddying currents until holes were actually worn into the rock itself. Some of these "potholes" were as much as two feet in depth.

A slight accident happened before the return journey was commenced, which fortunately was not attended with very disastrous results. The surface of the rock was exceedingly slippery, and a lady, in her desire to secure a botanical specimen somewhat beyond her reach, overbalanced herself, slipped on the glassy stone, and fell headlong into the current. Help of course was promptly at hand, and she was rescued from her perilous situation. The first gentleman, however, who grasped the necessity for immediate action, and gallantly rushed to the lady's assistance, in his ardour lost his balance, and also found himself in the water. Fortunately no bones were broken, and the heat of the day soon removed the temporary inconvenience resulting from the involuntary immersions.

On the return Professor Tate pointed out the curious parasite, *Cassytha pubescens*, festooning the *Acacia retinoides*, and drew attention to the sedge *Cladium psittacorum*, which he said was the tallest of its kind in Australia. The plant was so called from the number of small parrots which were attracted by its pretty coral-red seeds. At 5 o'clock the members of the section left Bridgewater, and reached the city a little after 6.

THE LINNEAN SOCIETY OF NEW SOUTH WALES.

MARCH MEETING.

The monthly meeting of this Society was held in the Society's House, Philip-street, on the 25th March, the President, Professor W. J. Stephens, M.A., F.G.S., in the chair. Mr. Sidney Olliff was present as a visitor; and the following gentlemen were duly elected members of the Society:—Mr. J. A. Boyd, Ripple Creek, Queensland; Mr. Sidney Olliff, Australian Museum.

The receipt of a number of donations was announced.

Papers were read as follow:—

1. On a Devonian fossil, allied to *Worthenia* (de Koninck), from New South Wales. By F. Ratte, Eng. Arts and Manufactures.

This fossil was obtained in the Murrumbidgee limestone, near Yass, by Mr. Jenkins, for the Australian Museum. It is interesting from its close resemblance to a new genus recently formed out of *Pleurotomaria* and others, by Professor de Koninck. It is, however, so different in many respects from all species of *Worthenia* as yet described, that it may probably require to be placed in a distinct genus. For the present, however, the author intends to leave it as above.

2 On the Phoriaspongiæ (Marshall). By Dr R. von Lendenfeld.

Both species described by Marshall have been found by the author, who considers them, together with some new species discovered by himself, to be Ceraospongiæ, with Flesh-spicules, and not, as Marshall had supposed, Desmacidandæ, or Ciandæ, living in sand. There exist many sponges on the Australian shores with a skeleton consisting of areniceous fibres, which form an irregular network, thus connecting the Phoriaspongiæ with the ordinary horny sponges. Eleven species of horny sponges, with Flesh-spicules, have been found in Australian waters. Their spicules are described and their relative positions to other sponges discussed The author upholds his previously-published views on the relationship between Ceraospongiæ and Monactinellidæ, and discusses the hypothesis recently put forward by Vosmaer.

3 Synonymy of, and remarks upon, four species of shells, originally described by Dr. J. E. Gray. By John Brazier, C.M.Z.S., &c.

The four shells here mentioned—*Nassa livida*, *Strombus australis*, *Bulla australis*, and *Bullina lineata*—were all described by Gray in the years 1825 and 1827; but they have been ever since referred to the wrong authors, and sometimes under other names. The synonymy is given in full.

4. Notes on the Australian Amphipoda. By William A. Haswell, M.A., B.Sc., &c.

The genera here dealt with are *Tulitrus*, *Allorchestes*, *Nicea*, *Atylus*, *Neobule*, *Aspidophoreia*, *Eusirus*, *Ampelisca*, *Lysianassa*, *Stegocephalus*, *Moera*, *Harmonia*, *Haplocheira*, *Xenocheira*, *Cyrtophium*, and *Proto*; several new forms are described, including a genus allied to *Cyrtophium*, but distinguished by the presence of an appendage on the superior antennæ and the multiarticulate character of the flagellar.

5. On the Toxoglossate Mollusca of New Zealand. By Captain F. W. Hutton, F.G.S.

A list with the synonyms and exact localities of the New Zealand species of *Pleurotoma*, *Drillia*, *Mangelia*, *Clathurella*, *Daphnella*, and *Terebra* are here given.

6. Notes descriptive of some rare Port Jackson Fishes. By J. Douglas Ogilby, Assistant in Zoology, Australian Museum, Sydney.

A careful description of *Plectropoma nigrorubrum*, *Cur. et Val.*, is given. Also of *Exocætus melanocercus*, *sp. nov.*; the

name *Ammotrotis Macleayi* is proposed for the *A. zonatus* of Macleay, and some remarks are made on *Callianymus calcaratus*, *Macleay*. The notes and descriptions are from freshly caught specimens.

Mr. Ratte exhibited a jaw-bone of a Devonian Fish from New South Wales, probably *Asterolepis* (Australian Museum) as well as the following:—A silicified fossil shell, apparently allied to *Worthenia*. A detached siphon of an *Orthoceras*. There is some doubt about this specimen, as it resembles very much the rare sub genus *Endoceras*, which, however, is a lower silurian fossil, whilst the fossil exhibited comes from the same limestone beds as *Asterolepis*, and is therefore Devonian. He also exhibited drawings of the above specimens, of the large *Crioceras Australe* (Chas. Moore) from the Neocomian of Northern Queensland, a sketch of its septa, and the drawings of two species of *Spirifer* (?) from New Caledonia, probably Carboniferous. (From the collection of the Rev. F. Montrouzier, Noumea. Casts in the Australian Museum.)

Dr. R. von Lendenfeld exhibited two Rock Specimens from the Australian Alps. One formed part of the summit of Mount Kosciusco, and the other was taken from the summit rocks of Mount Townsend, the highest mountain in Australia. The former is a very coarse-grained dark-colored granite, the latter possesses the appearance of gneiss; although it is also granite of a very light color.

Dr. R. von Lendenfeld also exhibited specimens of Cypress Pine (*Frenela robusta*), which had been affected by the Larva of *Diadoxus erythrurus*. Extensive tracts of pine scrub have been devastated by this insect, which may thus render great services to the settlers in the back country. A living specimen of the larva, a grub an inch and a-half long, was also exhibited.

Mr. Ogilby exhibited the Fishes referred to in his paper.

Mr. E. P. Ramsay exhibited the following rare birds:—*Scenopoeus dentirostris*, Ramsay, and a new species of *Collyriocincla*, obtained by Mr. Boyer Bower at Cairns, Queensland; also a fine specimen of *Lophorina superba* from the Astrolabe Ranges, in New Guinea. Also the anterior portion of the skull containing the premaxillaries and two front incisors complete of a new extinct marsupial, allied to the wombat, but quite distinct from the genus *Phascolomys*. The portion exhibited indicated an animal at least twice the size of any known fossil or recent species. The two upper incisors are

worn away in a similar oblique manner to that exhibited in the new genus *Scoparmalon*.

Mr. Ramsay read an interesting letter from Sir Richard Owen, relating to the discovery of the mode of reproduction of the Monotremes and to Sir Richard's recent notes on the subject, which will be published in full in the Proceedings.

Mr Pedley exhibited a Fungus occuring on the leaves of the peach-trees over the district extending from Prospect to Kamden. It is of the order Ascomycetes, and lodges exclusively on the lower side of the leaf, the mycelium choking up the stomata, and thus destroying the vitality of the plant.

Mr. Edelfelt exhibited a bag formed of fibre obtained from a species of *Morus* (?) by the natives of New Guinea near the Owen Stanley Range, and described its mode of preparation.

NOTE AND QUERY.

THE PRODUCTION OF MANNA.—I have been often exercised in mind regarding the production of manna, and would feel much gratified if I could gain some definite information upon the subject. In my bush travels I have gathered and eaten quantities of it from under the trees (Eucalyptus.) In answer to my queries, some have declared it to be an exudation from certain portions of the tree; others have declared a species of locust to be the cause of its production; but no one with whom I have communicated appeared to be able to give any satisfactory or reliable information on the point. I am therefore led to pen this with a view to elicit the information I seek.—ALPHA.

THE

Southern Science Record.

AND

MAGAZINE OF NATURAL HSTORY.

VOL. II. (New Series.)

