





















THE ANNALS  
AND  
MAGAZINE OF NATURAL HISTORY,

INCLUDING  
ZOOLOGY, BOTANY, AND GEOLOGY.

(BEING A CONTINUATION OF THE 'MAGAZINE OF BOTANY AND ZOOLOGY,' AND OF  
LOUDON AND CHARLESWORTH'S 'MAGAZINE OF NATURAL HISTORY.')

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“Omnes res creatæ sunt divinæ sapientiæ et potentiæ testes, divitiæ felicitatis humanæ:—ex harum usu *bonitas* Creatoris; ex pulchritudine *sapientia* Domini; ex œconomiâ in conservatione, proportione, renovatione, *potentia* majestatis elucet. Earum itaque indagatio ab hominibus sibi relictis semper æstimata; a vere eruditis et sapientibus semper exulta; male doctis et barbaris semper inimica fuit.”—  
**LINN.**

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\* The two birds represented are described at page 186, but the figures were not referred to.

ERRATA.

- Page 202, foot note, 11 lines from bottom, for '*Sc. leucogenys*,' read '*Sc. erythrogenys*.'  
16. 6 lines from bottom, for 'white,' read 'red.'  
Page 344, 12 lines from bottom, for 'exists,' read 'exist.'

THE ANNALS  
AND  
MAGAZINE OF NATURAL HISTORY.

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“..... per litora spargite muscum,  
Naiades, et circū vitreos considite fontes :  
Pollice virgineo teneros hinc carpite flores :  
Floribus et pictum, divæ, replete canistrum.  
At vos, o Nymphæ Craterides, ite sub undas ;  
Ite, recurvato variata corallia trunco  
Vellite muscosis e rupibus, et mihi conchas  
Ferte, Deæ pelagi, et pingui conchylia succo.”  
*Parthenii Ecl. 1.*

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No. 62. SEPTEMBER 1842.

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I.—*Description of two new species of Kangaroos from Western Australia.* By JOHN GOULD, Esq., F.L.S., &c.

**M.** PRIESS, who has just returned from Western Australia, where he has been for some years assiduously engaged in collecting specimens of natural history, having kindly placed in my hands two new and highly interesting species of Kangaroos, I hasten to avail myself of the pages of your valuable Journal, in order to make them known to the scientific world as quickly as possible.

The first of these new kangaroos is a fine large animal, which in general appearance closely resembles the *Macropus major*, but differs in being altogether more slender in form and in the much darker colouring of the fur of the upper surface, particularly at the base of the ear and back of the neck; the fur is also more woolly in its texture: this animal, on account of its fleetness, I propose to name

**MACROPUS OCYDROMUS.**

Macr. *Macropo majori* assimilis, differt autem statura graciliori, vellere magis lanuginoso, et colore nigrescenti-vinoso corporis superioris, præsertim ad basin aurium et ad nucham.

*Hab.* Swan River, Western Australia.

*Male.*—Face and forehead dull cinnamon brown, becoming darker over the nose and forehead; cheeks without a white stripe; the upper lip and chin beset with a number of long

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B

and short fine black hairs, those on the edge of the upper lip being rigid; base of the ears and occiput blackish vinous brown; the remainder of the ears clothed externally with short grizzled hairs, the tips of which are white, and the base brown, forming a strong contrast with the dark colouring of the lower part of the ear; internally the ear is clothed with long white hairs; the blackish brown colouring of the occiput is continued down the back of the neck and over the middle of the back, becoming lighter as it proceeds downwards towards the tail; throat, fore part of the neck and chest brownish white; sides of the body, flanks, and under surface dull cinnamon brown; arms and hands grizzled brown externally, becoming lighter on the inner surface and much darker towards the extremities, the hair at the base of the nails being blackish brown; thighs, legs and feet similar to the fore-arms, the toes and hairs at the base of the nail being lighter brown; a deep vinous brown mark extends along the ridge of the tail, gradually passing into black at the tip; the remainder of the tail dull cinnamon brown.

*Female*.—Similar in colour, but much lighter in every part.

	Male.		Adult female.	
	ft.	inch.	ft.	inch.
Length from the nose to the extremity of the tail...	6	8	6	2
— of tail .....	2	11	2	7
— tarsus and toes, including the nail .....	1	1	0	11 $\frac{1}{4}$
— arm and hand, including the nails .....	1	1	0	11 $\frac{1}{4}$
— face from the tip of the nose to the base } of the ear .....	0	7 $\frac{1}{2}$	0	7 $\frac{1}{4}$
— ear .....	0	4 $\frac{1}{2}$	0	4 $\frac{1}{4}$

The other animal is a third species of that rare form to which I have given the generic designation of *Lagorchestes*. It is about the size of a rabbit; the fur is long, dense, and very soft to the touch; the upper surface of the body beset with numerous long, fine white-tipped hairs, extending beyond the general fur nearly two inches, rendering it at once a most conspicuous and remarkable species. Like the two other members of the genus the fore-feet are extremely small and the claws sharp; the ears, on the other hand, are larger in proportion to the head than in either the *L. conspicillata* or *L. Leporoides*.

The long white-tipped hairs has suggested for this animal the name of

#### LAGORCHESTES ALBIPILIS.

*Lagorch. statura Cuniculi*, et pilis longis albidis ultra vellus densum et permolle usque ad uncias duas productis conspiciendus.

*Hab.* Western Australia.

Nose, face and forehead grizzled brown and grayish white;



external surface of the ear grizzled gray and black; internal surface thinly clothed with white hairs; all the upper surface mingled gray, reddish brown and black, distinct black fascia being apparent on the lower part of the back and rump; the base of the fur on all the upper surface is black, succeeded by fawn-white and tipped with dark brown; the lengthened hairs dispersed over the back are black for three-fourths of their length and tipped with white; throat and under surface dull buffy white, the base of the fur being deep gray; arms brownish white; legs grizzled brown and fawn colour; toes covered with long glossy brown hair; tail thinly clothed with short brown hairs on the sides, a narrow line of black along its upper surface gradually deepening as it approaches the extremity, where the hairs lengthen and form a small tuft; under surface of the tail clothed with stiff dirty white hairs, which increase in length as they approach the extremity.

The *female* is so similar that a separate description is unnecessary.

	ft.	inch.
Length from the tip of the nose to the extremity of the tail ...	2	3
_____ of tail .....	1	0½
_____ tarsus and toes, including the nail .....	0	4¼
_____ arm and hand, including the nails .....	0	2¼
_____ face from the tip of the nose to the base of the ear .	0	3¼
_____ ear .....	0	2¼

I cannot conclude without expressing my obligation to M. Priess for the readiness with which he afforded me the use of these valuable specimens for my "Monograph of the Macropodidæ," and also for his kindness in promising me the loan of the other novelties he has collected.

July 18, 1842.

II.—*Contributions to Structural Botany.* By W. HUGHES WILLSHIRE, M.D., M.B.S., Lecturer on Botany at Charing Cross Hospital.

[Continued from vol. ix. p. 86.]

5.—IN that remarkable member of the family *Bromeliaceæ*, *Tillandsia usneoides*, I have met with a form of vegetable tissue, which, as far as I am acquainted, has hitherto remained unobserved. I may first remark, that after a lengthened search I have been unable to detect any appearance of stomata in any portion of this parasitical plant, and that I entirely agree with Miquel, that it must be regarded as a *false parasite*, and not as a *true one*. The whole of the stem and leaves of the plant is covered with large transparent furfuraceous scales, the bases of which appear to me to perform a glandular office, and present, with respect to their structure, rather a peculiar

appearance: the cells of which they are composed are devoid of colour, save the four central ones, which are filled with a yellowish green or brown fluid; the fourfold development of the cells appears to be derived from the transverse and longitudinal division of a primordial cell. Beneath the scales is the epidermis, which is composed of a thin cellular tissue, having sinuous walls, next to which is a layer of cellular and parenchymatous matter, whose cells are more or less filled with green, and sometimes purple colouring matter; next, and forming the centre of the stem, is the woody tissue, which is composed of a fine, rather tough, cordlike, and dark-coloured bundle of woody fibre or liber cells, having a very few excessively delicate spiral vessels, the spire of which, however, I have not succeeded in unrolling: the whole of the woody matter is of a bright yellow brown colour by transmitted light. In the leaves the central cord separates into smaller ones, which run parallel with the edges of the foliaceous expansion. It is in the pericarp, however, that the particular form of tissue exists to which I at first alluded: if the inner brown-coloured portion of this organ, which easily separates in the dry state from the external and lighter-coloured layer, be examined, it will be found that it consists of three distinct layers of tissue, the central one of which is very distinct from the others; the upper and under layers are composed of cellular tissue, possessing no colouring matter in the cells, at least in the state in which I have had an opportunity of examining it; the upper or most internal one being very thin and delicate: between them is placed a series of longitudinal fibres or hollow cellular bands, connected together by a great number of small parallel transverse ones, which latter have elongated oval spaces between them. These series of anastomosing bands appear to be perfectly continuous with each other; at the inosculating places of the transverse with the longitudinal ones no septa or partitions exist, and the central hollow of the fibres is like that of a single though variously divided tube. It is from this layer that the deep brown colour of the inner surface of the pericarp is derived, every band or fibre being filled and extended by a brown colouring matter. In the spaces intervening between the transverse bands the colourless membrane of the cellular layers is distinctly seen; a large transparent globule I have also generally observed lying in the centre of the spaces referred to. Now if this structure is to be referred to that form of tissue called *cellular fibrous tissue without membrane*, it certainly can only be regarded as a *variety* of structure not individually noticed before; but I am inclined to believe it is otherwise, and that it is a form having its origin in a manner quite

distinct from that in which Schleiden has shown fibre without membrane arises. It appears to me to have its origin from primordial membrane alone, and that the formation of a secondary layer,—a spiroidal fibrous one,—has nothing to do with it. The layer of tissue at first was a common cellular one, composed of several parallel series of square-shaped cells, having rather wide intercellular spaces between them: as the increase of development ensued, the primary membrane forming the superior and posterior walls of the cells became absorbed, leaving only the lateral ones, which thus formed a series of membranous walls to a continuous and inosculating series of intercellular spaces: the edges of these walls finally becoming connected or grown together, and the intercellular spaces filled with colouring matter, an apparently fibrous tubular layer is the result.

In *Bromelia nudicaulis* it has been remarked by Dr. Lindley, that the membrane of the cuticle breaks into little teeth of nearly equal width when torn; I have observed the same circumstance to occur in *Tillandsia usneoides*.

6.—In the spirally-twisted fruit-vessel of *Loasa lateritia* common cellular tissue is displaced by another structure, in order to admit of that peculiar direction which the pericarp assumes. This structure consists of elongated cells, closely approaching to, or even apparently identical with, one portion of the woody tissue of the stem, and which are marked longitudinally by a single row of dots or pores exactly like those on the ducts of the vascular system of the plant: the fibres of the different layers cross each other obliquely, so that when two layers are examined under the microscope the structure is *netted*, and between each mesh a single pore is seen. The seeds are enveloped in a rather lax covering of membrane, which is traversed by anastomosing tubular fibres of a bright brown colour, and which at the edges of the seed becomes expanded into a wing.

7.—Meyen is right in affirming what has been denied by Korthals, namely, that the glandular hairs of *Drosera* contain spiral structure. In the centre of the hair I have generally succeeded in unrolling a spiral vessel; this by Meyen is said to be single, but in many hairs I have found more than one. Korthals is also wrong in his description of the glandular head: I have never been able to discover any hollow there; the centre is in fact of a dense consistency, formed of elongated cellules, assuming in the mass an oval shape. The whole hair is enveloped by a layer of tissue, which is derived from the epidermis of the leaf, and which in old hairs becomes loose and lax, like a sheath. The cells containing the colouring matter are elongated, fusiform, or club-shaped.



III.—*Note on the appearance of Clouds of Diptera.* By  
ROBERT PATTERSON, Esq., Member of the Nat. Hist. Soc.  
Belfast, &c.

THE appearance of Dipterous insects in large numbers is in certain localities and at certain times a matter of common observation. About Lough Neagh myriads of *Culicidæ*, *Tipulidæ* and *Ephemeridæ* are seen, and *Culex detritus* is recorded by Mr. Haliday\* as rising above trees, so as to resemble the smoke of a cottage chimney. In Phil. Trans. 1767, it is stated that in 1736 the common gnat (*Culex pipiens*) rose in the air from Salisbury Cathedral in columns so resembling smoke, that many people thought the cathedral was on fire. In Norwich, in 1813, a similar alarm was created. At Oxford, in 1766, “a little before sunset, six columns of them were observed to ascend from the boughs of an apple-tree, some in a perpendicular and others in an oblique direction, to the height of fifty or sixty feet †.”

A phænomenon similar to that last mentioned was this summer observed for some days at Belfast. Wherever there were trees, columns of insects were seen, and attracted the notice of even the most incurious. They began to appear a little before seven o'clock, and diminished in numbers as the light decreased, so that by half-past nine few were visible. On the evening of June the 11th, I went with Messrs. Bryce and Hyndman to the house of our fellow-member Mr. Grattan, situated on the north side of the bay, and about half a mile from the town, for the purpose of observing them. The following notes were there drawn up, our remarks being limited to an irregular semicircular area, having an average diameter of seventy or eighty perches.

The insects appeared in columns above the trees, the shade of colour varying according to the greater or less density of the mass from that of light vapour to black smoke, the columns not only differing in this respect from each other, but each column being frequently different in different parts. They might have been mistaken for dark smoke-wreaths but for their general uniformity of breadth, and for a graceful and easy undulation, similar to that of the tail of a boy's kite, when at some height and tolerably steady. The individual insects flew about in each column in a confused and whirling multitude, without presenting in their mazy dance, any of those regular figures which gnats frequently exhibit over pools of water. The motion of their wings filled the air with a pe-

\* Entom. Mag., No. 11. p. 51. † Kirby and Spence, vol. i. p. 114.

cular and not unmelodious humming noise, like the distant sound of the machinery of a spinning-mill, but more varied.

The columns rose perpendicularly to the height of from 30 to 60 feet, and in some instances to the height of 80 feet. They were equally abundant over trees of every kind, as ash, beech, birch, poplar, &c., and so numerous were these distinct columns, that so many as from 200 to 300 were visible at the same time. As each column was every instant undergoing a change in density of colour, diameter, elevation or form, the phenomenon was one of exceeding interest, especially as connected with the living myriads, which in these aerial gambols gave expression to their enjoyment.

Some individuals were taken in a gauze net, and on examination by Mr. Haliday proved to be *Erioptera trivialis* ♂ (Hoffmansegg); others taken two evenings afterwards at the Royal Academical Institution (where they presented the same appearance, but in smaller masses) were *Chironomus testaceus*\* (Macquart); so that different species would appear to have occasioned a similar phenomenon in different localities.

As we are at present ignorant of the conditions which are requisite to call these tiny multitudes into existence, the state of the barometer and thermometer for some successive days is given as recorded by Mr. Bryce:—

	Thermometer.		Barometer.	
	Mean of 9 A.M. and 2 P.M.		Mean of 9 A.M. and 3 P.M.	
June 9 . . . .	69	125	30	398
— 10 . . . .	69	25	30	332
— 11 . . . .	69	50	30	400
— 12 . . . .	73	75	30	450
— 13 . . . .	69	62	30	378

During all these days there was a very light summer wind between E. and N. On the 13th, between two and six P.M., a thunder-storm with rain passed north by west over Lough Neagh, Antrim, &c., and was followed by a diminished temperature.

I have been unable to define the precise range in which these singular assemblages of insects appeared. About Belfast they were everywhere abundant over trees. At the residence of one gentleman, about a mile to the north of the town, they came forth in myriads; and when the noise of their wings first attracted his attention, he for a moment supposed it to be the sound produced by letting off the steam from a steam-vessel at a distance. By a lady on the

\* In the box sent to Mr. Haliday, containing probably above 100 specimens of this insect, there was but one female.

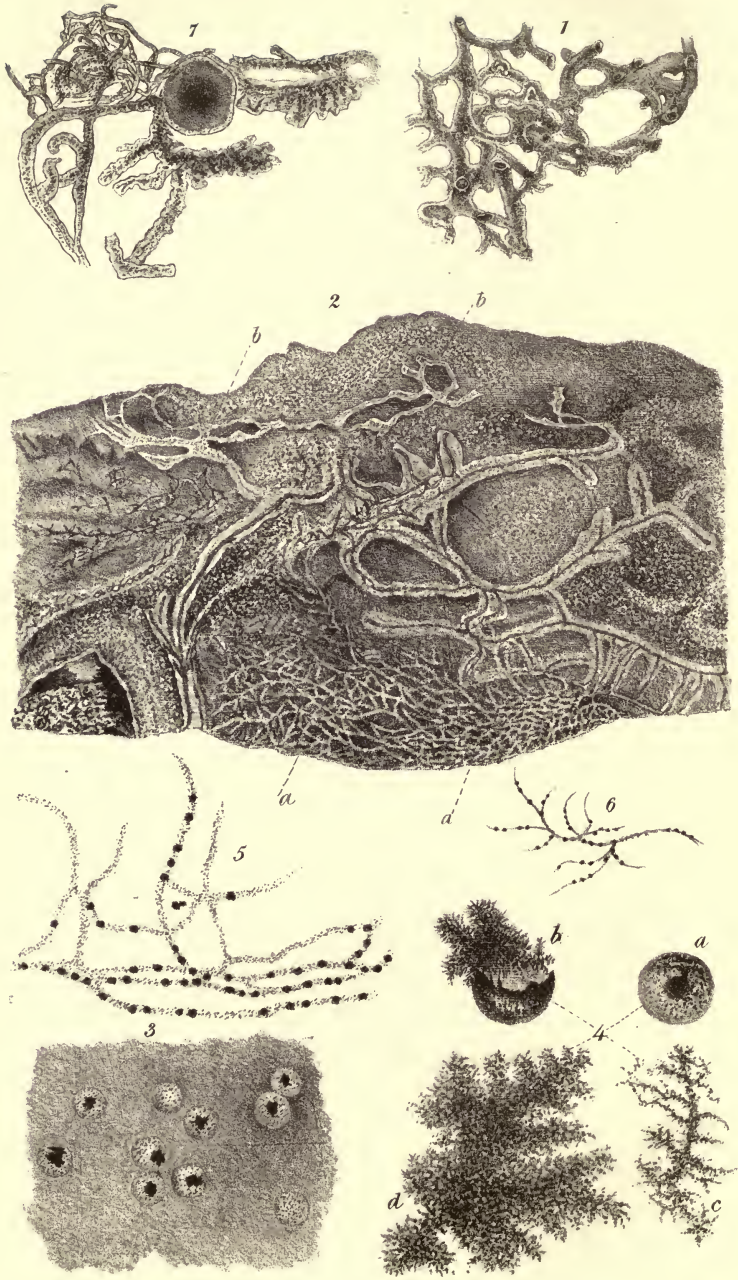
evening of the 11th, and by another on the evening of the 13th, it was mistaken for the sound of something boiling, and one of them hastened from the hall door into the house to see that her servant was not neglecting some culinary matter then in progress. At Colin Glen, about four miles west of Belfast, they were observed on the 12th. On the evening of the 11th, the person who has the care of the Friar's-bush burial-ground, adjoining the Botanic Garden, thought the dark smoky-looking columns which he saw were caused by something being burned in the garden, and ascended the highest part of the ground to ascertain if such were the case. I observed the insects on the evenings of the 10th, 11th, 12th, 13th and 14th; but on communicating these particulars to my friend Mr. Thompson, I was gratified by finding that they had attracted his notice above the trees in front of his residence on the 9th; and he has obligingly placed at my disposal the following note respecting them:—

“Belfast, June 9, 1842.—When returning from the Botanic Garden to town this evening at eight o'clock, and about a quarter of a mile from Donegal Square, my attention was arrested by what appeared to be several narrow columns of black smoke rising into the air above the trees to a great height—‘like the mast of some tall ammiral.’—Looking upon them as smoke, I could not understand why a portion of one should occasionally vibrate, or as it were, break down, until it would touch a neighbouring column to the east of it, while another would play a similar part towards a column on the west. The whole appearance seemed to indicate an extraordinary state of the atmosphere, though I could not conceive the gentlest zephyrs blowing different ways so near each other and about the same time. On approaching nearer, however, the phenomenon was explained, and proved to arise from columns of a large species of midge instead of smoke. The trees along the west side of the square are deciduous and chiefly elms (*Ulmus montana*), about forty-five feet in height, forming a continuous row, and the summit of almost every tree (for there evidently was no favouritism as to species) seemed to be emitting smoke—sometimes in two or three distinct columns. The insects presented themselves in masses of every form, the most remarkable of which was still the tall mast-like column. One cloud of them appeared above the middle of the spacious street, where numbers of persons were now assembled gazing and wondering at the singular spectacle. There were as usual several swifts (*Cypselus apus*) flying about the Square, and I particularly remarked, that although they occasionally passed very near the masses of insects, they never once swept through any congregated party of them. For some time past the weather has been remarkably fine, dry and warm, as was this day.

“My brother, as I afterwards learned, remarked the same appearance this evening above the trees at the Grove, a mile distant from







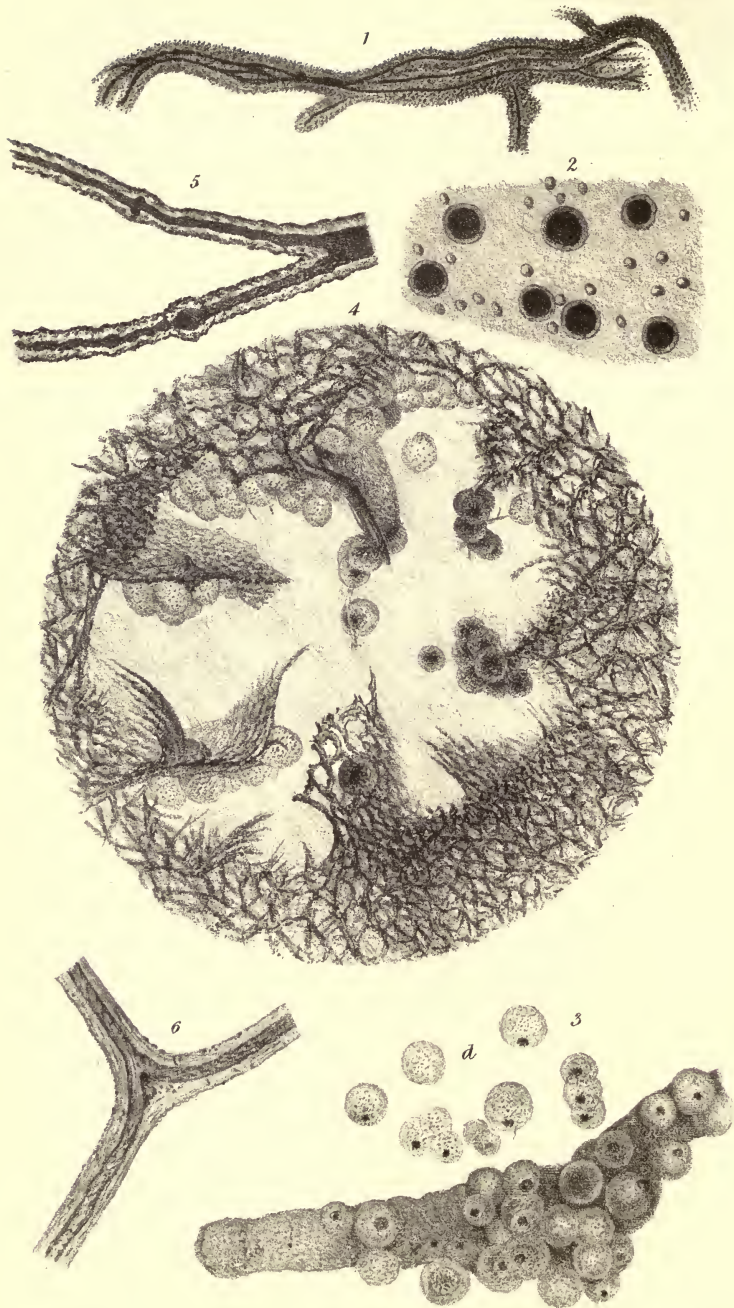
Drawn by M<sup>r</sup>. Hattersly

Designed by Linn<sup>us</sup> to the Queen

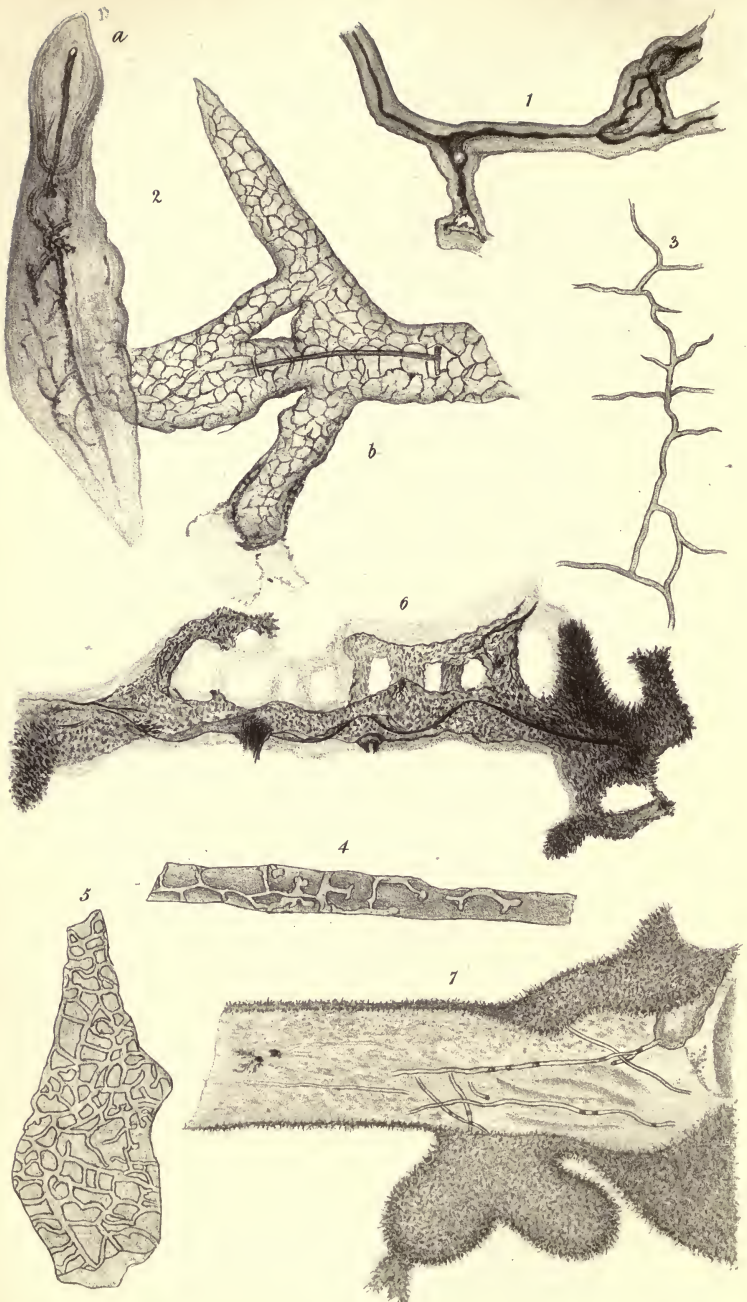
On Zinc by Lens Aldous.