List of Australian Terebridæ.

By Professor Ralph Tate, F.G.S., F.L.S., &c.

The Auger-shells comprise a well-defined group or family—(*Terebridæ*), and are so named from their long, narrow, many-whorled shell. The family is now restricted to the single genus *Terebra*, which includes 120 well-established species and about 50 others described but not figured, and therefore not as yet susceptible of identification. Several conchological writers have split up the genus into subordinate groups, but it must be admitted that such division is not advantageous, if we except the sub-genus *Euryta*, which was established by the Messrs. Adams for the reception of the bucciniform species, of which there are five in number.

The species are mostly tropical, and appear to inhabit shallow waters beyond low tide-mark; they have their head-quarters in the Indian and Pacific Oceans; one or two species occur in all warm seas.

Thirty-six species are known as denizens of Australian waters; these, as regards geographical distribution, may be considered under two groups—

(1) Migrants from the Indian and Polynesian Provinces, which are, with two exceptions, limited in Australia to the tropical and sub-tropical shores; they number 20 species in all. The two species reaching into temperate waters are *T. spectabilis*, which, from Sumatra to New Guinea, thence to North Australia, extends south to Tasmania; and *T. cancellata*, which, as an Australian shell, is confined to the southern coast-line. Much uncertainty, however, prevails as to the correct identification of the Terebra

so common and widely distributed on the Southern coasts. It has been under examination by Mr. E. A. Smith, who names it *T. cancellata* (Quoy), whilst Mr. F. Angas refers it to *T. ustulata*, (Deshayes). Though I have not at command the material for comparison which the above-named gentlemen have had, yet, so far as I can judge from figures and descriptions, our shell is neither the one nor the other; it certainly agrees in shape better with *T. cancellata* than with *T. ustulata*, but the interstices between the ribs are smooth. The outline agrees best with *T. exigua*; the length is 22 mill., breadth of last whorl 5·5.; colour chestnut-brown, the band next the suture light-horn; the ribs are nearly straight, thick, and sub-angular, with narrow, angular, smooth interspaces; there are about 40 on the penultimate whorl.

In this category are included those species whose Australian habitats are not known, but which, from their geographical distribution, may reasonably be expected to occur in our tropical rather than in our temperate waters. Also the species from the habitat "La Terre de Van Diemen" have been placed among the tropical forms; all of them are unknown in Tasmania, and it is almost certain that a part of North Australia, which bears the same name, is the region implied.

(2) Endemic species, the majority of which belong to temperate waters, especially of New South Wales. The following six are tropical,—*albida*, *ustulata*, *Bermonti*, *Taylori*, *brevicula*, and *turrita*; *T. australis* belongs to temperate and tropical parts; whilst nine are restricted to our temperate waters, making 16 in all.

Genus Terebra.

[*f.*—Whorls smooth, with or without a smooth sutural band next the suture.]

T. maculata—(Linnæus).

T. crenulata—(Linnæus).

T. dimidiata—(Linnæus).

T. oculata—(Lamarck).

The above have been recorded from North-east Australia.

T. muscaria—(Lamarck).

T. subulata—(Linnæus).—Named by Mr. Brazier, from examples collected by himself at Darnley Island, Torres Straits.

T. albida—(Gray).—Described from specimens from New Holland.

T. Brazieri—(Angas, 1871).—Type from Brisbane Water, also Port Stephens and Port Jackson, New South Wales (Brazier); Tasmania (Tenison Woods); Port Elliot, South Australia (Bednall).

T. lauretanæ—(Tenison Woods, 1879).—Type from Port Jackson Heads, N.S.W. (Brazier).

T. circumcincta—(Desh.).—Port Curtis, Queensland. (Stutchbury).

[ff.—Whorls with a plicate or tuberculate band next the suture.]

T. AFFINIS—(Gray).—Recorded from Tropical Queensland.

T. MARMORATA—(Deshayes).—Type from Moreton Bay. (Cuming, coll.); also from Port Curtis, Queensland (Stutchbury), and Port Jackson (Brazier).

T. DESCHAMPSIERI—(Kiener).—

Syn.—*T. Bernardi* (Deshayes), founded on examples from East Coast of Australia. (Cuming, coll.)

T. SPECTABILIS—(Hinds).—

Syn.—*T. Jukesii* (Deshayes), from Port Essington, N.A., and *T. addita* and *T. Kieneri* (Desh.), from "La Terre de Van Diemen." (Cuming, coll.)

Other localities—Port Jackson (Brazier) and Port Arthur, Tas. (Tenison Woods).

T. USTULATA—(Deshayes 1859).—Type from "La Terre de Van Diemen." (Cuming, coll.)

T. EXIGUA—(Deshayes, 1859).—Type from "La Terre de Van Diemen." (Cuming, Coll.)

T. VEXILLA—(Tenison Woods, 1879).—Type from Port Jackson. (Brazier).

T. BERMONTI—(Lorois).—

Syn.—*T. pertusa* (Born, non Basterot), from Darnley Island, Torres Straits.

T. FICTILIS—(Hinds). Habitat, Australia.—

Syn.—*T. bicolor*—(Angas).—Type from Port Jackson; recorded for Tasmania by Tenison Woods.

T. TAYLORI—(Reeve).—Type from Torres Straits.

T. CANCELLATA—(Quoy).—Port Elliot (Bednall), Great Australian Bight (Tate), King George's Sound (Brazier).

T. BREVICULA—(Deshayes).—Type from "La Terre de Van Diemen."

T. MYTEOS—(Lamarck).—

Syn.—*T. scabrella* (Lamk.).—From New Holland.

T. CINGULIFERA—(Lamarck).—From New Holland.

T. ALBOMARGINATA—(Desh.).—From Australia. (Cuming, coll.).

T. TRISERIATA—(Gray).—

Syn.—*T. prælonga*, Deshayes.—From Port Curtis, Queensland. (Cuming, coll.).

T. AUSTRALIS—(E. A. Smith).—From Swan River and Paterson's Bay, North Australia. (Coll. British Mus.)

[fff. No sutural band. Whorls striate or plicate next the suture.]

T. CERULESCENS—(Lamarck).—

Syn.—*T. nimbosa*—(Hinds).—From New Holland.

T. ALBULA—(Menke).—Type from sub-tropical West Australia.

T. NITIDA—(Hinds).—

Syn.—*T. plicatella*—(Deshayes).—From "La Terre de Van Diemen." (Cuming, coll.).

T. ASSIMILIS—(Angas).—Type from Port Jackson.

T. PLUMBEA—(Quoy).—Recorded as also Australian by Tryon.

T. TURRITA—(E. A. Smith).—Type from Torres Straits. (*British Museum*).

T. BEDDOMEI—(Petterd).—From Tasmania.

SUB-GENUS EURYTA.

T. TRILINEATA—(Adams and Angas).—Type from Port Jackson.

T. ANGASI—(Tryon), 1885.—

Syn.—*T. pulchella*—(Adams and Angas, non Deshayes).—Type from Rapid Bay, South Australia.

T. Brazieri—(Angas).—1875 (non Angas 1871).—Type from Port Jackson. (Brazier).

THE FOSSIL TEREBRIDÆ OF AUSTRALIA.

BY PROFESSOR RALPH TATE, F.G.S., F.L.S., &c.

The family is not known in rocks of older date than the Eocene. The number of fossil species given for the genus *Terebra* in Woodward's Mollusca (1866) is 24; but that number has since been reduced by the transference of some to *Columbella* and by the suppression of others. Conrad's genus *Coelatura*, which he had referred to Terebridæ was afterwards removed by him to Tornatellidæ; whilst his genera *Pyramitra* and *Terebrifusus* are regarded by Tryon as not belonging to the family, which comprises now the sole genus from which it derives its name. Certain desiderated palæontological works do not permit me to offer a complete list of the fossil species, but since 1866 at least 16 species have been added, and those now to be described bring up the total to 22.

As far as the European Tertaries are concerned, the Eocene period has only one species, *T. plicatula* (Lamk.), common to the Hants and Paris Basins; the genus culminates in the Miocene, and it has representatives in the Pliocene of Piedmont. There are three in the Eocene deposits of the United States, two in those of Chili, seven in those of Java, and one in Borneo; and there is one in the Miocene of the Caribean area. From the Older Tertiary rocks of New Zealand two species have been described. The Australian area possesses eight species, distributed geographically as follows:—At Table Cape, Tasmania, 2 species; at

Muddy Creek, 4 (one common to Table Cape); at Aldinga, 2; at the River Murray Cliffs, in South Australia, 2 (one common to Table Cape).

It is noteworthy that the basal portions of our Older Tertiary, as represented in the boring section at Adelaide, in the lower marls and glauconitic limestones at Aldinga, in the clays at Schnapper Point, Hobson's Bay, and elsewhere have not yielded as yet a single species.

TEREBRA.

I.—*Without a sutural band.*

1. TEREBRA SIMPLEX. (Tenison-Woods).

Ref. Proc. Roy. Soc. Tasmania for 1875, p. 21, tab. 1, fig. 1.

This species has the general form of *T. maculata*, (Linnæus), but the whorls are slightly shouldered and strongly wrinkled transversely; the posterior whorls are transversely plicate. There is no infra-sutural groove.

Dimensions of largest examples of 15 whorls,—Length 70; breadth of last whorl, 15 millimetres.

Localities:—Table Cape, Tasmania (T. Woods). Muddy Creek, Hamilton, Victoria, (R. T.)

The specific name given to this fossil is preoccupied by a Calfornian shell described by P. Carpenter; but as that "is very probably a minor variety of *T. variegata* (Gray)," Tryon, there is no need to apply a new designation.

2. TEREBRA ADDITOIDES. (Tenison-Woods).

Ref. Proc. Roy. Soc. Tasmania for 1876, p. 95.

The whorls are flatly convex, transversely acutely plicated; plicæ thin, distinct, straight and subnodulose near the suture, interspaces finely and closely reticulated. There is no infra-sutural groove, though the slight deflection of the plicæ in front of the nodulations simulates the appearance of one.

Dimensions of a specimen having 13 whorls:—Length, 24; breadth of last whorl, 5 millimetres.

Locality:—Table Cape, Tasmania (T. Woods and R. M. Johnston!). A fragment consisting of two upper whorls from the Gastropod bed in the River Murray Cliffs, near Morgan, may belong here.

The specific name indicates its affinity with *T. addita* (Deshayes), synonymic with *T. spectabilis* (Hinds).

II.—*With a sutural band.*

3. TEREBRA CATENIFERA. (Tate.)

Shell cylindrical, of many polished whorls; whorls convexly flattened, slightly overlapping, double-banded and nodulose in

front of the suture, the posterior band rather the broader, and separated by a shallow sulcus; about 20 pairs of nodulations on the penultimate whorl: anterior half of each whorl distantly and superficially spirally ridged; whole surface, excepting the nodulations, arcuately striated by lines of growth; base spirally ridged and transversely wrinkled.

Dimensions of a specimen with 17 whorls (the posterior two of which form a smooth pullus):—Length, 37; breadth of last whorl, 6 millimetres

Locality:—Muddy Creek, Hamilton, Victoria. (R. T.).

It has much resemblance to the Japanese species *T. serotina*, (Adams and Reeve).

Terebra geniculata (Tate).

Shell cylindrical, many-whorled, polished; whorls convex or subangulate; constricted around the posterior part, between which and the suture there is a row of tubercles (about 12 on the last whorl); the rest of the whorl is ornamented with distant varicose ribs, the interstices being spirally striated and faintly marked with lines of growth.

The ribs are stout, subcompressed, and abruptly bent and subnodose on the angle of the whorl; they are confluent with and equal in number to the tuberculations on the band next the suture.

Dimensions—Fifteen whorls in a length of 17 mills.; breadth of last whorl, 3 millimetres.

Locality—Muddy Creek, Hamilton. (R. T.)

The narrow tuberculose band and the geniculate varicose costæ distinguish this species.

Terebra platyspira. (Tate).

Shell cylindrical, many-whorled, polished; suture slightly excavated; whorls flat with a sulcus at the posterior fourth, and transversely ornamented with curvilinear flat ridges or wrinkles.

Dimensions of a specimen of about 15 whorls—Length, 45; width of last whorl, 6 millimetres.

Locality—Muddy Creek, Hamilton. (J. Dennant).

This is very distinct from any living species.

Terebra scalaris. (Tate).

Shell cylindrical, many-whorled, anterior whorls flatly convex, overlapping at the suture, with a revolving sulcus and the posterior-third longitudinally finely ribbed and scabrously-latticed with close-set striæ; the sutural band is convex or subcarinate, which is ornamented like the rest of the whorl. The apex consists of one and a half smooth whorls, the next following whorls

are somewhat concave, transversely plicate, and ornamented with two nodular rows next the suture; with increasing growth, the nodules become less and less pronounced and finally disappear at the 9th or 10th whorl; concurrently the transverse plications gradually assume the form of growth-wrinkles.

Dimensions of a specimen of 20 whorls—Length 30, breadth of last whorl, 6 millimetres.

Locality—Gastropod-bed of the Middle Murravian, near Morgan, on the River Murray, South Australia. (R. T.)

TEREBRA CRASSA. (Tate).

Shell subcylindrical, whorls flatly convex, slightly flattened at the suture, ornamented with thick costæ separated by narrow angular interspaces, and interrupted at the posterior-third by a narrow and deep sulcus. There are about 20 costæ on the last whorl.

Dimensions—About 10 whorls in a length of 17 mills.; breadth of last whorl, 4·5 millimetres.

Locality—Oyster-banks of the Upper Aldinga series, Aldinga Bay, South Australia. (R. T.).

This species bears a resemblance of some varieties of *T. dislocata* (Say), but it is narrower and more coarsely ornamented.

TEREBRA MITRELLÆFORMIS. (Tate).

Shell cylindrically subulate, polished; whorls convex; upper whorls distinctly costated, interrupted near the suture by a narrow sulcus, otherwise smooth. The plications are slightly arcuate and attenuated above and below; becoming almost obsolete on the anterior whorls.

Dimensions—Eight whorls in a length of 9 mill., breadth of last whorl, 2·5 millimetres.

Locality—Oyster-beds of the Upper Aldinga Series, Aldinga Bay. (R. T.).

The specific name of this fossil indicates its resemblance to Mitrella of the Columbellidæ; amongst species of which it comes near to *M. Lincolnensis*, but apart from the differential characters of the aperture, the fossil shell is more slender than juvenile specimens of the living Mitrella. In respect to shape and ornament *T. mitrellæformis* would seem to approach to *T. nana*, (Deshayes), inhabiting off the mouth of the Indus, but that species is without a sutural band.

CONSPECTUS OF THE AUSTRALIAN SPECIES OF FOSSIL TEREBRIDÆ.

I.—*Without a sutural band.*

1. Transversely striated or wrinkled. *T. simplex* (T. Woods).
2. Transversely plicate and striate. *T. additoides* (T. Woods).

II.—*With a sutural band.*

3. A double row of nodulations. *T. catenifera* (Tate).
4. A row of tubercles and geniculate costæ. *T. geniculata* (Tate).
5. Transversely wrinkled. *T. platyspira* (Tate).
6. Scabrously-latticed. *T. scalaris* (Tate).
7. Varicosely costate. *T. crassa* (Tate).
8. Transversely plicate. *T. mitrellæformis* (Tate).

DESCRIPTION OF A NEW MELASTOMACEOUS PLANT FROM NEW GUINEA.

BY BARON FERD. VON MUELLER, K.C.M.G., M.D., Ph.D., F.R.S.

Medinilla Maidenii.

(Pachycentria Maidenii, F. v. M.)

Stem short, simple, suffruticose, somewhat verrucular, rooting at its lower portions; leaves large, sessile or decurrent into a short stalk, rather membranous, lanceolar-ovate, strongly five-nerved, as well as all other parts of the plant quite glabrous, the outer pair of nerves arising from above the base of the leaf at some distance from the commencement of the inner pair; veins very faint, not crowded; flowers in mostly distant fascicles towards and at the lower portion of the stem; stalklets bearing minute linear acute bracts and bracteoles at their base, not jointed, about as long as the rather small flowers or somewhat longer; calyx urceolar-campanulate, quite truncated, smooth, somewhat extending beyond the flat-topped ovary; petals four, oblique cuneate-obovate, rose-colored; stamens eight; anthers rather short, nearly as long as the filaments, narrow oblong-cylindrical, gradually attenuated upwards, but not beaked, opening by a terminal pore and also by a longitudinal slit, the connective spurred at the base by a short blunt somewhat recurved appendage, but without any anterior enlargement; style about as long as the stamens; stigma minute, spherical; berry small, pale, pulpy, roundish, more turgid towards the base, more attenuated towards the truncated summit; seeds exceedingly numerous, very minute, ovate, smooth, the turgid blunt hyaline raphe almost as large as the pale brownish-yellow nucleus.