Drawn by M<sup>r</sup> Hattersly.

Day & Haghe L. W. to the Queen.

On Zinc by Lens Aldous.



Belfast, in an opposite direction from Donegal Square. Leaving town for some time on the following day, I had not any further opportunity of witnessing the interesting phænomenon.

“W. THOMPSON.”

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IV.—*On the spongy origin of Moss Agates and other siliceous bodies.* By J. S. BOWERBANK, Esq., F.G.S.\*

[With Three Plates.]

IN the course of the last session I had the honour of submitting to the Geological Society a paper “On the structure and origin of the flinty bodies of the chalk and greensand formations of England,” in which I endeavoured to prove that the greater portion of these siliceous masses were derived from the silicification of spongy bodies which existed at the bottom of the sea at the periods of the deposit of these strata in as great abundance as their recent types are now found in the ocean, both in tropical and temperate latitudes. In my description of the organic contents of the flints and cherts there described, I mentioned the frequent occurrence of spicula among these remains. From their appearance in bodies which bore every appearance of being true keratose sponges in which spicula were not at that time thought to exist, I was led to believe that the sponges which had originated these siliceous masses were an order of the tribe differing from our recent keratose types only by the possession of siliceous spicula, and therefore, although not absolutely belonging to the same genus as the sponges of commerce, yet so nearly allied to them in every other respect as to leave no reasonable doubt of the true spongy nature of the fibre that abounds in them. Since that period I have received from my friend Rupert Kirk, Esq., of Sydney, numerous specimens of at least three distinct genera of sponges, and among them many keratose ones, which upon examination with a microscopic power of 500 linear, proved to contain siliceous spicula in great quantities. This circumstance induced me to suspect their presence in the sponges of commerce, and upon examining them carefully I detected spicula in each of the two species from the Mediterranean as well as in that from the West Indian Islands, although, I believe, every author who has hitherto described the sponges of commerce has denied their existence in these bodies. Since the publication of these facts, I have had the opportunity of examining two species of keratose sponges in the collection at the British Museum, which are preserved in spirit in the state in which they were immediately after being taken from their native element, and in both these specimens

\* Read before the Geological Society of London, April 7, 1841.

the interstices of the horny fibre are filled with a semipellucid fleshy matter, in which numerous spicula are found imbedded. I will not enter into a lengthened detail of the investigations of these recent forms, as they have already been given to the public in two papers. The first "On the keratose sponges of commerce," I had the honour to read before the Microscopical Society of London on the 27th of January 1841\*, and the second "On the structure of a keratose sponge from Australia," is published in the 'Annals and Magazine of Natural History,' April 1841. It is necessary to state thus much, as the discovery of siliceous spicula in recent sponges removes the discrepancy that appeared to exist between the recent and the modern types of a portion of the animals under consideration. The fibre in all the sponges of commerce, as well as in many keratose species from Sydney, that I have examined, is solid; but in one species, *Spongia fistularis*, Lamarck, described by Dr. Grant in the 'Edinburgh Philosophical Journal,' vol. xiv. p. 339. the structure is truly tubular; and this is the only recent type of the form that I am acquainted with, although, as it will be hereafter seen, this tubular form of the fibre is of frequent occurrence in the fossil sponges.

The results arising from the examination of the siliceous bodies of the chalk, greensand and oolitic formations, induced me to extend my researches to other siliceous masses; and with this view I obtained, through the kindness of Mr. Tennant, a considerable number of polished specimens of moss agates from Oberstein in Germany, from Sicily, and other localities.

I examined these specimens as opake objects by direct light concentrated on their surfaces by the application of a convex lens, and in many cases the results of the examination far exceeded my expectations of being able to detect the organic structures imbedded in them. Upon a minute and careful examination of numerous polished slabs of the moss agates of Oberstein, almost every specimen presented strong evidence of their spongy origin. The structure and arrangement of the fibre of the sponge is rarely to be found in a state of perfect preservation throughout the whole of the mass, but usually presents the appearance of having suffered to a great extent by maceration and disruption of its component parts previous to its fossilization. Generally speaking, the fibres adhere together in confused and ropy masses, with here and there one or two in a somewhat better state of preservation, and occasionally, especially near the external sur-

\* Published in the Transactions of the Microscopical Society, part the first, vol. 1, p. 32.

face of the original mass, small portions of the tissue are sometimes observed in so perfect a state as almost to deceive the observer into believing them to be fragments of recent sponges. In some parts of the mass, especially near that which is in the finest state of preservation, parts of the structure may generally be seen in all the intermediate stages between perfect preservation and nearly complete decomposition, where the organic tissues have resolved themselves into a shapeless mass, only to be recognised as formerly having belonged to the sponge by the aid of the surrounding, connected and less decomposed parts of the animal structure.

The siliceous matter in which these remains are imbedded usually presents a clear and frequently a crystalline aspect, while the remains of the organized matter is strongly tinted with colour: bright red, brown and ochreous yellow are the prevailing colours, but occasionally the fibre is milk white or bright green. Sometimes the interior of the tubular fibre only is filled with colouring matter, while the sides are of a semipellucid or milky white; in others the whole of the fibre is impregnated with it. The colouring matter is generally confined within the bounds of the animal tissue, leaving its surface smooth and uninterrupted; but occasionally the fibre is not only completely charged with it, but its surface is also slightly encrusted by it.

These are the usual characters presented by the greater portion of the moss agates of Oberstein and other parts of Germany.

It would be taxing the patience of the reader to too great an extent if I were to attempt to describe the whole of these siliceous bodies that I have subjected to examination; I shall therefore confine myself to a detailed description of a few of the most characteristic specimens, and especially to those which afford the strongest and most perfect evidence of their organic origin.

The first of these specimens is a moss agate, said to be from Sicily. The structure of the sponge tubuli is very obscure in the greater part of the mass, but at the margin of the specimen the tubes are in as perfect a state of preservation as if they were those of a recent sponge immersed in Canada balsam; in this state they are represented in Pl. I. fig. 1. anastomosing precisely in the same manner as those of the Mediterranean sponge, and where they have been divided at the surface of the specimen they are frequently observed to be hollow. No spicula are present, but it is evident that it was a true keratose sponge. The greater part of the specimen consists of innumerable bright red fibres of nearly an uniform diameter, ramifying in every direction, frequently terminating as if



broken, and presenting appearances of much confusion and disarrangement, as at *a, a*, fig. 2, and no remains of the structure surrounding them are perceptible. But in some few portions, and especially near the margin where the perfect sponge-tubes are found, we perceive each of these red fibres to be enveloped by the semipellucid and horny-looking substance of the sponge, as seen in the centre of Pl. I. fig. 2, thus proving that the *red* fibre is in reality the cast of the interior of the tubular sponge fibre; and if we compare them with the hollow spaces of the perfect tubes, we find them to be as nearly as possible of the same diameter.

In the portion of the agate represented by Pl. I. fig. 2, there are parts of the tissue seen at *b, b, b*, into which the red pigment does not appear to have entered, and when the fibre is in the most perfect state of preservation this is usually the condition in which it is found; and it is natural that such should be the case; for in the recent type of these sponges, *Spongia fistularis*, it is always found, that although the internal cavity is continuous throughout the whole of the fibrous structure, yet that it is universally closed at a short distance before it arrives at the natural termination of a fibre.

In another specimen, which is in my possession, of a moss agate from Oberstein, we have the spongy structure in a different form. In the first specimen described the most striking feature is the bright red fibrous-looking casts of the interior of the sponge-tubes; while, in this, we have in the best preserved parts of the structure the walls of the tubes themselves impregnated with the red pigment and the interior of the tubes filled with pellucid silex; while in that portion which has suffered most by decomposition, there is a confused mass of bright red with obscure traces of fibrous structure, with here and there a fibre in a sufficiently good state of preservation to enable us to recognise the whole as the same substance as the more perfect structure, but so obscured by decomposition as to render it perfectly undistinguishable from inorganic and extraneous matter, if it were not for the better state of preservation of other parts of the sponge.

Another agate which I examined I found to be, literally speaking, a complete mass of sponge. The fibre of the centre of this specimen, for about one-third of its diameter, is of a bright red colour, the surrounding part is of an ochreous yellow, but the organized structure does not vary in any respect but in colour. There are the casts of a few small foraminated shells dispersed amid the spongy tissue, and in a few irregular cavities which occur in it I observed that the silex was arranged in that peculiar stratified mode which stamps it as an agate. In the fourth agate examined, the sponge-tubes



were seen in a fine state of preservation in several parts of the specimen, and were very similar to the tubes described in the former instances, both in their dimensions and mode of arrangement. The substance of the tube is of an opaque white, while the interior is filled with the bright red pigment before described. In this case also, as in the former ones, the fibrous casts of the interior of the tubes occupy a great part of the space within the agate, with an occasional intermixture of what is evidently a disorganized or semi-decomposed mass of the horny tubes.

The fifth specimen is also a keratose sponge, the tubes of which are very slight, and the points at which they anastomose are more distant from each other than in the former cases that have been described. The sides of the tubes are composed of the red pigment which usually does not extend beyond the boundary of the horny substance; but in some parts of this specimen it not only thus supplies the place of the horny matter, but a quantity of it has also been deposited around the tubes, greatly increasing in appearance their natural diameters, and indicating the strong elective attraction that has existed between it and the animal substance of the sponge: and this is rendered the more evident by this red pigment not being perceived in any other part of the siliceous mass beside that occupied by the sponge-tubes, either in a state of perfect preservation or of semi-decomposition; the whole of the spaces between these portions of animal matter being occupied with unstained and beautifully pellucid silex.

The fibres of all the specimens hitherto described are truly tubular, and in this respect strongly resemble in their structure the recent *Spongia fistularis*. In their arrangement of their fibres and their mode of anastomosing they appear very closely to resemble the sponges of commerce and many of the Australian keratose species.

Such are the prevailing characters of the sponge tissues to be found in the German and Sicilian moss agates. I have examined nearly 200 of these interesting bodies, and in the whole of them I have been enabled to discern spongy tissue either in precisely similar states to those tissues that I have described at length, or in some modification of them; and it is only in very few cases indeed that a careful and patient examination of a specimen, however indistinct it might at first have appeared, has not been rewarded by finding in some part of it, not only the casts of the interior of the fibre, but portions of the fibre itself in a sufficiently perfect state to leave no doubt remaining upon my mind of the truth of its animal nature.

The green jaspers of India are also fruitful sources of

spongy tissue; and generally speaking, the organic structure is in a better state of preservation than it is in the moss agates of Germany and Sicily. The green colouring matter in these siliceous mosses is found, with very few exceptions, to be confined within the boundaries of the sponge fibre, the surrounding siliceous matter consisting of minute pellucid radiating crystals, which have for their bases the sponge fibres, amid which they have been deposited. Upon taking some small thin pieces from various parts of a large mass of this mineral in the possession of Mr. Tennant, I found every fragment of it to abound with beautifully preserved ramifying sponge fibres; and upon examining numerous small rough specimens of this substance, some of which I obtained from the same gentleman, and others from a lapidary in Clerkenwell, I found the whole of them to abound, in a similar manner, with well-preserved fibres of various species of sponges. On a few of these small rough specimens a portion of the natural external surface remained; and upon examining this as an opaque object with direct light and a microscopic power of 500 linear, I found some of them to be furnished with minute contorted tubuli very similar to those which I described in a former paper as occurring upon the surface of chalk flints\*. Upon examining some very dark-coloured polished specimens of a green jasper which I obtained from Mr. Tennant, I found the spongy structure in a more perfect state of preservation than in any of the specimens previously examined.

The fibres in this case are not disposed in the same manner as in the sponges of commerce, but are arranged in a series of thin plates, resembling very much in their appearance portions of macerated woody fibres of the leaves of some endogenous plants. This singular form of tissue I believe to be exceedingly rare among recent sponges, as I have met with it in but one species which came among the large collection of sponges received from my friend Rupert Kirk, Esq., of Sydney, who obtained them on the coast in that neighbourhood. On examining about seventy thin sections of green jasper which I obtained from a lapidary in Clerkenwell, and which were said to have been imported from India, I found the results equally satisfactory: every specimen afforded undeniable evidence of spongy origin, and in the greater part of them the organic structure was in so perfect a state of preservation as readily to admit of their being recognised as distinct species. Among this series of specimens there were several slices which had evidently been cut from the same mass which pre-

\* Transactions of Geological Society of London, New Series, vol. vi. p. 183, pl. xviii. fig. 2.

sented appearances of an exceedingly singular nature. The substance of the sponge in this instance appears to have suffered so much by decomposition as to prevent its being detected in its original fibrous form. It has, in fact, become a confused magma of disintegrated spongy matter, only to be recognised as such by the frequent occurrence of similar decomposed material in other bodies of the like description. Amid these remains of the sponge there are an innumerable quantity of globular vesicles of nearly a uniform size: many of these are simple and transparent, and only to be recognised as organized tissue by the regularity of their size and form, and by having universally dispersed over their outer surfaces minute irregular particles of an opaque black matter: but by far the greater number of them are furnished with a globular opaque body of about one-third their own diameter, which usually occupies the vesicle, and which causes it, when in this perfect state, and when seen with a linear power of about 150, and represented by Pl. I. fig. 3, very strongly to resemble the separated ova of the frog when immersed in water. Along with these vesicular bodies, there are numerous small brown fibrous masses which resemble very small keratose sponges: the largest of these are about five or six times the diameter of the vesicles, and they are seen decreasing gradually in size until they may be traced to be identical with the nucleus contained within the vesicles, but in a higher stage of development, as represented at Pl. I. fig. 4. *a*, *b*, *c* and *d*. Upon carefully examining the other specimens of this series, I found in several of them similar vesicular bodies of a large size imbedded amid the fibrous tissue of the sponge. They were more sparingly dispersed through the tissue in the latter cases, but in every other respect they closely resembled those first described. These curious vesicles have evidently existed before the siliceous matter became solidified, as each of them has become a base from which a mass of acicular calcedonic crystals has radiated.

From the whole of the circumstances attending these interesting remains, their uniformity in size and shape, their gradual development into small masses of sponge-like tissue, and the great similarity that they bear to the ova of numerous species of British sponges, described by Dr. Grant in the valuable papers on these subjects published in the 'New Edinburgh Philosophical Journal' of 1827, little doubt remains on my own mind that they are the fossilized gemmules of the sponges which have given form to the siliceous masses in which they are imbedded. It is true they differ from the gemmules of the British sponges described by Dr. Grant, as the latter are oviform, while the former are



spherical; but this variation is of no moment, as we shall hereafter find that in other cases the fossilized gemmules are oviform like those of various species of British *Halichondria*; while in the recent sponge from Australia, which I have described in the 'Annals and Magazine of Natural History' for April 1841, the gemmules are precisely of the same form as those occurring in the green jasper described above. It is a singular circumstance that the mode of propagation of the sponge should be thus capable of demonstration from the fossil specimens, but the case which I have just described is by no means rare in its occurrence. In an agate which is said to have come from Oberstein, the gemmules are seen apparently in an immature state attached in considerable numbers to the fibre of the sponge; and in the two portions of this specimen, which is represented by figures 5 and 6, and which are drawn to the same scale, it is apparent from the variation in their size that they are in different stages of development. In another agate in my possession, which I believe to be from Oberstein, and in which the spongy fibre is in a most perfect and beautiful state of preservation, the gemmules are seen sparingly scattered amid the tissue. Some of these have the usual form of round compact globules pellucid for a small space inwards from the circumferential line, but dense and opaque thence to the centre; while others appear to have been partially developed without having been ejected from the parent body, as they present the appearance of well-defined globular sponges, whose diameters are three or four times that of the undeveloped gemmules, as represented by Pl. I. fig. 7. If this idea of their development *in situ* be correct, it will perhaps account for the frequent occurrence of the small detached patches of minute sponge-fibre that are so often found imbedded amid the well-developed and large-sized tissue of the sponge which is especially characteristic of the various masses alluded to.

In a fourth agate, which probably came from the same place as the last, the fibre of the sponge has suffered so much by decomposition as to leave but few pieces of it in so fine a state of preservation as that represented by Pl. II. fig. 1. There are none of the gemmules in this specimen which are adhering to the fibres; but although not seen in actual attachment, they are dispersed in great numbers throughout the whole of the mass, and are seen in various stages of development, as represented in Pl. II. fig. 2. Among them are interspersed vast numbers of small pellucid yellow globules, which bear a striking resemblance to similar minute granular bodies that are observed in great abundance imbedded in the gelatinous or fleshy sheath that is found surrounding the fibres of

the sponges of commerce, and which are probably incipient gemmules. In a fifth specimen of agate that I procured from Mr. Tennant they assume a very singular appearance. Some of the gemmules are in a very perfect and beautiful state of preservation, and in this condition are separated from each other; while others are observed, apparently, in various stages of decomposition, presenting no definite outline or distinct or regularly marked surface, but assuming the appearance of having been resolved into gelatinous masses which have run together into moniliform strings, in a manner very similar to the mode of arrangement assumed by the discs of the blood when vitality has ceased to exert its repellent influence upon them, as seen in Pl. II. fig. 3.

Numerous other cases might be cited if it were necessary to prove the spongy nature of these interesting remains, and the frequency of their occurrence in masses of agate; but I shall content myself with selecting but one more; and this I have chosen, not only because it is one of the most perfect and illustrative of the spongy nature of these remains, but also from its occurrence in a class of siliceous bodies which we have not hitherto noticed. The specimen to which I allude occurs in a siliceous mass from the island of Antigua, and is in the possession of Dr. Robert Brown, who has favoured me with the loan of it. The agate in which this beautiful sponge occurs is nearly four inches square by about two inches thick, and is part of an originally much larger mass. Its natural surfaces do not afford any indication of its spongy origin when examined by a lens of an inch focus, and the cut or fractured surfaces when examined in the same manner would rather lead us to believe it to be a coral than a sponge, from the whiteness of the tissue and the regularity of the arrangement of the large excurrent canals. There are also plates of spongy tissue projected from the parietes of these canals towards their centres, which cause them strongly to resemble the sections of the polyp cells of corals; but this resemblance to the coral tribe ceases when a thin slice is examined as a transparent object with a power of 150 linear. The whole is then seen to be composed of the usual anastomosing fibres which are so characteristic of the keratose tribe of sponges. Even in the best preserved parts of the specimen the fibres appear to have undergone decomposition sufficient to render the characters of their surface somewhat indistinct, but not to such an extent as to interfere with their mode of arrangement. A section at right angles to the axis of one of the most distinct and best preserved of the excurrent canals is represented by Pl. II. fig. 4. There are six large plates of reticulated

spongy tissue projecting from the inner surface towards the centre of the canal for about one-third of its diameter, and to the sides of these there are oviform gemmules attached in such numbers as to assume in some parts very much the aspect of a cluster of grapes, and against one portion of the side of the canal they are grouped in a similar manner. The mode of their attachment to the plates of tissue cannot be observed, in consequence, not only of their position, but also from their crowded state; but at the terminal edge of one of the plates which reaches nearly to the centre of the canal, there is seen one of the largest oviform gemmules that is within the field of vision, from beneath which a single fibre of the sponge is seen to emerge and pass towards the centre of the canal, near which it terminates abruptly as if by fracture. There is a gentle curve near the middle of this fibre, in the hollow of which a gemmule is seated that is nearly equal in size to the one adjoining; so that the position and distinct attachment to the fibre of the sponge of this oviform body removes the possibility of a doubt of their being the true ova or gemmules of the sponge. In the two gemmules last described, the nucleus is distinct and well-defined, and is of a size equal to about a third of the smallest diameter of the gemmule; in some of the others it occupies nearly the whole of their interior, while in the greater number of them it is either very indistinct or not at all apparent. In all these respects the gemmules agree perfectly with those before described, as occurring in the green jaspers as well as in the other agatized bodies referred to.

The ova of birds, of fishes, and of reptiles, are always provided by nature with either a bony, horny, or tough membranous covering to protect them from the numerous accidents to which they are of necessity exposed until they arrive at maturity. It is therefore but natural to expect that the ova of the sponge tribe should be furnished with a means of preservation of a similar description, and thus it is that we find them the last and only remains of the sponge from which they date their origin. The presence of the gemmules in the agates and green jaspers that have been already described, is perhaps the strongest evidence of their organic origin that has been adduced, as in most of the cases cited the organic structure of the fibres has been in such a state of decomposition as to afford by no means the amount of evidence of their animal nature, that they are capable of producing, when examined in a more perfect state than that which has hitherto been described.

[To be continued.]



V.—Note of Species obtained by deep Dredging near Sana Island, off the Mull of Cantire. By GEORGE C. HYNDMAN, Esq., Member of the Natural History Society of Belfast\*.

WHEN cruising about with my friend Edmund Getty, Esq., in the Gannet yacht on the 19th of July 1841, the following result was obtained by dredging at the depth of forty fathoms, about two miles east of Sana Island. The bottom was shelly, with a proportion of shell-sand. The region "coralline," according to Mr. Forbes's definition. Dredge down three times.

Species obtained.	No. of living specimens.	No. of dead specimens.	Observations.
FISHES.			
Aspidophorus europæus	1		
MOLLUSCA.			
Chiton lævis	1	.....	On fragment of <i>Echinus</i> .
Capulus hungaricus	.....	6	Small and worn.
Emarginula fissura	.....	4	Small.
Trochus tumidus	.....	1	
—— millegranus	.....	1	2
Buccinum undatum	.....	2	Largest size, containing <i>Pagurus Bernhardus</i> .
Fusus despectus	.....	3	3
—— corneus	.....	3	..... One very minute.
Natica glaucina, Flem.	.....	2	Invested with <i>Actinia (Adamsia) maculata</i> , and containing <i>Pagurus Prideauxiana</i> .
—— Montagui, Forb.	.....	2	
—— Alderi, Forb.	.....	1	
Rissoa communis, Forb.	.....	1	
Orthocera	.....	1	In shell-sand.
——	.....		
Anomia	.....	14	All upper valves.
Nucula margaritacea	.....	4	
—— oblonga, Brown's	.....		
Illus.	.....	1	
Modiola vulgaris	.....	6	Small.
Nucula rostrata	.....	2	Single valves.
Anatina pubescens	.....	4	Single valves.
Kellia suborbicularis	.....	1	Odd valve.
Mactra elliptica	.....	20	Single valves, chiefly small.
Goodallia triangularis	} .....	} .....	} All dead; two or three of each species perfect, and several odd valves.
—— minutissima			
Tellina crassa	.....	12	Single valves.
Psammobia florida	.....	18	Single valves.
Cardium lævigatum	.....	3	Single valves, small.
Lima subauriculata	.....	1	"Nearly half an inch in length," as was a specimen procured by Mr. Jeffreys at Oban.
—— fragilis	.....	12	Single valves.
—— tenera	.....	160	Not a single specimen with the valves united, but some of them with the cartilage fresh. Many worn and covered with <i>Serpulæ</i> and crustaceous zoophytes. The specimens are generally large—one is 1½ inch in length. Mr. Jeffreys found the species at Oban 1¾ inch.
Pecten sinuosus	.....	2	Single valves.
—— obsoletus	.....	12	Single valves.

\* This and the following communication were brought before the notice of the British Association at the Manchester meeting by Mr. Patterson.

Species obtained.	No. of living specimens.	No. of dead specimens.	Observations.
<i>Pecten opercularis</i> .....	2	50	Of the living specimens, one was full-grown, the other small. The dead valves were separate and much worn; a few of small size.
<i>Pectunculus pilosus</i> .....	.....	300	
<i>Venus ovata</i> .....	.....	6	Single valves.
— <i>fasciata</i> .....	1	2	
— <i>virginea</i> .....	.....	2	Single valves, small and much worn.
— <i>cassina</i> .....	3	21	
<i>Lucina undata</i> .....	.....	2	The living specimens and the perfect dead shell (the remainder were odd valves) small; the odd valves mostly full-sized. The animal has a large hatchet-shaped foot, and a long siphonal tube.
<i>Nudibranchia</i> Mollusca .....	.....	.....	Single valves.
ECHINODERMATA.			A species of.
<i>Stellonia rubens</i> .....	1		
<i>Echinus sphæra</i> , Müll.	1	.....	Large.
— <i>miliaris</i> , Leske.	.....	3	
<i>Echinocyamus pusillus</i> .....	.....	50	
<i>Spatangus purpureus</i> ...	6	.....	From a very small size up to largest. The intestines filled with fragments of shells. Do they eat the shell-fish and break up the shells, or do they swallow the shell-sand and extract the nourishment from it?
ZOOPHYTES*.			
<i>Flustra foliacea</i> .			
— <i>truncata</i> .			
— <i>tuberculata</i> .			
<i>Thuiaria articulata</i> .			
<i>Antennularia antennina</i> .			
<i>Sertularia abietina</i> .			
— <i>polyzonias</i> .			
<i>Plumularia falcata</i> †.			
<i>Thoa Beanii</i> .			
<i>Farcecia salicornia</i> .			
<i>Notamia loriculata</i> .			
<i>Campanularia volubilis</i> .			
<i>Cellepora ramulosa</i> .			
— <i>pumicosa</i> .			
<i>Crisia eburnea</i> .			
<i>Discopora hispida</i> .			
<i>Hippothoa lanceolata</i> .			
— <i>catenularia</i> .			
<i>Tubulipora obelia</i> .			
— <i>serpens</i> .			
<i>Lepralia immersa</i> .			
— <i>variolosa</i> .			
— <i>nitida</i> .			
<i>Cellepora perlacea</i> . Delle Chiaie ‡.			
— <i>Macry</i> . Delle Chiaie?			
<i>Corallina officinalis</i> .			

\* Although Zoophytes were plentiful, no *Algæ* whatever occurred.

† *Pl. myriophyllum* was dredged up near the same locality in June 1842.

‡ These two species (hitherto unnoticed as British) and other minute ones have been determined by Mr. W. Thompson.

VI.—Results of deep dredging off the Mull of Galloway, by Capt. BEECHEY, R.N. Drawn up by W.M. THOMPSON, Esq., Vice-Pres. Nat. Hist. Society of Belfast.

CAPTAIN BEECHEY, the distinguished navigator, having in the month of April last been engaged in a survey of part of the Scottish coast in H.M. steam-vessel Lucifer, most kindly undertook to use the dredge in the deepest water in which his soundings might be made, and the following are the highly interesting results obtained on three occasions; the products from the different depths being most carefully kept separate.