Near the Strickland-River; W. Baeuerlen.

A seemingly semiparasitic plant, the specimens seen about two feet high and unbranched. Stem obtusely quadrangular. Leaves not unlike those of *M. speciosa*, developed only on the upper part of the stem, opposite, to 10 inches long and to 5 inches broad, somewhat pellucidly dotted, flat, paler beneath. Flowers in the fascicles several or few; peduncles obliterated; pedicels thin, ¼ to ½ inch long. Flowering calyces about ⅛ inch long, not angular. Petals measuring nearly ⅓ inch in length. Stamens uniform; filaments very narrow, but flat; anthers resembling those of Ochthocharis and Veprecella, about ⅛ inch long, basifixed, slightly recurved upwards, somewhat retuse at the base. Style slender; stigma very minute, spherical. Berry about ⅓ inch long and broad. Placentæ soft, strictly axile, covered with seeds from the base to the summit.

This beautiful and remarkable plant is dedicated to J. H. Maiden, Esq., who, notwithstanding impaired health, undertook the onerous duties of Hon. Secretary of the Australian Geographical Society in Sydney, sharing in all the toil for arranging and fitting out Captain Everill's Expedition.

I have not ventured to remove this plant from the genus Medinilla, although the form and dehiscence of the anthers bring it near Pternandra, from which the truly axile not basal nor parietal placentation separates it. The main obstacle to leaving our plant in Medinilla consists in the want of anterior basal appendages or protrusion of the anthers; indeed they are very short in the original *M. rosea*; as regards its rameal inflorescence, distant from the leaves, it approaches *M. radicans*, differing from that plant in the obliteration of petioles and peduncles, in the not verticillate leaves with a very peculiar nervature, and also most particularly in the form of the anthers. Some affinity to *M. Malabarica* also exists.

There is however no objection to putting our plant into Pachycentria, if that genus must be kept permanently separated from Medinilla. The inflorescence removes the present species already from all Pachycentrias hitherto known.

Oology of Australian Birds.

By A. J. Campbell.

[Read before the Field Naturalists' Club of Victoria 14th December, 1885.]

SUPPLEMENT — PART II.

Another season has passed, but not without additions to Australian Oology; and on account of my own excursion to Northern Queensland in early Spring a little new information has been gathered. With regard to ornithological news in the vicinity of Rockingham Bay alone—a district very rich in birds—in two months I identified over 150 species, out of a possible 300. I noticed in that locality our common Kingfisher or Laughing Jackass (*Dacelo gigas*) and a variety of Pennant's Parrakeet (*Platycercus pennantii*) which have not been previously reported above Wide Bay district and the Richmond and Clarence district respectively; also the Pale-headed Parrakeet (*P. pallidiceps*) hitherto doubtful in that locality,* and the Rufous-fronted Fantail (*Rhipidura rufifrons*). The Uniform-colored Honey-eater (*Ptilotis unicolor*), which has only been reported from the Port Darwin and Gulf of Carpentaria districts, was also seen. Coming more immediately to oological matters, it might have been more profitable had I deferred my visit to tropical Australia a month or two later, because I ascertained afterwards the majority of birds breed late in Spring or early Summer, but owing to the exceedingly mild climate, and having regard to the rain seasons, birds may be found breeding at all times of the year. The Government recognized that fact in legislating for the protection of certain native birds by proclaiming close periods for Winter breeders, Autumn breeders, Autumn and Winter breeders and Spring and Autumn breeders. However I was enabled personally to take the interesting nests and eggs of *Ptilotis flava*, *P. unicolor*, and *Sittella leucocephala*, all new to science. The Obscure Honey-eater (*Myzomela obscura*) was seen building in the mangroves in August, and the dissection of a female Rifle-bird (*Ptiloris victoriæ*) at the beginning of September proved its breeding season had commenced, yet a most persevering search in the scrubs on Barnard Islands, where this rare and lovely bird is tolerably abundant, failed to reveal its nest. It was also reported to me that about Christmas-time the Queensland Edible Swifts (*Collocalia terræ-reginæ*) breed in numbers in certain caves in the mountains near Dalrymple's Gap. In the proper season what a mighty paper would a trip to these caves make. I throw out the hint to my young energetic oological friends. These caves are also reported to be the abode of numberless bats, and no doubt, like the wonderful birds' nest caves

* Precise locality Townsville.

at Gormanton, North Borneo, troops of bats would be seen leaving the caves every evening with flocks of Swifts in-coming, and *vice versa* in the morning, while, from some commanding rock or tree, Hawks would swoop down into the mass and strike at whatever was most convenient, bats or birds.

16. ASTUR RADIATUS — (Radiated Goshawk). *Locality* — Queensland, New South Wales, and Interior. *Egg*—Roundish in shape, surface somewhat rough, and of a uniform dull or bluish-white color; length, 2 inches $1\frac{3}{4}$ lines; breadth, 1 inch $9\frac{3}{4}$ lines.

Mr. George Barnard, of Duaringa, kindly allowed me to describe this rare hawk's egg from his collection. He states that the clutch was two eggs, which were taken from a stick nest, lined with leaves, &c., situated in a lofty eucalypt.

254. BATHILDA RUFICAUDA—(Red-tailed Finch). *Locality*—Queensland, New South Wales, and Interior. *Egg* — White, longish in shape; length, 8 lines; breadth, 5 lines.

264. PŒPHILA CINCTA—(Banded Grass-Finch). *Locality*—Queensland. *Egg*—Soft white, roundish in shape; length, 7 to $7\frac{3}{4}$ lines; breadth, $5\frac{1}{2}$ lines.

This pretty Finch has a fondness for building underneath the broad hard leaves of the Spiral Pandanus tree, where it constructs its grassy nest to deposit 4 or 5 eggs.

76. ARTAMUS ALBIVENTRIS—(White-vented Wood-Swallow). *Locality*—Queensland. *Egg*—Like that of *A. leucopygialis*, with markings generally stronger in color. Ground color, whitish or warm white, marked, principally round the upper quarter, with blotches and spots of umber or reddish-brown intermingled with obscured grey markings; length, $10\frac{1}{2}$ to 11 lines; breadth, 8 lines.

317. PTILOTIS FLAVA — (Yellow Honey-eater). *Locality*—Queensland. *Egg*—Warm white, marked about the apex with blotches of pinkish red of the same character of color as that generally found on eggs of the *Maluri* (Superb Warblers). Some of the markings are confluent; a few spots also appear here and there over the other portion of the shell. Length, $10\frac{1}{4}$ to $10\frac{3}{4}$ lines; breadth, $6\frac{1}{4}$ to $6\frac{1}{2}$ lines.

On the 22nd of September I discovered the nest of this lively and beautiful Honey-eater in an orange-tree in the Acacia Vale nurseries, Townsville. The nest contained a pair of eggs, and was composed of bark, grass, and spider's old nests, and lined with fine grass.

322. STOMIOPERA (*Ptilotis*) UNICOLOR — (Uniform-colored Honey-eater.) *Locality*—North Australia and New Guinea. *Egg*—Ground color, white with a faint pinkish tinge, with large blotches and spots of beautiful pinkish and purplish red; the markings being well distributed, but inclined to congregate around the upper quarter. Length, $11\frac{1}{4}$ to $11\frac{1}{2}$ lines; breadth, $6\frac{1}{2}$ to $6\frac{3}{4}$ lines.

The day following the discovery of the Yellow Honey-eater's nest, I discovered this other new one, which, however, was much larger, being thickly constructed of grass, externally coated with fine strips of Melaleuca bark and spider's nests. It was suspended by the rim to a forked twig of a small thickly-foliaged tree at Stuart Creek. The nest contained two eggs. Previously I found a nest with a pair of fully-fledged young.