Species obtained.	From 50 fathoms, 8 miles S.S.W. the Mull of Galloway.		Observations.	From 110 to 140 fathoms, 5 miles S.W. the Mull of Galloway.		Observations.	From 145 fathoms in Beaufort's Dyke*.		Observations.
	No. of living specimens.	No. of dead specimens.		No. of living specimens.	No. of dead specimens.		No. of living specimens.	No. of dead specimens.	
MOLLUSCA.									
Trochus papillosus	1	...	Adult .....	...	.....	.....	1	1	
— millegranus	...	...	A few alive and several dead	...	...	Many dead and broken; chiefly small.	2	...	A few dead.
— tumidus	.....	.....	.....	.....	.....	A few dead .....	.....	.....	A few dead.
Cypræa europæa	...	2	.....	.....	.....	Ditto .....	.....	.....	Ditto.
Fusus turricola	...	1	.....	.....	.....	Ditto.	.....	.....	
— muricatus	.....	.....	.....	.....	.....	Ditto .....	1	2	
— Bamfius	.....	.....	.....	.....	.....	Ditto .....	.....	.....	A few dead; small.
— linearis	.....	.....	.....	1	.....	.....	.....	.....	
— costatus	.....	.....	.....	.....	.....	.....	1	.....	Large.
— corneus	.....	.....	.....	2	.....	Small .....	1	1	Small.
Buccinum undatum	.....	.....	.....	1	.....	Ditto .....	.....	1	
Natica Alderi	.....	.....	.....	1	.....	.....	.....	.....	
— Montagui	.....	.....	.....	3	.....	.....	.....	.....	
Nasa macula	.....	.....	.....	.....	.....	.....	.....	1	
Tornatella tornatilis	.....	.....	.....	.....	.....	.....	.....	1	
Eulima polita	.....	.....	.....	.....	.....	.....	2	.....	Perfect.
Capulus hungaricus	.....	.....	.....	.....	.....	A few dead; small	2	.....	Small.
Emarginula fissura	.....	.....	.....	.....	.....	Many dead .....	.....	.....	Several dead.
Chiton fuscatus, Br.	.....	.....	.....	.....	.....	.....	1	.....	
— discrepans, Br. ?	.....	.....	.....	.....	.....	.....	1	.....	
Dentalium entalis	3	...	Several dead	.....	.....	Several small; some alive.	.....	.....	A few living.
Astarte Damnoniæ	.....	.....	Odd valves	.....	.....	Several; alive .....	.....	.....	A few odd valves.
— scotica	.....	.....	.....	.....	.....	Several odd valves; chiefly small.	.....	.....	Ditto; small.
Lucina radula	.....	.....	.....	.....	.....	Odd valve.	.....	.....	
Venus virginea	.....	2	.....	.....	.....	Odd valves; medium size.	.....	.....	A few odd valves; one perfect shell.
— ovata	.....	.....	Several dead	.....	.....	Ditto chiefly; a few alive.	.....	.....	Very few alive; and some odd valves.
— cassina	.....	.....	A few young, alive.	.....	.....	Ditto; several small.	.....	.....	A number of odd valves of all sizes.

\* A remarkable dyke, beginning about 5 miles S.W. the Mull of Galloway, and extending northward nearly to Corsewall. It is from a mile to a mile and a quarter wide. Its average depth in the centre is 130 fathoms.





Species obtained.	From 50 fathoms, 8 miles S.S.W. the Mull of Galloway.			From 110 to 140 fathoms, 5 miles S.W. the Mull of Galloway.			From 145 fathoms in Beaufort's Dyke.		
	No. of living specimens.	No. of dead specimens.	Observations.	No. of living specimens.	No. of dead specimens.	Observations.	No. of living specimens.	No. of dead specimens.	Observations.
<i>Galathea rugosa</i> ...	...	...	.....	...	...	Several small; none exceeding in body 1½ inch in length.			
<i>Areturus longicornis</i> , Westwood... ANNELIDA.	1								
<i>Aphrodita aculeata</i> ...	...	...	.....	1					
ZOOPHYTES*.									
<i>Plumularia falcata</i> .	1†	...	.....	2†					
— <i>myriophyllum</i> ...	...	...	.....	2					
<i>Sertularia abietina</i> .	1	...	.....						
— <i>cupressina</i> ...	...	...	.....	2					
— <i>pinaster</i> , Soland. and Ellis ‡	...	...	.....	2	...	One specimen.			
<i>Tubularia indivisa</i> .	...	...	.....	2	...	Ditto.			
<i>Campanularia dumosa</i> .....	...	...	.....	2	...	.....	3†	...	Excepting this there are crustaceous species only, as <i>Lepralia</i> , &c.
<i>Farcimia salicornia</i> ...	...	...	.....	2					
<i>Crisia cornuta</i> .....	...	...	.....	2					
<i>Cellepora ramulosa</i> .	1	...	.....	2					
— <i>Skenei</i> .....	...	...	.....	2	...	One specimen.			
<i>Flustra foliacea</i> ...	1								
— <i>truncata</i> .....	1								

I beg, in connexion with this and the preceding catalogue (by Mr. Hyndman), to call the attention of naturalists interested in the study of the Mollusca to the results obtained in a third locality on the western coast of Scotland—at Oban—by Mr. Jeffreys, published in Sowerby's 'Malacological Magazine' (No. 2, 1839). Mr. Jeffreys obtained "*Terebratula aurita* § plentifully in about 15 fathom water," and along with it found "*Crania personata* not uncommon." He procured also the three species of *Lima*—*L. tenera*, *L. fragilis*, *L. subauriculata*—taken off Sana Island. *Nucula minuta* was dredged at Oban as well as off the Mull of Galloway; it has been procured on different occasions by deep dredging in Belfast bay, and many years ago was found at the Giant's Causeway. The *Myrtea spinifera*, of which a single valve was

\* No *Algæ* were brought from any of the three depths.

† These numbers denote the different depths at which the species of Zoophytes were found; No. 1. at 50, No. 2. at 110, No. 3. at 145 fathoms.

‡ *S. margarita*, Hassall, seems to be identical with this. My specimen is without vesicles. It agrees with the description and magnified figure of Solander and Ellis better than the figure of natural size.

§ This species was dredged in Belfast bay by the collectors attached to the Ordnance Survey.

brought up off the Mull of Galloway, was found to be not uncommon in deep water at Oban—on the strand at Red Bay, county of Antrim, I found an example of this shell. *Trochus papillosus* and *Eulima polita*, dredged by Capt. Beechey, were not procured at the more northern localities, Sana island\* and Oban—of the latter species, a single living example was taken in the course of the Ordnance Survey in Belfast bay. The most northern locality on the Irish coast, in which it had hitherto been obtained, was Dublin bay.

Many observations are suggested by these catalogues, and others of a similar nature in my possession, but to my friend Mr. E. Forbes must be left the treatment of a subject in which he of all men possesses the most ample and important data.

VII.—On a new British species of *Alchemilla*. By CHARLES C. BABINGTON, M.A., F.L.S., F.G.S., &c.

IN looking over the valuable herbarium belonging to W. Borrer, Esq., I was gratified by finding in it an original *wild* specimen of *Alchemilla*, gathered by the late Mr. G. Don upon the Clova Mountains, in Scotland, many years since, and considered by him as a species quite distinct from *A. alpina*. Upon a careful examination of the specimen and also of a living plant in Mr. Borrer's garden, I was soon convinced that the plant was indeed a distinct species, although it may be found in almost all the British botanical and other curious gardens under the name of *alpina*, the true *alpina* being often nameless in the same collections. Upon inquiry I have always found, that whenever the original source was known from which the roots were obtained, they are stated to have been sent by Mr. G. Don from Scotland. Upon showing the plant to the late lamented Prof. Don, he also informed me that his father had found it in Scotland.

Having now satisfied myself that the plant was a distinct species, and also that it came from the Highlands, I took all the means in my power to ascertain its identity with some described species, but having totally failed, I feel convinced that it has escaped the notice of botanists. It was denominated *A. argentea* by Mr. Don, but that name was never published, and as Lamarck employed the same name for *A. alpina*, I have considered it advisable to give a new name to this plant, as the employment of *argentea* (although a most excellent and descriptive name) would only tend to create confu-

\* In June 1842, Mr. Hyndman dredged a full-grown *Trochus papillosus* near Sana Island.



sion. It is right to state that Mr. W. C. Trevelyan, in the 2nd edition of his paper upon the botany of the Feroe Isles (printed at Florence), has shortly characterized our present subject under the name of *A. argentea* (Don). He finds it to be plentiful in those islands.

I propose to name and characterize the plant as follows:—

*Alchemilla conjuncta* (Bab. MSS.). Foliis radicalibus peltato-palmatis 5-7 partitis, laciniis oblongis obtusis apice adpresso-serratis subtus albo-sericeis ad  $\frac{1}{3}$  conjunctis, corymbis parvis lateralibus terminalibusque distantibus.

*A. argentea*, G. Don, MSS.! in *Borr. Herb.*, Trevelyan in *Bot. of Feroe Islands*, not *Lam. Enc.* 1. 77.

Closely allied to *A. alpina*, but usually much larger in all its parts, and distinguished by not having its leaflets separated to their base, broader, more silky beneath, and spreading from the petiole in such a manner, that in the radical leaves the two external leaflets almost, if not quite, touch each other, so that at first sight the whole leaf presents the appearance of being peltate. The stems have long alternate spreading branches which are often again subdivided, and the flowers, which are more silky and upon longer stalks than those of *A. alpina*, are collected into small, nearly simple, distant corymbs. In *A. alpina* the leaflets are separated to the base, and form a digitate not at all palmate leaf, the outer ones being very distant from each other, or even nearly opposite.

VIII.—*Contributions to the Ichthyology of Australia.* By JOHN RICHARDSON, M.D., F.R.S., &c., Inspector of Hospitals, Haslar.

[Continued from vol. ix. p. 393.]

GERRES FILAMENTOSUS (*Cuv. et Val.*).

No. 4. Mr. Gilbert's collection, Sept. 1840.

THIS fish, Mr. Gilbert informs us, is an inhabitant of a freshwater swamp at Port Essington, but he does not state whether the swamp communicates with the sea or not. The *Gerres lineatus* is also said to be taken in the freshwater lagoon of Colluco, but as the other species are marine, it is probable that these enter the fresh waters at certain seasons from the sea. Mr. Gilbert's specimen was obtained in the month of September. The same species was obtained by Messrs. Quoy and Gaimard at New Guinea, and by Messrs. Kuhl and Van Hasselt at Java. In the 'Histoire des Poissons' the *woodawahah* of Russell (p. 52. pl. 68.) is considered to belong to this species; but this appears to be somewhat doubtful, from the

second dorsal spine being represented as no stronger than the rest, and its filamentous tip as being very little prolonged. Russell's specific character also states "*spina anali unica*," whereas in our example of *filamentosus* the second and third spines are both very conspicuous and longer than the soft rays of the fin, the second being the strongest one, and but just perceptibly shorter than the third.

Both the anal and dorsal spines are much compressed. The first dorsal spine is very short, the second is as broad again in the direction of the axis of the fish as any of the others, and its filamentous tip, which in Mr. Gilbert's specimen is broken off, is stated in the 'Histoire des Poissons' to be long enough to reach to the caudal fin. The lateral line is strongly marked on scales smaller than the others. RAYS.—D. 9|10; A. 3|7; P. 15; C. 17 $\frac{2}{3}$ ; V. 1|5.

The colours have of course faded in the dried specimen, but the scales still exhibit much pearly and silvery lustre with strong reflexions when moved in the light. Above the level of the pectoral each scale has a deep steel-blue bar along its middle producing about nine longitudinal lines, the intervals and all the under parts being silvery. There are about five of the blue lines with four silvery ones above the lateral line.

DIMENSIONS.		inches.	lines.
Length from intermaxillary symphysis to tip of caudal .....		6	9
_____ base of caudal .....		5	3
_____ anal fin .....		3	10
_____ ventrals .....		2	2
_____ dorsal .....		2	2
_____ pectorals .....		1	8
_____ edge of gill-flap .....		1	7
_____ centre of eye .....		0	9 $\frac{1}{4}$
Diameter of eye .....		0	6
Depth of caudal fork .....		1	0
Height of third dorsal spine .....		1	0
_____ of third anal spine .....		0	8 $\frac{1}{2}$

### CHÆTODON SEXFASCIATUS (Nob.), Six-banded Chætodon.

Specimen in the British Museum.

The Chætodons with vertical bands do not appear to be numerous. Two species only are described in the 'Histoire des Poissons,' one of them (*striatus*) with five bands, and the second with eight (*octofasciatus*). A third species with bands (*chrysurus*) is mentioned in the 'Zoological Proceedings' for 1833 (p. 117), as existing in the seas of the Mauritius. Its bands are also eight, but they are angular in the middle. Mr. Gould brought a six-banded species from Western Australia, which is now in the British Museum.

Its profile, including the dorsal and anal fins, and excluding the parts before the eye and half the trunk of the tail with its fin, is nearly orbicular. The profile of the head is concave, and thus causes the

snout to appear to project more than it actually does. The curve of the back springs boldly from the middle of the orbit. The large eye just touches without altering the profile, and is the breadth of itself from the end of the snout. The preoperculum is strongly serrated on its vertical edge and rounded corner, but scarce perceptibly so on its horizontal limb. The operculum, as is usual with the *Chætodons*, is cut away in a wide shallow arc. The lateral line, formed by a series of short tubes, is nearly parallel to the back till it arrives opposite to the ends of the dorsal and anal, when the curve changes to a straight course through the tail. The scales have rectangular bases and sides, with a ciliated semicircular external edge. The uncovered surface is strongly marked by acute furrows corresponding in number with the marginal teeth.

RAYS.—D. 10|20, last one divided ; A. 3|16 or 17 ; C. 17 $\frac{2}{3}$  ; P. 17 ; V. 1|5.