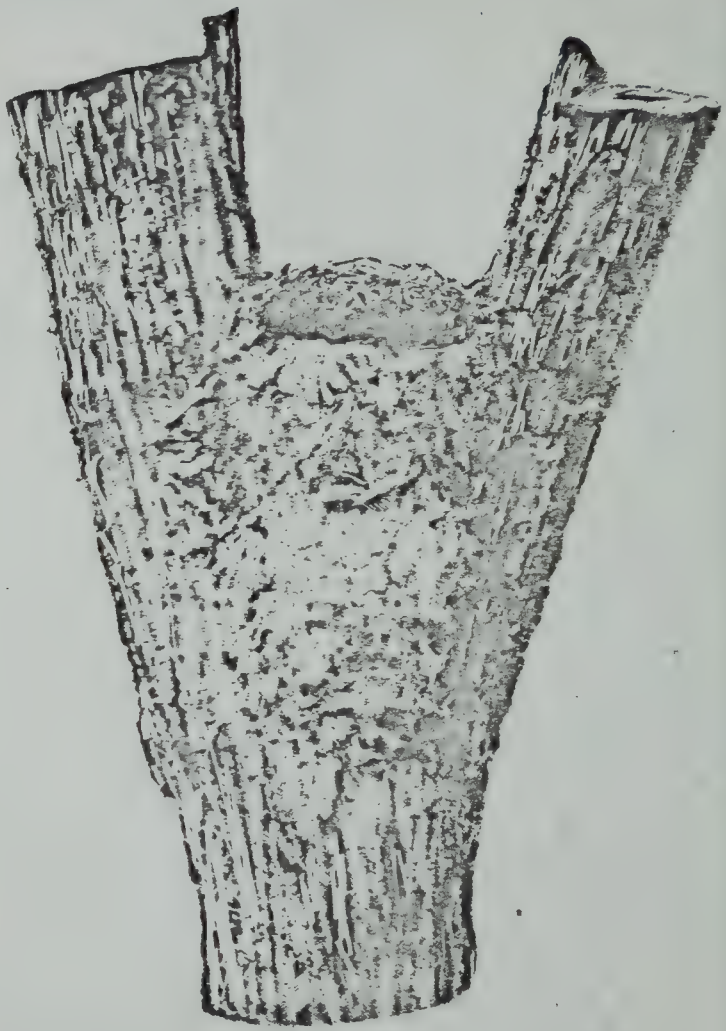
352. MELITHREPTUS MELANOCEPHALUS—(Black-headed Honey-eater). *Locality*—Tasmania. *Egg*—Of a flesh color, with a darker shade of the same color round the upper quarter; there are also distributed markings and spots of yellowish and reddish brown; in some specimens the yellowish-red is substituted by purplish-red. Length, 9 lines; breadth, 6 lines.

Much interest is attached to this little bird because its nest was last discovered, and now completes these and all the Honey-eaters known to Tasmania. At a meeting of the Royal Society of Tasmania, November 1884, "Mr. E. D. Swan drew attention to an extremely rare nest of eggs of the common Black-cap (*Melithreptus melanocephalus*), which had been taken at Austin's Ferry, Bridgewater, and presented to the museum by Miss A. Brent, Roseneath. Although the bird was one of our commonest, and various rewards offered for the eggs, Mr. Swan stated this had been the first egg as yet obtained. The nest taken in November is composed almost entirely of wool, though a few pieces of moss, stringy bark, and cob-webs are also used. It is cup-shaped, two inches in depth, and two in breadth on the inside, while externally the measurements are one inch more each way. It was suspended by the rim to a small branch of a lofty gum-tree (*Eucalyptus*), where, from its situation, it was very difficult of detection."

374. SITTELLA LEUCOCEPHALA * — (White-headed Sittella). *Locality*—Queensland, New South Wales, and Interior. *Egg*—Rounder and smaller than that of the better-known *S. chrysoptera*. Ground-color of a faint greenish tinge, rather boldly marked all over with various shades of Chinese ink or slate color. In some specimens the markings are inclined to congregate round the centre, and are intermingled with a few spots of dark olive. Two clutches of two eggs each furnished the following dimensions: (1) $7 \times 6\frac{1}{4}$ lines; (2) $6\frac{1}{4} \times 6$ lines.

This Sittella's nest, in common with its species, is wonderfully made and cunningly placed in an upright fork of a dead limb. The specimen now being described is in a forked branch of a Brigalow tree (a species of *Acacia*). It is lined with soft silky material such as cocoons, bark, &c., and externally there is felted on, with cob-web or other sticky substance, little pieces of bark assimilating the color of the bark on which the nest is placed, giving the nest, at a short distance, the appearance of merely an excrescence of the tree, thus rendering its detection a

* See illustration.



NEST OF SITELLA LEUCOCEPHALUS.

TWO-THIRDS NATURAL SIZE.

great difficulty or a mere matter of chance. The one under notice was discovered by the bird's own actions. Inside measurement of the nest is 1½ inches across the mouth by 1¼ inches deep. The White-headed Sitella breeds in October.

445. TRICHOGLOSSUS CHLOROLEPIDOTUS — (Scaly-breasted Lorrikeet). *Locality*—Queensland, New South Wales, and Interior. *Egg*—White. Length, 11½ to 12 lines; breadth, 9½ to 10¼ lines.

467. LOPHOPHAPS PLUMIFERA—(Plumed Bronzewing Pigeon). *Locality*—North and South Australia and Interior *Egg*—White, of the usual shape. Length, 1 inch; breadth, 9½ lines.

494. CASUARIUS AUSTRALIS—(Australian Cassowary). *Locality*—Northern Queensland. *Egg*—Of a graceful elliptical form, and is superficially like shagreen or rough American cloth, but not quite so rough as the Emu's egg. General appearance in color a beautiful pea-green, but if examined critically the raised rough particles of the shell only will be found to be green, while the minute interstices are greenish white. Length, $5\frac{7}{16}$ inches; breadth, $3\frac{3}{16}$ inches.

The above description is taken from a handsome pair of eggs exhibited by Dr. Lucas at the last meeting. The Cassowary eggs are of great interest, not only for their great beauty but being the largest of all Australian eggs. The Cassowary inhabits the dense tropical jungles between the Herbert River and Cape York Peninsular. The nest is generally placed near the base of a large tree in the great scrubs, and consists of a heap of sticks, leaves, and other *debris*. A set of eggs is from 4 to 6, generally the latter, which are laid in September, the young making their appearance the following month. The Cardwell aboriginals call the bird "yun-gun," or, in pigeon English, "bigf-ellow chookie-chookie."

525. TRINGA CANUTUS—(Knot). *Locality*—New South Wales and Victoria. *Egg*—Color, light pea-green, closely spotted with brown in small specks about the size of a pin-head. Length, 1 inch 1¼ lines; breadth, 1 inch.

The asserted discovery of the egg of the Knot was by Lieut. Greely, late Commander of the United States Expedition to Lady-Franklin Sound. The discovery is announced in the July number of the *Auk*, the American ornithological journal, by Dr. Hart Merriam, the Secretary of the "American Ornithological Union." He says:—"Lieut. Greely writes me the specimen of the bird and egg were obtained in the vicinity of Fort Conger, lat. 81° 44′ North." The doctor does not state, however, whether the egg was preserved, but it is to be feared it perished in the midst of the Lieutenant's sufferings.

Although the Knot is found in suitable situations all over the world it is a curious fact that until so recently its breeding quarters remained a mystery. Of course, the bird is only a migrant to Australia. I have more than once been chided with reference to including in Australian Oology birds that breed in

foreign lands, and which are only visitors. But I think if the habitat of these birds is recognized as extending to Australia, our oology would not be complete if it did not contain a description of their eggs, whether such birds breed under the Equator or beyond the Arctic Circles.

The Volcanic Eruptions in the Straits of Sunda.

By D. Ploos van Amstel.

[Read before the Royal Society of Victoria 10th December, 1885.]

The volcanic eruption on the island of Krakatau in August, 1883, induced the Netherlands-Indian Government to commission Mr. R. D. M. Verbeek, of Batavia, the eminent Dutch geologist and engineer, to draw up a full and exhaustive report as to its causes and effects. The first portion of that report appeared in print in the course of last year, and an extract of that portion, translated from the Dutch, was read at the ordinary meeting of the Royal Society of Victoria on the 10th of July, 1884. The second portion, which completed the report, has recently been published, accompanied by 25 colored plates and 43 large and small maps, and a French translation of Mr. R. D. M. Verbeek's *Krakatau* will shortly appear. The report will be found a most valuable contribution to the literature of earthquakes and volcanic eruptions, and as a standard work will be hailed by the scientific world with more than ordinary interest. The first part of Mr. Verbeek's work, which appeared last year, is divided into three chapters, the first containing a history of Kratatau previous to the eruption of 1883, the second reports about the eruptions of the 20th of May to the 26th of August, 1883, while the third chapter deals with the terrific eruption of 26th to 28th August, 1883. The second and last report, only recently published, is divided into four chapters, viz, iv., v., vi., vii. The fourth chapter treats the causes which led to the eruption and of eruptions in general. The fifth chapter deals with the phenomena in connexion with the eruption of 1883. The sixth chapter describes the volcanic phenomena which have taken place at the time of the eruption at other places within and outside of the Indian Archipelago, and lastly the seventh chapter furnishes an explanation of the maps and plates and a description of the voyage of the commissioners. Each chapter is subdivided into various parts so as to enable the reader to readily refer to any subject he desires to be informed upon, and although some parts of the work, as, for instance, the macroscopic and microcospic investigations into the nature of the Krakatau formations, the various analysis, the description of the

geological strata of the islands and shores of the Straits of Sunda, of the underground of Krakatau, require a thorough knowledge of geology to be fully understood, yet, on the whole, Mr. Verbeek's famous work of *Krakatau* will be read with unflagging interest by the educated reader. The island of Krakatau is situated at the junction of three fissures or crevices, forming lines of weakness of the crust of the earth. The eruptions commenced on the 20th of May, 1883, and finally ceased on the 28th of August, 1883. The most terrific of these eruptions took place on the 27th of August, 1883, when in the morning the weather became windy and gloomy, with the barometer standing at 30·12. The sun became gradually obscured, and it commenced to grow dark. The barometer rose and fell an inch at the time, and before 10 o'clock in the forenoon an impenetrable darkness set in, relieved by flashes of fork lightning, and accompanied by a rumbling sound as that of distant thunder. All of a sudden, a terrific squall, accompanied by a heavy shower of rain and ashes, spread terror far and wide. The mysterious rattling, rumbling sound, as though of distant thunder; the loud reports like the discharge of heavy artillery; a strong smell of sulphur pervading the air, and making it difficult to breathe; the fearful flashing of incessant lightning, and a wilder and more awful scene was never witnessed by the eye of man. Amidst this scene of Nature's wildest mood, a loud and deafening crashing sound, as though the death-knell of the world had sounded, struck man dumb with fear and terror. The central part of the volcano—a mass of about 1,094 cubic yards (one cubic kilometer) suddenly caved in, an immense cloud of pumice-stone and ashes rose to a dazzling height, and the roaring waters, closing over the steaming crater, burst hissing on the red-hot lava. The sea, foaming and writhing under the falling masses of earth, rose suddenly to a height of more than 100ft—30 metres—and, submerging the surrounding shores, sent thousands of souls without a warning to their last account. The ships in the Sunda Straits, covered with ashes, were tossed about like cockleshells in the surging ashy waves, and in the impenetrable darkness, the wind howling dismally through the rigging, the crew, dumb with fear and terror, had to grope their way with footsteps creaking on the mass of ashes that covered the deck by tons and stuck like glue to the masts and rigging. On the following day, the 28th of August, the morning gradually broke, and the sun, becoming slowly visible, revealed in all its terrors the scenes of destruction of the day before. The surrounding shores, covered with ashes to a depth of about 2in., appeared as though resting under a mantle of snow. Dead bodies, wrecked houses, uprooted trees were strewn over the land, whilst corpses floating amidst vast masses of pumice-stone and dead fishes collided with the ships and boats, and told the harrowing tale of the Krakatau eruption. One of the maps

which accompanies the work shows the area of submerged land, and another the manner in which the direction of the waves had been affected by the surrounding islands. The effect of the Krakatau wave, which was in no way a tidal-wave, being unconnected with any ebb or flood, was felt at various places all over the world, and from the rapidity with which it travelled, reaching Aden in 12 hours, the learned writer comes to the conclusion that the depth of the Indian Ocean between Krakatau and South Africa is 14,000ft. (4,200 metres), between Krakatau and Rodriquez. 15,000ft. (4,560 meters), and between Krakatau and South Georgia, 20,000ft. (6.340 metres). Consequently, a very deep ocean-bed exists to the west and south-west of Australia, soundings of which have never been taken as yet. At this stage the writer expresses his regret that no tide-gauges exist at a greater number of places along the shores of the Pacific and Atlantic Oceans, so as to be able to more narrowly watch the movements of the sea. With the central part of the volcano, the whole of the northern part of Krakatau fell in, and is now covered by the sea to a depth of 600 to 1,000 English feet (200 to 300 metres). The small island, Poolsche Hoed, entirely disappeared, whilst a portion of the bottom of the sea, surrounding Krakatau, also fell in. The bottom of the Sunda Straits and the surrounding shores underwent no change. In the fourth chapter the writer calls attention to the geographical situation of the volcanoes of the earth, being spread over the globe with some regularity, in longer or shorter ranges, one behind the other, as, for instance, the volcanoes of South and Central America, of Alaska and the Aleutian Islands, of Kamschatka, the Kuriles, and Japan, of the Philipines and North Celèbes (Menado), and lastly of the smaller Sunda Islands of Java and Sumatra. This peculiarity of position is in no way to be ascribed to mere chance. There must be a cause, which forced the melted matter to appear by preference in certain directions, and it is self-evident that this cause is to be traced to the fissures or crevices of the crust of the earth, forming, as it were, a line of weakness. Capillary intrusion of sea-water to the volcanic foci, or water, percolating or rushing through fissures or crevices into the subterranean cavities, produces steam of a high temperature, and pressure is generated. Aristotle already assigned the origin of earthquakes preceding volcanic eruptions to steam, and although this hypothesis has frequently proved to be correct, yet previous to the Krakatau eruption no earth tremors or shocks had been experienced. The earth, as supposed by the author, has only partially cooled down, and whilst the crust of the earth has been hardened into a solid mass, and the kernel of the earth, where the heaviest matters have accumulated, is a solid mass, under the immense pressure there existing a ring or girdle of fluid melted matter most likely exists between the crust and the kernel of the earth. It is further supposed that this

matter presses upwards into some of the highter-situated cavities, which, inside of the solid crust of the earth, form lakes of burning lava. Usually streams of lava, when the volcano is at work, flow from the crater, and fine particles of sand and ashes are ejected with immense force. The Krakatau eruption, however, was not accompanied by any streams of lava, only pieces of pumice-stone, ashes, sand, and hot mud were ejected, the steam evidently pressing these matters upward through the lava with great force. The earth-shocks and tremors felt in Australia between the 26th and 29th of August, 1883, point to a connexion between the subterranean cavities lying underneath Australia and the island of Krakatau, a difference of pressure in the one cavity producing a difference of pressure in the other. In conclusion, the author, as a result of his researches, believes that a portion of our globe is still in an incandescent molten state, and discountenances the theory, which to some extent obtains at present, that the volcanic foci may be the result of chemical combinations. The author deals exhaustively with ejected matter, which, according to his statement, consisted, to the extent of 95 per cent., of pumice-stone and ashes, and was ejected with a velocity exceeding that of projectiles from cannon. The thickness of the ejected matter in some places on the Island of Krakatau is estimated at about 200ft. (60 metres), whilst the sizes of the Krakatau products range from 18.27 cubic yards (1 cubic metre) to the finest particle of ash The writer calculates from data supplied to him that the total mass of the ejected matter amounted to $4\frac{1}{3}$ cubic miles (18 cubic kilometres). From reports received since from commanders of vessels, masses of pumice-stone were met with in May, 1884, on the East Coast of Africa, whilst vast masses are now floating between the Caroline and Marshall Islands, and are likely to reach the shores of South America, near Panama, in the beginning of 1886. Amongst the ejected matter, which attained a height of about 170,000 English feet (50 kilometres), were found the so-called "Krakatau marbles," small round bodies containing lime and clay. In the beginning they were found loose on the pumice-stone, but were afterwards met with imbedded in pieces of clay-stone (?) In the first portion of Mr. Verbeek's report, the roundness of these bodies was attributed to the quick rotary motion at the time of the ejection. This explanation now falls to the ground, as these bodies must have been round before they were ejected from the crater. The perfect roundness of these marbles or bullets is a remarkable fact, and unknown amongst the various concretions yet described. It is also difficult to explain how it is that these bodies so rich in lime should be found in stones or pieces of rocks entirely free from lime. Amongst the Krakatau products were also found masses which evidently did not form any constituent part of the volcano itself, but were thrown up from the underground of Krakatau. The ejection of matter from the