The caudal is lunate on the margin : the pectorals are rounded. The dried specimen shows the following markings, but we have no knowledge of the colours of the recent fish. The ocular band occupies the upper surface of the head, from the lips to midway between the end of the snout and the beginning of the dorsal, and curving downwards embraces the whole orbit, becomes narrower on the cheek, yet takes in the angle and most of the upper limb of the preoperculum, and cuts the junction of the suboperculum and interoperculum in its course to the base of the ventrals ; its posterior edge makes a curve nearly similar to that formed by the margins of the dorsal and anal fins, but in the opposite direction, and the portion of the head lying before that curve projects out of the orbicular profile above mentioned. The second band, which is also broader above, commences immediately before the dorsal, and touching in its course the margin of the gill-cover and base of the pectoral, descends with a slight curve to the middle of the ventral, which is itself black. The third band encroaches a little on the scaly base of the dorsal, taking in the third and sixth spines, and becoming narrower in its direct course downwards, terminates before and in contact with the first anal spine. The fourth band, commencing near the tips of the first five jointed rays of the dorsal, descends to the first jointed anal rays. It is curved in an opposite direction to the anterior bands, and is broadest at the lateral line. The parts of the dorsal and anal fins behind the fourth band are black, and the fifth band is a narrow curved stripe which crosses the tail, and appears to be a continuation of the black curve formed by the margins of the fins. The sixth band is the narrowest, though blackest of all, and crosses the tail at the base of the caudal. The white spaces between the bands are narrower than the bands themselves. The extreme edges of the dorsal and anal are pale or whitish, and there is a yellowish tint on the caudal, its crescentic margin being very pale.

	DIMENSIONS.	inches.	lines.
Length from tip of snout to extremity of caudal fin .....		6	9
————— base of caudal.....		5	6
————— anal.....		3	6



DIMENSIONS.		inches.	lines.
Length from tip of snout to dorsal .....		2	4 $\frac{3}{4}$
————— hinder margin of orbit .....		1	0
————— orbit to end of dorsal or anal .....		4	0
Height of third, fourth and fifth dorsal spines .....		1	0
————— jointed rays of dorsal .....		0	9
————— second anal spine .....		0	8
————— jointed anal rays .....		0	7
Length of caudal fin .....		1	3
————— ventrals .....		1	4
————— ventral spine .....		0	9
————— pectorals .....		1	3

### DREPANE PUNCTATA, the Spotted Reaper-fish.

*Chatodon punctatus*, Solander, Pisc. Nov. Holl. ined. Parkins. No. 21.

“*Chatodon punctatus*. Habitat in Novâ Hollandiâ propè *Endeavour's Careening place*, ex oceano fluvios ascendens. Corpus latum, ferè subrotundum, valdè compressum. Caput majusculum, infra oculos squamosum, aliàs nudum, supra oculos declive. Oculi magni, iris argentea, pupilla nigra. Os parvum. Dentès setacei, minimi, conferti, tantummodo in maxillis; faux, lingua et palatum glabra. Maxillæ obtusæ. Nares propè oculos, rotundi, minores aperturæ vix anteriores sed interiores, h. e. dorso capitis propiores. Lingua lata, obtusa, crassa, brevis. Branchiarum opercula nuda, lævissima. Membrana branchiostega 6-radiata. Gula dilatabilis. Humeri elevati crassiusculi. Dorsum acutum, attenuatum, posticè deorsum rotundatum. Latera plana. Linea lateralis ad basin capitis incipit, dorso propior, secundum flexuram dorsi arcuata, in postremâ caudâ descendit. Anus ante medium piscis, a pinnâ anali remotus. Cauda brevis lata, plana, valdè compressa. Pinna dorsalis, paulo ante medium dorsi incipiens, in summo dorso spinosa, posticè mutica, elevata, usque ad caudam extenditur: pars spinosa 8-radiata; radii 1 et 2 brevissimi, adpressi, 3<sup>tus</sup> longus dein sensim breviores, 8<sup>vus</sup> a reliquis ad partem muticam parum remotus; pars mutica 21-radiata, æqualis, posticè rotundata, basi squamosa. Pinnæ pectorales falcatae, ad caudam elongatæ, muticæ, 17-radiatæ; radius 6<sup>tus</sup> longissimus. Pinna analis 20-radiata; radii tres anteriores spinosi, breves decumbentes, reliqui mutici, longi, pinnam efficientes parti posterioris dorsalis simillimam, basi squamosam. Pinnæ ventrales ovatæ, acuminatæ, breves, sed pone anum extensæ, 6-radiatæ; radius 1<sup>mus</sup> spinosus, validus, 2<sup>dus</sup> longissimus, apice subramentaceus. Pinna caudalis lata, subcuneata, subtruncata, in medio parum rotundata, angulis laterilibus acutis parum productis, 17-radiata. Squamæ mediocres, arctè adhærentes. Br. 6; D. 8|21; A. 3|17; C. 17; P. 17; V. 1|5.

“Color totius piscis argenteus: latera a summo dorso infra medium maculis nigris\* ornata; maculæ seriebus transversalibus, inæqualibus dispositæ. Fig. Pict. Piscis sæpè sesquipedem longus.”—*Pisc. Nov. Holl.*

\* Parkinson has noted beneath his sketch, that “the whole fish is silvery with fuscous spots.”



Cuvier considers this fish to be the same with the *Chatodon punctatus* of Linnæus, and also with the *Latte* of Russell (No. 69). Parkinson's pencil sketch above quoted represents the spinous part of the dorsal as lower, and the articulated part as higher than Russell's figure. And on comparing it with plate 179 in the 'Histoire des Poissons,' the mouth appears a little larger, the profile of the nape less gibbous, and the first jointed rays of the dorsal higher, rendering that part of the fin more even anteriorly, though it is equally rounded posteriorly with Cuvier's figure. The anal is also higher anteriorly and is rounded throughout, and a few radiating lines are indicated on the limb of the preoperculum. In all other respects the resemblance between Parkinson's sketch and the plate in the 'Histoire des Poissons' is close. In this work the species is said to frequent the Malabar coast and the seas of Java, New Guinea, and China.

*CHELMON MARGINALIS* (Nob.), the Willëmawillum.

No. 12. Mr. Gilbert's collection.

Only two species of *Chelmon* are described in the 'Histoire des Poissons,' and these are very readily distinguished from each other by the relative length of their beaks and the form and extent of the spinous part of their dorsals, as well as by the very different patterns of colour they exhibit. Mr. Gilbert's fish so closely resembles the best known species, the *Chelmon rostratus*, in general form as well as in part of its markings, that I have some hesitation in proposing it as a distinct species on the strength merely of the characters of a single individual. It wants two vertical bands on the body which *rostratus* possesses, and the anal fin is decidedly more angular than the dorsal, which is rounded, the reverse being the case in *rostratus*. There is also a submarginal dark band round the soft part of these two fins in the proposed species, which is not noted in the descriptions or shown in the figures of *rostratus*. Mr. Gilbert states that his fish is the 'willëma-willum' of the aborigines, and that it frequents shallow rocky places and sandy beaches in all the bays of Port Essington. The faculty of shooting a drop of water from the mouth so as to strike an insect, which the members of this genus possess in common with the *Toxotes*, is, I have reason to believe, enjoyed also by an undescribed New Holland *Holocanthus*, which greatly resembles *Chelmon* in the prolongation of the snout.

The proportions of the Port Essington *Chelmon* are almost the same with those of the common *rostratus*. The snout, measured from the nostrils, is exactly one-sixth of the total length, caudal included; which again is double the height of the body. The anal fin forms

a spherical triangle with the apex a little blunt; the dorsal is much more widely rounded, being the segment of an obtuse ellipse. The finely grooved and toothed upper edge of the orbit projects a little, rendering the forehead wider than the occiput or snout. The pre-orbital is oblong, with a convex under-border irregularly armed with acute teeth. The ascending limb of the preoperculum is finely and closely toothed; the teeth are a little larger on the angle, and on the lower limb they are more acute and farther apart. The operculum is cut away in a wide and very shallow sinus, the points at its extremities being bluntish. The membranous border is moderately broad. The supra-scapular is toothed, and the scapula, which is more conspicuous, is more strongly and acutely serrated. The humeral is also acutely toothed. The scales are strongly and closely furrowed on the border and ciliated with teeth. The lateral line, traced on scales smaller than the rest, forms an arc of a nearly circular curve, until it comes opposite to the few last rays of the dorsal, when it changes abruptly to a straight course through the tail.

RAYS:—D. 9|29; A. 3|18; C. 16 $\frac{2}{2}$ ; P. 15; V. 1|5.

The dorsal, anal and ventral spines are strong and moderately compressed as in *rostratus*. The caudal is square at the end, with a slight tendency to convexity. The scaly sheath envelops the spinous part of the dorsal to the tips of most of the spines. It is the slight development of this sheath in *longirostris*, together with the greater size of the spines, which forms the most striking difference in the shape of that species, exclusive of the greater length of its snout. The first soft ray of the ventral tapers to a filamentous tip, similar to that of the species just named.

The colours cannot be certainly known from the dried specimen, which is otherwise in good condition and presents three vertical bands, all formed by narrow black borders enclosing a nearly even stripe of a somewhat yellower tinge than the rest of the fish, but not of a darker hue. The ocular band commences high on the nape, passes through the eye, and terminates on the fore-part of the interoperculum: it is wider on the cheek than above the eye. The second band takes in the two first dorsal spines and terminates at the ventral: its fore-border cuts the bony operculum vertically a little anterior to its centre, and its hinder one passes down the membranous edge of the gill-flap, the supra-scapular and scapula being included in its breadth. The third band crosses the tail at the base of the caudal. A narrow band of the same kind edges the soft parts of the dorsal and anal, the caudal band just mentioned forming a connecting link between the borders of the two fins. The bands follow the contour of the fins exactly, the anal one being somewhat angular and the dorsal one elliptical, and though they are narrower than the vertical bands on the body, they have broader interior black edges. There is not the slightest trace of the eyed spot on the dorsal, or of the two vertical bands which cross the body in *rostratus*, but there are faint longitudinal lines coincident with the junctions of the rows of scales, the middle sections of the scales being more silvery. Under the microscope the scales appear

to be sprinkled with minute black specks. There is a mesial black stripe on the forehead extending from between the eyes to the base of the upper jaw.

DIMENSIONS.		inches.	lines.
Length from tip of beak to end of caudal fin .....		6	0
————— base of caudal fin .....		5	0
————— anus .....		3	2
————— pectoral .....		2	2
————— ventral .....		2	2
————— dorsal .....		0	0
————— tip of gill-flap .....		1	1
————— centre of eye .....		1	3 $\frac{3}{4}$
Diameter of the eye .....		0	5
Length of ventral spine .....		0	10
————— soft ventral rays .....		1	4
————— ninth dorsal spine .....		1	1
————— third anal spine .....		1	0
Height of soft dorsal .....		1	8
————— soft anal .....		1	2 $\frac{1}{2}$
————— body .....		3	0
————— body and vertical fins .....		4	2

**PLATAX LESCHENALDI** (*Cuv. et Val.?*), the Kahi-sandawa.

No. 4. Lieut. Emery's drawings.

The specimen from which Lieut. Emery made his drawing was taken in Talc Bay, and measured eight inches in length, and fifteen between the extended tips of the dorsal and anal fins. The figure does not agree in all points with the 'Kahi-sandawa of Russell, which is the *Platax Leschenaldi* of the 'Histoire des Poissons,' but it resembles it so much, that it seems better to direct the attention of naturalists to it under that designation, rather than under a new specific name. Russell describes four vertical bands as existing in the young of the *Kahi-sandawa*, and states that they disappear as the fish increases in age. The wide range of the Kahi-sandawa, from India to New Guinea, increases the probability of its being also an inhabitant of the seas which wash the northern coasts of New Holland.

Lieut. Emery's drawing represents the dorsal and anal fins as triangular in profile, their posterior edges being not falciform, but almost perfectly straight. The height of the dorsal rather exceeds that of the body, and is considerably greater than that of the anal. The caudal terminates in a slightly waving line, convex in the middle and a little concave towards the two angles, which are acute. The pointed ventrals reach half way along the anterior border of the anal. The profile is steeply convex from the mouth to the ventrals, and also upwards to the beginning of the dorsal, which rising still more precipitously, renders the outline slightly concave before its base. The height of the body, measured a little obliquely, from the base of the first jointed dorsal rays to the beginning of the anal, is



equal to the length of the fish, caudal excluded. The caudal forms rather more than a sixth part of the total length. The scales are tolerably large. Fewer rays are indicated in the fins than in any species described in the 'Histoire des Poissons,' the dorsal ones being two less, and the anal ones merely equal in number to those of *bata-vianus*, but it is not very probable that Lieut. Emery counted all the small posterior rays of these fins.

The colour of the body is primrose-yellow, that of the two vertical bands and the pectoral fin yellowish brown, and of the other fins dark oil-green. The ocular band passes over the forehead, includes two-thirds of the eye and the corner of the mouth, and terminates on the belly before the ventrals. The pectoral band, of nearly uniform breadth throughout and broader than the ocular band, crosses the nape, takes in the edge of the gill-flap, and spreads on the side to the width of two-thirds of the length of the pectoral: it terminates on the belly immediately behind the ventrals. There is a small triangular black mark on the base of the pectoral.

#### PLATAX ORBICULARIS (Cuv.), Orbicular Platax.

"*Chætodon orbicularis*, Forskal."

*Platax orbicularis*, Rüppel, Atl. 67. t. 13. f. 3; Cuv. & Val. vii. p. 332. No. 37. Mr. Gilbert's list.

This fish, according to Mr. Gilbert, frequents most parts of the harbour of Port Essington, and swims near the surface, which renders it an easy mark for the spears of the natives, who name it 'be-role-coord.' It agrees in so many points with the *Platax orbicularis* of the Red Sea, first described by Forskal and since figured by Rüppel, that I have no hesitation in considering it to be the same species. Rüppel's figure is stated in the 'Histoire des Poissons' to have been sketched from a young individual, and shows an ocular and a humeral band, which were not visible in the specimen presented to Cuvier by Rüppel, nor do any traces of them exist in the example brought from Port Essington. The vertical bands, so common in the fish of this genus, are said to disappear as the individual increases in age. In the 'Histoire des Poissons' the dorsal is said to be rounded and the anal a little angular. M. Rüppel's figure shows a dorsal more angular than the anal, while in Mr. Gilbert's specimen both these fins are much rounded, the anal however coming nearest to a circular arc, because of its shortness and greater height, the curve of the dorsal being more lengthened, and in proportion a little more elevated anteriorly.

In the dried specimen the back and sides have a tint intermediate between broccoli-brown and honey-yellow, the under parts being paler with much nacry lustre. The pectorals are colourless, the ventrals are broadly tipped with brownish black, and the anterior edge of the anal is widely bordered with the same, the rest of the margin of that fin and the margins of the dorsal and caudal being narrowly fringed with black. M. Rüppel's figure omits the black border of the fore-part of the anal, and shows a broader fringe of that tint on the rest of the fins. His text describes the colour of the fresh



fish as brownish and silvery, with an unctuous metallic lustre; the ventrals as blackish brown, and the vertical fins as chestnut-brown, all with black edges; the pectorals being hyaline. Both Forskal and Rüppel notice certain individuals as having small irregular black spots scattered on the sides. The Port Essington fish has about twenty brownish dots dispersed on the flanks behind the pectoral fin and below the lateral line. The caudal fin, which is represented in the figure as being slightly concave on the margin, has in the Port Essington fish also a concave edge, but not evenly so, the centre being convex, yet not projecting so far as the angles, which are rather acute. The thickness of the scaly covering is such that the number of rays in the fins cannot be ascertained except by dissection, and the three works which have described the species disagree in their enumeration. I have therefore taken much pains to be correct in this point, and find them to be as follows:—

RAYs:—B. 6; D. 5|34; A. 3|26; C. 18; P. 16; V. 1|5; Port Essing. specim.  
 5; 5|36; 3|25; 20; 16; 1|5; Rüppel. —  
 6; 3|33; 0|26; ..... Forskal. —  
 3|32; 3|25; ..... Cuv. & Val. —

The first dorsal spine is very short; its interspinous bone has been mostly removed from the specimen. The occipital crest is three-sided and tapering, without enlargements. There is a wide furrow between the eyes. The upper margin of the orbit is striated, the suborbitars are irregularly gouged on the surface, and the naked limb of the preoperculum is irregularly striated at the angle, and minutely crenated on its lower limb, the widely rounded angle, and half its ascending edge. The bony operculum is rounded at its upper angle and pretty deeply concave below, the sinus being filled by membrane supported by the projecting point of the suboperculum. This last-named bone is widest at its junction with the interoperculum, but at one-third of its length from thence it suddenly narrows and then tapers to its point. There are three small pores on each limb of the lower jaw. The teeth form a dense brush-like band on each jaw, the dental surface being flat. The teeth of the outer row are rather the strongest and are tricuspid, the middle point being the largest and longest.

There are fifty scales in a row between the gill-opening and caudal fin, and about fifty-five in a vertical line, of which fifteen are above the lateral line. They are roundish, with from eight to twenty-four furrows on their basal borders, varying according to the place from whence they are taken.

Rüppel states eighteen inches as the usual length of the species. The Port Essington specimen measures as follows:—

DIMENSIONS.	inches.	lines.
Length from intermaxillary symphysis to tip of caudal .....	17	6
..... base of caudal .....	14	6
..... anus .....	8	2
..... edge of gill-cover ...	5	0
..... centre of orbit.....	2	9

DIMENSIONS.		inches. lines.	
Diameter of orbit .....		1	2
Length of ventral fins.....		4	6
— pectorals.....		3	0
— caudal .....		3	0
Height of anal .....		3	3
— dorsal, measured directly .....		2	7
— dorsal, measured along the rays .....		4	6
— body between fore-part of dorsal and anus .....		10	2
— fish including anal and dorsal .....		14	2

[To be continued.]

IX.—*Observations on the genera Zygnema, Tyndaridea, and Mougeotia, with descriptions of new Species.* By ARTHUR HILL HASSALL, Esq., M.R.C.S.L., Corresponding Member of the Dublin Natural History Society.

IT is the general belief of Cryptogamic physiologists that union of the filaments of the different species composing the genera *Zygnema*, *Tyndaridea*, and *Mougeotia* is indispensable to the production of fertile spores. This belief I consider to be erroneous so far as the genus *Zygnema* is concerned, as I think that I have the means of satisfactorily proving. In three species of *Zygnema* which I have recently met with, and which I have named *Zygnema quadratum*, *Z. intermedium* and *Z. angulatum*, the filaments do not unite, and yet all equally produce spores, only two of which, however, it is remarkable to observe, are placed in contiguous cells, and on one side of each of these a cell void of contents is invariably situated, a channel of communication being set up between every two cells, that is, between an empty one, and that which contains a seed, by means of a hollow process, situated at the point of junction of the cells, through which the contents of one cell passes into and mingles with those of the other\*.

From a consideration of the structure of these species, the accuracy of which cannot be doubted, it is evident that conjugation is not essential to the production of spores, and therefore, that the supposition entertained by some that the entire of one filament contains fertilizing matter, and the other that which is to be fertilized, is erroneous; while it is apparent from the disposition of the spores, not more than two being juxtaposed, and of empty cells, that each filament includes both forms of reproductive matter so disposed as to lie in adjacent cells.

Should future observation disclose the fact, that this alter-

\* A species of *Mougeotia*. *M. notabilis* likewise produces spores without conjugation of the filaments.—A. H. H.

nate disposition of spores and empty cells does not invariably prevail, this will not affect the truth of the statement that spores are sometimes formed without union of the filaments, for that is incontestably proved by reference to the species of *Zygnemata* spoken of above; nor does it disprove the theory of the formation of spores by the mingling of the contents of two adjacent cells, the one of which is provided with fertilizing matter, the other with that which is to be fertilized; for in the supposed instances of departure from the arrangement referred to, it might be fairly inferred that those spores not in communication with an empty cell would not be fertile. It must be borne in mind, likewise, that the material contained in the spiral tubes previous to its passage from one cell to the other, contracts itself into a little mass not usually of a regular form, but which might assume the appearance of a spore without possessing the fertile properties of one. This must be discriminated from the true spore.

The formation of spores without union of the filaments is not confined to these three species, but occasionally happens with some other species of the genus, more especially with what is to be regarded as a variety or condition of *Zygnema porticale* (*Z. quinimum* of Agardh). In this the same disposition of spores and empty cells is remarked, but there is no direct channel of communication between the cells, the coalition of the contents of which being brought about by the rupture of the partitions which separate them, when these do not give way, the cells swell up and assume a remarkable moniliform appearance not peculiar to the species, but occurring in several others where union is prevented by any cause. It is curious to notice also that many of the cells throw out irregular and blind processes, thus evincing a strong tendency towards union with the cells of other filaments, which union would appear to have been frustrated by the operation of some unexplained cause; perhaps the motion of the water in which the species was growing.

In a species of *Zygnema* which I have named *Z. polymorphum*, the spores are likewise formed in some of the filaments without union, but somewhat differently from the manner in which this is brought about in the species hitherto spoken of. In this there is no alternate arrangement of spores and empty cells, a spore being placed in every cell; but these cells it is to be observed are twice as long as those which contain spores formed in the usual way by the union of the cells of different filaments; so that each spore contained in these elongated cells is constituted of the same quantity of material as the regularly formed spores, but that the elongated cells at the period of the formation of



the spores in them had still to undergo a further and final division. It would be an interesting, but not an easy task, to determine whether spores formed in this manner are productive or not.

The length of the cells is very variable, not only in the species of this genus, but in all *Confervæ*, both marine and freshwater, simple and branched, this being the necessary result of their principal mode of development, viz. by the continued growth and subdivision of the cells composing them\*. Such is the extent of this variation in the length of the cells, that some are twice as long as others in the same filament with every intermediate shade of length. Uncertain as is the length of the cells during the growth of any species of *Conferva*, yet this will be found to be pretty uniform when the growth has ceased, and the state of conjugation commenced; and when in the following descriptions mention is made of the length of the cells, it is to be understood that the reference relates to their length in that state, unless when otherwise indicated.

#### GENUS ZYGNEMA.

\* Conjugation parallel; spores oval, and contained within the cells of one or other filament.

*Zygnema maximum.* Filaments highly mucous, and of a light green colour, their diameter and length being very considerable; cells when in a state of conjugation a little longer than broad, prior to which however they are frequently not half so long as broad: winding round the interior of these are about eight spiral tubes filled with granular matter, the granules being small.

This is the finest and largest of all the *Zygnemata* hitherto described, the diameter of the filaments greatly exceeding those of *Zygnema nitidum*, *Conjugata princeps* of Vaucher. I have met with it several times, and have found it in considerable quantities in two localities in a pond on Nazing Common, Essex, and in a slow stream near Enfield Highway. There is no *Conferva* known to me with which it can possibly be confounded. When kept in a small vessel of water, it, like the following species, passes into decay in a few hours.

*Zygnema bellis.* Filaments about a foot in length, with truncate extremities, of considerable diameter, mucous, glossy, and of a deep and beautiful green colour; investing membrane of the cells very evident and transparent; in some filaments, five or six lax spiral tubes may be faintly dis-

\* See Annals for July 1842, upon the subject of the growth of *Conferva*.



cerned winding round the interior of the cells: these contain the reproductive globules, which are large and distinct, with a dark central nucleus; cells in the young filaments scarcely so long as broad, but rather longer than broad in those which have conjugated. Seeds oval, sometimes almost circular, lying in inflated cells, the cavity of which they do not fill.

This well-marked species has occurred to me in several localities in the vicinity of Cheshunt, in one of which, viz. in two sheltered ponds, communicating with each other by a narrow channel, opposite to Sir Henry Meux's house, it is very abundant—not floating upon the surface, but diffusing itself through the water, to which it imparts a rich emerald green colour. The diameter of the filaments is little less considerable than that of *Z. nitidum*, whose equal, if not superior in beauty, this fine species may be fairly considered.

*Zygnema quadrispirale?* Filaments of somewhat less diameter than those of *Zygnema nitidum*; cells from three to five times as long as broad; winding round the interior of these are spiral tubes, usually four in number.

*Zygnema neglectum.* Filaments of considerable diameter and length; cells rather longer than broad, lining the interior of which are spiral tubes, usually three in number, which in the young filaments perform collectively within each cell about six revolutions, but in the more aged filaments a smaller number. Spores occasioning no inflation of the cells.

I should have but little hesitation in referring this species to the *Conjugata adnata* of Vaucher; but abundant as it is, and frequently as I have observed it, I have never met with it attached to any object, but invariably free and floating, sometimes unmixed with any other species, but more frequently entangled among the filaments of *Z. nitidum* and *Z. quininum*. It is for this reason therefore that I hesitate to regard it as identical with that species. The filaments are intermediate in diameter between that of *Zygnema nitidum* and *Z. decimum*, to both of which it bears outwardly some resemblance. The number of spiral tubes varies, but is usually three; while in *Zygnema nitidum* the prevailing number is four, and in *Z. decimum* but two.

Abundant in the neighbourhood of Cheshunt.

*Zygnema pellucidum.* Filaments of more considerable diameter than those of *Zygnema rivulare*; cells usually seven or eight times as long as broad, never less than five, and frequently as many as ten times: four faint spires scarcely at all visi-

ble in the more aged filaments wind round the interior of each cell.

I suspect that the mode of conjugation of this species is angular, resembling that of *Zygnema curvatum*; but I am not certain that it is so.

In a pond in Mr. Yorke's brick-field near Cheshunt.

*Zygnema rivulare.* Filaments seven or eight inches in length, usually attached; cells varying in length from eight to four times their breadth, being at the period of conjugation nearly four times as long as broad: three spiral tubes wind round the interior of each cell, performing in those cells whose length exceeds the diameter by eight times from sixteen to twenty revolutions, and in those half as long as the preceding half as many revolutions.

The above is an exceedingly well-marked, and in this vicinity abundant species, and I am surprised that it has not before been described. It is most frequently attached either to stones or wood in the New Barge and Lea rivers, but it is occasionally found mixed up with other floating species in still water. The filaments nearly equal in diameter those of *Zygnema decimum*, from which however it is readily distinguished by the greater length of its cells, and the presence of three closely coiled spiral tubes: sometimes however there are but two spirals, and then the resemblance to *Zygnema decimum* is much greater.

*Zygnema Grevilleanum.* Filaments about equal in diameter to those of *Zygnema rivulare*, round the interior of the cells, which are generally about eight times as long as broad, but frequently much longer; two lax spiral tubes are disposed so as to cross each other and describe in each cell three or four oval spaces.

To this species, probably the most elegant of the genus, I have taken the liberty of assigning the name of Dr. Greville, author of the excellent 'Algæ Britannicæ,' as a slight mark of personal respect, as well as an acknowledgement of the eminent services rendered by that gentleman to natural history.

*Zygnema subventricosum.* Diameter of the filaments about equal to that of *Z. commune*; cells at the period of conjugation about six times as long as broad, but prior to that time frequently much longer: within the interior of each cell a single spiral tube performs five or six revolutions, and at the situation of the joints two short semicircular lines are to be noticed: spores large, occasioning the cells in which they are placed to assume a ventricose form.