crater was accompanied by loud reports, which were heard, as the accompanying map will show, over the immense area of 1-14th part of the globe. No such distance was ever recorded before. Some of the reports were heard at Doreh in New Guinea, Daly Waters and Alice Springs of Central Australia, on the Island of Rodriguez, and Ceylon. The most terrific explosion, which took place at about 10 o'clock in the forenoon of the 27th of August, 1883, produced air-waves of immense length, travelling round the world in 35½ hours. It is also stated that at that time an immense ash-cloud rose from the crater to a height of about 170,000ft. (50 kilometres), travelling from the 27th of August, 10 o'clock a.m., to 6 o'clock p.m. on the 9th of September, thus in 13½ days from Krakatau *viâ* Trinidad, Fanning's Island, and Strong's Island to Galle and Madras, a distance of 23.000 miles—from the 9th of September, 6 o'clock p.m, to the 22nd of September, 6 o'clock a.m.; thus in 12½ days, the ash-cloud travelled right round the world. In regard to the magnetic and meteorological phenomena, as observed at Batavia by Dr. P. D. Van der Stok, director of the Meteorological Observatory, the vibrations of the magnetic needle, as shown in map, fig. 8, were not the effect of the eruption itself, but solely the result from the rain of ashes at Batavia, these ashes containing a magnetic constituent, the magnetic iron ore. These magnetic disturbances ceased with the rain of ashes. At that time the temperature fell considerably, which was caused, as the writer states, not by any evaporation of the moisture of the ashes, but by the ashes having greatly cooled down in the highest strata of the atmosphere. Electric discharges took place in the ash-cloud, and the lightning struck the lighthouse at Java's first point and at Flakke Hoek. No atmospheric electricity was experienced at Batavia. Mr. R. D. M. Verbeek has expressed his hearty thanks to Mr. Ellery (our well-known astronomer), to Mr. Russell of Sydney, to Mr. Todd of Adelaide, and Dr. Hector of Wellington, whose interesting information in respect to tidal gauges, barograms, &c., greatly assisted him in his valuable work. The magnificent barograms from Sydney are specially mentioned, as they enabled him to fix the time of the heaviest explosion.

PROCEEDINGS OF SOCIETIES.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of this Club was held at the Royal Society's Hall on Monday evening, 14th December, 1885. The President, the Rev. J. J. Halley, occupied the chair, and about sixty members and visitors were present.

The hon. Librarian acknowledged the receipt of the following donations to the Library:—"Annual Reports of Ballarat School of Mines for 1882 and 1883," from Mr. F. M. Krausé; "Plants of New South Wales, arranged according to Baron von Mueller's Census," by Dr. Woolls, F.L.S., from the author; also Kirby's "Elementary Text-Book of Entomology" and Howe's "Atlas of Elementary Biology," which have been added by purchase.

The hon. Secretary read a short account of the Club excursion to Murrumbeena, on Saturday, November 22nd, which had been fairly attended, but no specimens of any note were obtained

The following persons were elected members of the Club:—Mrs. R. W. Hooke, Messrs. W. Ball, Edw. Crellin, C. Morris, M. Trickett, and Master L. Inglis.

Papers were promised for the next meeting by Mr. C. A. Topp, M.A., entitled "Further Notes on the Utricularia," and by Mr. F. Reader, on the "Immigration of Plants."

Papers read:—1. Mr. A. J. Campbell read a paper entitled "Oological Notes," in which he described the eggs of the following birds, which had been recorded for the first time during the season just closed:—The radiated Goshawk, the red-tailed Finch, the white-vented Wood-swallow, the yellow Honey-eater, the uniform-colored Honey-eater, the black-headed Honey-eater, the white-headed Sittella, the scaly-breasted Lorikeet, the Australian Cassowary, and the Knot.

2. Mr. C. A. Topp read, for Mr. J Dennant, of Hamilton, "A Geological Sketch of South-West Victoria," Part II, describing the structure of the different ranges of the Grampian series. The writer stated that their age was difficult to determine, owing to the absence of fossils; and showed the sandy ridges of the county of Lowan to be the remains of former sandstone ranges. His remarks were clearly explained by means of a carefully-prepared geological sketch-map.

The paper gave rise to considerable discussion, principally relating to the question of the rising or sinking of the Victorian coast-line.

Owing to the unavoidable absence of Dr. Dobson, and Mr. F. R. Godfrey, their papers were postponed until the next meeting.

Mr. C. French, F.L.S., contributed a short note on two rare Humming-birds from Mounts Chimborazo and Pinchinca, South

America, where they are found about 1000 feet above the snow line.

The following were the principal exhibits of the evening:—By Mr. F. G. A. Barnard, brown coal and lignite from Lal-Lal, Coleoptera collected at Lal-Lal excursion, and a Hawk-moth (*Sphinx convolvuli*) recently taken at Kew; by Mr. E. Bage, plants collected at Lal-Lal excursion, also skeleton leaves of native plants prepared and presented to the Club by Mrs. Lewellin; by Miss F. M. Campbell, five kinds of fossil wood from Glenmaggie, Gippsland; by Mr. A. J. Campbell, new eggs in illustration of his paper, four rare hawks' and other eggs taken during his recent excursion to Northern Queensland, a Cassowary skin and other rare Queensland birds, photographs of Townsville tribe of aboriginals; by Mr. J. P. Chirnside, geological specimens from Denver and Colorado, U.S.A.; by Mr. A. Coles, two fish stuffed by a new process whereby the color is retained in the specimens; by Mr. P. Dattari, growing Ferns (*Lomaria lanceolata, Woodwardia aspera*, and *W. caudata*) from Greensborough, and *Aspidium hispidum*, from Warragul; by Mr. C. French, the rare Humming-birds *Oreotrochilus Chimborazo*, and *O. Pinchinca* from the Andes; by Mr. T. A. Forbes-Leith, four American birds, the Maryland Yellow-throat, a pair of Canadian Nuthatches (*Sitta Canadensis*), a downy Woodpecker (*Picus pubescens*) from U.S.A., and an Amazon Oriole, also a specimen of the wild Canary from Africa, compared with one of the domesticated birds; by Mr. R. Hall, larva of Emperor Moth; by Mr. H. Kennon, stalactites and stalagmites from caves at Portland; by Mr. F. Reader, grasses from Studley Park; by Mr. F. Spry, Victorian Lepidoptera; by Mr. O. A. Sayce, microscopic parasites found on neuropterous insects taken at Lal Lal.

After the usual *conversazione* the meeting terminated.

THE LINNEAN SOCIETY OF NEW SOUTH WALES

The monthly meeting of this Society was held in the Society's House, 54 Philip-street, on Wednesday evening, 30th December, 1885. The President, Professor W. J. Stephens, M.A., F.G.S., in the chair.

Dr. Katz, Mr. T. W. E. David, and Mr. Edward S. Smithurst were introduced as visitors.

The following gentlemen were duly elected members of the Society:—T. W. Edgeworth David, Esq., B.A., F.G.S., Geological Surveyor, Department of Mines; Boughton Kyngdon, Esq., Sydney; H. R. Labatt, Esq., Appin; H. E. Cohen, Esq., Sydney.

The receipt of a number of donations was acknowledged.

The following papers were read:—

1. Descriptions of Australian Micro-Lepidoptera. By E. Meyrick, B.A., F.E.S.

In this, the thirteenth of Mr. Meyrick's papers on the Micro-Lepidoptera of Australia, the descriptions of the *Œcophoridæ* are continued. One hundred and twenty species are described, and 12 new genera named as follows:—*Haplodyta*, *Machæritis*, *Aochleta*, *Semicosma*, *Leptocroca*, *Lathicrossa*, *Thamnosara*, *Gymnobathra*, *Cremnogenes*, *Crossophora*, *Ochlogenes*, *Disselia*, *Macrobathra*, and *Satrapia*. There is also an appendix containing some species of genera mentioned in former papers, which have lately come to hand.

2. Remarks on Australian Ptinidæ, and Descriptions of New Genera and Species. By A. Sydney Olliff, F.E.S., Assistant Zoologist, Australian Museum.

This paper treats of Ptinidæ, belonging to the typical subfamily in which the antennæ are inserted in front of the head. Six new species of *Ptinus* and one of *Diplocotes* are described. The genera *Diphobia* and *Enasiba* are established for the reception of two remarkable forms allied to *Diplocotes*, from South and West Australia.

3. New species of Land and Freshwater Mollusca from Maclay-Coast and Triton Bay, New Guinea. By John Brazier. C.M.Z.S., &c.

Five species are described as new under the names of *Helix* (*Geotrochus*) *Gorenduensis* and *Maclayana*, *Helix* (*Rhysota*) *Achilles*, *Melania Wallariensis* and *Paludina Kowiayiensis*. The names are given of some other shells found on the Maclay-Coast.

4. Addendum to the Monograph of the Australian Sponges. By R. von Lendenfeld, Ph.D.

Two new species of *Hulme* are described as representing five varieties, which, however, appear to run into one another so closely that these species may not in reality be distinct.

5. Description of a new species of *Coris*. By E. P. Ramsay, F.R.S.E., and J. Douglas-Ogilby.

The name of *Coris rex* is given to this fish. It was taken near Bondi Heads a few days ago and presented to the Australian Museum by Mr. G. Billington.

Mr. Ogilby exhibited the fish named above.

Mr. Brazier exhibited the shells from the Maclay-Coast described in this paper.

Baron Maclay exhibited a fragment of Jet from New Guinea, which had been found by Mr. Wilkinson to possess a specific gravity of 1·24, and was presumed by him, mainly on the ground of its resemblance to Jet of this country, to indicate, probably, the existence of coal. Baron Maclay

added that as far as he knew the first discovery of coal in New Guinea was mentioned in the report of Van Delden as far back as 1828. Further details about the same coal on the small Island Lakahia, on the N.W. coast of New Guinea, are to be found in the account of the expedition of the Dutch Government steamer "Etna" in 1858, edited by the Royal Institut. in 1862 (on page 131-143). The opinion of the scientific commission of the "Etna" is that the coal on the island Lakahia belongs to a *recent* formation, and is a "lamellated" ("bladerige") coal.

Mr. Prince exhibited a large number of Volutes, differing very considerably in general appearance, but all belonging to *V. piperita*, though including the supposed species *V. Ruckeri*, *V. Macgillivrayi*, *V. Cathcarti*, and *V. Rutilla*.

Dr. Cox exhibited specimens sent from the Hunter by Mr. J. S. Skeat, including teeth and bones of horses, from deep alluvium; and from the upper carboniferous near Maitland, representatives of the following genera:—*Spirifer*, *Pleurotomaria*, *Productus*, *Aviculopecten*, *Bellerophon*, *Sanguivolites*. The beds from which these fossils were obtained overlie the West Maitland Coal Seams. Also excellent casts of fishes taken in gelatine, and coloured after life. Also a very splendid flower and fruit of *Eucalyptus ficifolia*, of West Australia.

Mr. Masters exhibited some Moths, apparently Pyralidæ, bred from Caterpillars found feeding on a *Coccus* which infested the common *Zamia*. The Caterpillars, in the course of a few days, completely cleared the plant of the scale, devouring the *Coccus* and forming with the scales or empty skins, a complete covering for themselves, which they carried about on their backs. They fed at night, and during the day fixed themselves securely to the mid-rib of the frond.

Mr. Whitelegge exhibited living specimens of *Cordylophora*, a fresh-water Hydroid Zoophyte, from Parramatta. Also, some very beautifully-mounted specimens of the same under the microscope. Dr. Lendenfeld expressed his belief that this exhibit was probably a new form.

Mr. Macleay exhibited a remarkably fine specimen of *Eunice* sp? taken in Sydney Harbour by James Hill, Esq., of Vaucluse.

NOTES, MEMORANDA, &c.

With the commencement of Vol. II (1886) of the new series of the SOUTHERN SCIENCE RECORD, it will be observed that we have ventured upon *illustration*, and trust that our efforts will receive sufficient support to enable us to illustrate continuously. We require all the practical sympathy and aid which our friends can extend to us, as our duties and responsibilities are very arduous. The field for scientific work is developing in a most encouraging manner, and we are anxious to promote the work of Australasian scientific investigation with all the resources at our command. But we must look for auxiliary aid in this enterprise, and will endeavour to merit it. We offer sincere apologies for past irregularity, and will, during the current year, supply copies with all possible promptitude. Friends would greatly help and facilitate our labors by forwarding annual subscriptions (10 6) always in advance.

We have much pleasure in announcing to our friends and readers that we have in preparation a series of papers on the "Motion and Locomotion of Coleopterous Insects," by Mr. P. Dattari, and that each paper will be accompanied by an illustration by the author. The first paper will shortly appear.

A large number of specimens have been brought from New Guinea by Captain Everill's party, portion of which will soon be on exhibition in Melbourne. A valuable collection of about 1000 botanical specimens has been made, which is to be forwarded to Baron von Mueller for classification. Captain Everill has made a map of the Fly River, from Kewai to its junction with the Strickland, and the course of the latter river from its junction wtth the Fly to the highest point reached (about lat. 5 deg. 20 min. South) and the junction of the Service River with the Strickland, and it is in the hands of the lithographer. The scientific world is to be congratulated on the successful result of the Expedition, and the fortunate return of the party.

NOTES AND QUERIES.

AN ELECTRIC TREE.—In a late issue of the *Argus*, there appeared a notice stating that a German exploring party had penetrated about one hundred miles inland in that part of New Guinea now known as Kaiser Wilhelm's Land, when a member of the Expedition, on approaching a particular tree, received an electric shock, of such force that he instantly found himself thrown upon his back to the earth. Subsequent examination and experiment proved that the compass would not act within a certain radius of the tree. I shall be glad if some of the readers of the "Southern Science Record" can furnish particulars of any similar phenomena among trees, and if so, whether any satisfactory explanation has been offered to account for the presence of what appears to be an abnormal quantity of electricity in such trees. A German journal some time back published an interesting account of the plant *Phytolacca electrica*, which appears to present analogous properties to those of the tree above referred to. On breaking a twig of this plant an electric shock is experienced, and the compass is affected at a distance from it of several feet. The direction of variation of the compass needle is reversed by reversing the direction of motion of the compass to or from the plant, the electrical influence of which is said to vary with the time of the day, Its maximum strength is attained at about 2 p.m., while its power is felt less at night. Birds and insects are said to keep at a respectful distance from the plant.—ALPHA.

THE RECENT FLOODS, AND ABORIGINAL FORESIGHT OR PREVISION.—Some time previous to the advent of the late floods, paragraphs and letters appeared in the daily journals of Victoria, recounting certain prophecies which had been made by up-country tribes of aboriginals, who positively predicted "big-one floods, by'mbye." It was stated that tribes of aboriginals 500 miles apart had similarly prophesied. But as an explanation of this seeming superior prevision on the part of our sable friends, another correspondent has stated that the natives are guided in their precautions against floods by the movements of the Formicarian family. If the natives observe the ants remove their eggs and "household gods" from their underground burrows, and industriously transport them into the upper portions of the trees, it is at once concluded that a great flood is approximate, and that the ants become aware of this through the operation of some special function or organ of their bodies; and hence the natives assume a weather-wise expression of countenance, and proceed to remove themselves to the elevated portions of the country. I have penned this paragraph chiefly with the object of eliciting information on so interesting a topic.—ALPHA.