This species is to be distinguished from *Zygnema commune* by its longer and ventricose cells, and by the presence of the curved lines at the joints, which are however met with in other species besides this.

In a small lake belonging to Mr. Bridgman near Cheshunt, and at other places.

*Zygnema æquale.* Filaments of less diameter than those of *Zygnema subventricosum*; cells usually eight times as long as broad, containing about six turns of a single spiral tube; spores oval, contained within the cells, the inflation of which they never occasion.

I have given this species, which cannot be confounded with any of the others described in this paper, the specific denomination of *æquale*, on account of the evenness of the filaments, which when they contain the spores never exhibit the smallest trace of inflation, and the uniform length of the connecting tubes.

= Neighbourhood of Cheshunt.

*Zygnema commune.* Cells about three times as long as broad, in the interior of each of which a single spiral tube performs about two and a half revolutions; spores not producing any inflation of the cells in which they are placed.

This species has occurred to me in the neighbourhood of Cheshunt, and in ponds at the back of the Norland estate, Notting Hill.

*Zygnema catenæforme.* Cells rather more than twice as long as broad, each containing about two revolutions of a single spiral tube; spores largely inflating the cells in which they are contained.

It is scarcely possible to distinguish the filaments of this species from those of *Z. commune* before conjugation: after this has occurred, the difference in the length of the cells and the form of these is so obvious as to leave but little doubt of its being distinct from that species. If a condition of any, however, it is of *Z. commune*.

Mr. Bridgman's pond, Cheshunt.

*Zygnema malformatum.* Cells about twice as long, in each of which a single spiral tube performs usually two revolutions: spores lying obliquely in the cells, which are a good deal distorted for their accommodation.

I should hesitate to regard this as distinct from *Z. commune*, but that it has occurred to me in considerable abundance, unmixed with any filaments which I could decidedly refer to that species.

Cheshunt.



*Zygnema brevissimum.* Cells scarcely so long as broad : a single spiral tube performs one turn and a half within each cell ; spores usually oval, but occasionally almost circular, their long diameter being placed transversely in the cells.

This species comes very near to the *Conjugata condensata* of Vaucher, who however represents the spores as being in that species always of a perfectly circular form. Those cells, which have not conjugated from some cause or other, frequently swell up and assume a beaded form.

Vicinity of Cheshunt.

*Zygnema polymorphum.* Filaments of less diameter than in any of the preceding species ; cells at the period of conjugation about three times as long as broad : a single spiral tube performs three or three and a half turns within each cell ; spores not occasioning any inflation of the cells.

The above is the description of the species in its regular form, from which, however, some of the filaments differ considerably. Thus, in some, many of the cells which have not conjugated are observed to have become inflated, and to present a very characteristic appearance ; in others, in which the cells are six times as long as broad, and which have not conjugated, spores completely formed, but of a very elongated shape, are placed one within each cell, the inflation of which these spores have not as yet occasioned : in a third set, which likewise have not conjugated, the spores have become perfectly formed, are much shorter, and now have produced considerable enlargement of that part of the cells in which they lie ; and lastly, in other filaments there is a regular alternate disposition of spores and empty cells.

This species comes very near to the *Conjugata inflata* of Vaucher, in which, however, the spores are represented as lying in inflated cells, which they do not in the species just described.

Vicinity of Cheshunt.

*Zygnema elongatum.* Diameter of the filaments rather less than in the preceding species ; cells very many times as long as broad, down the interior of which a single tube passes in a waved manner : at the situation of the joints, the apparatus for the division of the threads, appearing like two curved knife-blades, is situated.

This is one of Vaucher's species, and a very abundant one it is. It is mentioned by Mr. Dillwyn in his 'Synopsis,' but has been excluded from Harvey's 'Manual : ' the grounds of this exclusion I am not acquainted with. It is to be distinguished from *Z. tenuissimum*, on the one hand, by its longer joints, laxness of the spiral tube, and greater diameter of the



filaments; and from *Z. subventricosum*, on the other, by the less considerable diameter of its filaments, as well as by other characters.

New River Reservoir, Cheshunt.

*Zygnema parvum.* Filaments very slender; cells rather more than four times as long as broad, each containing about two turns of a single spiral tube; spores generally producing a slight inflation of the cells.

The filaments of this species are nearly as slender as those of *Z. tenuissimum*, from which it may be distinguished by its much shorter joints.

Vicinity of Cheshunt.

*Zygnema tenuissimum.* Filaments extremely slender; cells about nine times as long as broad, each containing five or six revolutions of a single spiral tube; spores producing a slight inflation of the cells.

This species is to be distinguished from all others of the genus which I have met with by the minuteness of its filaments.

Vicinity of Cheshunt.

\*\* Seeds produced without conjugation.

*Zygnema quadratum.* Filaments at first cylindrical; cells about nine times as long as broad, each containing from six to seven revolutions of a single spiral tube; spores oval, large, and much elongated, contained within quadrangular enlargements of the cells; tube of communication arising from the point of junction of two cells.

I find this remarkable species very abundantly in ponds on Cheshunt Common.

*Zygnema intermedium.* Filaments nearly equal in diameter to those of *Zygnema quadratum*; cells about five times as long as broad, round the interior of which a single spiral tube performs about four revolutions; spores oval, smaller than those of the preceding species, and not contained in quadrangular enlargements of the cells, but still producing a slight inflation of them: tube of communication placed at the junction of two cells in the same filament.

I have no doubt of this being specifically distinct from the preceding. It occurred abundantly to me at High Beech, Epping Forest, and I have since met with it in other localities.

*Zygnema angulatum.* Filaments at first straight, but at the period of reproduction becoming angulated, the angles being situated at the passage of communication set up by means

of a hollow process between almost every pair of cells in the same filaments; spores oval.

I met with sufficient of this species in the vicinity of High Beech to enable me to preserve several specimens of it.

#### GENUS TYNDARIDEA.

It has been surmised of the two little bodies into which the sporular mass in each of the cells of the species of this genus is invariably divided, that the one consists of fertilizable matter, and the other of that which is to be fertilized; and this supposition is in a measure supported by the circumstance of a channel of communication frequently existing between them, but it is opposed by the fact that these little masses are continually undergoing division and separation according to the growth of the filaments; so that each furnishes the material for two others from time to time, which themselves again undergo division. These sporular masses present a different form in each species, and are thereby doubtless designed to assist man in his endeavours to discover the differences between these minute productions; they are, in fact, to be regarded as so many seals placed upon them by their Divine Creator, by means of which they may be frequently distinguished from each other.

*Tyndaridea gracilis* of Vaucher? Filaments nearly equal in diameter to those of *Tyndaridea stagnicola*; cells four times as long as broad, sometimes five times, at first filled with sporaceous matter as in the species of the genus *Mougeotia*, which subsequently contracts into two rarely perfectly divided roundish masses.

It is most probable that the above species is the *Conjugata gracilis* of Vaucher, but this cannot be ascertained with certainty without seeing it in a state of reproduction. The filaments may however be readily recognised by the above description.

*Tyndaridea stagnicola.* Filaments slender; cells about two and a half times as long as broad; sporular masses somewhat cruciform; spores circular, contained within the cells, the diameter of which they entirely fill, as well as a portion of the connecting tube.

I cannot identify the above species with any described by Vaucher or Agardh. The filaments are more slender than those of *Tyndaridea bicornis*, but the species is to be distinguished from all others with which I am acquainted by the circumstance of the seeds passing a little way into the connecting tubes.

Abundant on Hertford Heath.

*Tyndaridea quadriformis*. Filaments more slender than those of *T. interposita*; cells rather better than four times as long as broad; endochrome divided into two quadriform masses.

The cells are longer than those of *T. interposita*.  
In ponds near Notting Hill.

*Tyndaridea interposita*. Filaments of less diameter than those of *Tyndaridea bicornis*; cells usually three or three and a half times as long as broad; spores circular, lodged within the cells; endochrome somewhat quadriform.

*Tyndaridea interposita* is to be distinguished on the one side from *Tyndaridea quadriformis* by the greater diameter of its filaments, but somewhat shorter cells; and from *Tyndaridea bicornis* on the other, in having longer cells, but somewhat finer filaments.

*Tyndaridea bicornis*. Filaments of more considerable diameter than those of *T. quadriformis*; cells usually better than twice as long as broad, but sometimes longer and sometimes shorter than this; endochrome consisting of two distinct masses united to each other by a lengthened tube of communication, and emitting a kind of ray or prolongation from each angle of their distal extremities: spores circular contained within the cells.

I have a suspicion that this is the species which is usually taken for the *Tyndaridea cruciata* of Vaucher, which has however filaments of more considerable diameter and rather shorter joints. It is by no means an uncommon species, but I have only met with it in a state of conjugation in the Diana pond, Bushey Park.

*Tyndaridea abbreviata*. Filaments of rather greater diameter than those of *Tyndaridea stagnicola*; cells usually a little longer than broad, but sometimes not so long; endochrome divided into two little masses, which, when magnified, resemble trees in miniature; these are connected by means of a transverse process, which may be compared to the trunks of the trees: spores circular, contained within the cells.

This species approaches somewhat near to *Tyndaridea stagnicola*, from which, however, I am satisfied that it is distinct, having had the opportunity of comparing the two species in specimens in which the spores were perfect in both. From *T. stagnicola* it is to be distinguished by the somewhat greater diameter of the filaments, and by the shortness of the cells, the spores appearing frequently to be in contact, so close are



they in this, while in *T. stagnicola* there is a distinct interval between them equalling that of the diameter of the spores themselves.

#### Genus MOUGEOTIA.

*Filaments* articulated, simple, at length generally united in pairs, either with or without the intervention of transverse tubes, and either angularly or parallelly. *Endochrome* at first filling the cells, but subsequently contracting into longitudinal or slightly spiral lines. *Spores* round, situated either in the cells or in the transverse tubes.

The genus *Mougeotia*, as above defined, appears to be a very natural one. The angular conjugation of the filaments is usually regarded as the most important characteristic of the genus. It is not so, however; for we have angular union of the filaments in an undoubted species of *Zygnema*, *Z. curvatum*. The character of most importance to notice is the circumstance of the cells being at first filled with granular matter, which subsequently generally contracts into longitudinal or slightly spiral lines.

*Mougeotia major*. Filaments of more considerable diameter than those of *Mougeotia genuflexa*; cells usually five or six times as long as broad; conjugation angular, and without the intervention of tubes.

This species approaches very closely to *Mougeotia genuflexa*, but differs from that species in the much greater diameter of the filaments and shortness of the cells.

In ponds in brick-fields near Notting Hill.

*Mougeotia glutinosa*. Filaments of rather less diameter than those of *M. genuflexa*, conjugating angularly; cells six or seven times as long as broad, those being the longest which have conjugated, at first filled with sporaceous matter, which frequently contracts into longitudinal lines: sporidium quadrangular, lodged between the filaments, which do not enter into its formation; spores when perfect somewhat oval.

This is a very distinct and fine species, occurring abundantly in boggy ponds on Hertford Heath. Not unfrequently a number of contiguous parts of cells unite, forming arched loops or links, separated from each other by the square ovarium, which is the chief characteristic of the species.

*Mougeotia transversalis*. Filaments more slender than those of the preceding species, conjugating angularly; cells about six times as long as broad, united by transverse tubes.

This is by no means an uncommon species, although it is



rarely met with in a state of conjugation : there is no other species of the genus with which it can be confounded.

Pond in the parish of Enfield.

*Mougeotia reticulata.* Filaments nearly as slender as those of *Vesiculifera bombycina*, conjugating angularly ; cells about six times as long as broad, united by transverse tubes of remarkable length.

Frequently a number of pairs of cells will unite in the same filament, as in *Mougeotia glutinosa* and *M. cærulescens* ; these however are not as in them contiguous pairs, but alternate, so that four or five filaments are sometimes united with each other by means of those alternate cells, which have not conjugated in the pair of filaments which were the first to become united.

*Mougeotia alpina.* On a careful examination of a specimen of this interesting Conferva, kindly forwarded to me by Dr. Greville, I came to the conclusion that it ought to be regarded as a member of the family of *Conjugatæ*, and that the conjugation was most probably angular. On informing Dr. Greville of my opinion, that gentleman wrote me word, that Mr. Shuttleworth, who had examined some of his specimens, had arrived at the same conclusion, and considered it to be identical with the *Seda capucina* of Bory, *Mougeotia capucina* of Agardh. This led me to compare specimens of both species, which I was enabled to do through the kindness and liberality of Dr. Greville, who has placed in my hands the whole of his valuable collection of *Confervæ* ; and the result of this comparison is, that I feel assured of the distinctness of the two species, the cells being in *Mougeotia capucina* many times longer than those of *M. alpina*. Outwardly the resemblance between the two species is very striking—the texture and colour being nearly the same in both, although the purple is somewhat richer in *Mougeotia capucina*\*.

*Mougeotia scalaris.* Filaments about equal in diameter to those of *Mougeotia genuflexa*, conjugating parallelly ; cells about four times as long as broad ; spores oval, lodged in the transverse tubes by which each pair of cells is united.

That this species is really to be regarded as a *Mougeotia*, notwithstanding its parallel conjugation, there cannot be the slightest doubt, from the circumstance of the sporular matter at first filling the entire cavity of the cells, and subsequently sometimes contracting into longitudinal lines, as in the other

\* Sir William Hooker has likewise with great liberality permitted me to make use of his collection of *Confervæ*, so rich in authentic species.

species of the genus *Mougeotia*. In no case is there ever any trace of division in the contents of the cells, nor are the spores ever circular: to both these points I particularly attended.

Pond in the parish of Enfield, also near Notting Hill.

*Mougeotia distans*. Diameter of the filaments about equal to that of *Mougeotia genuflexa*, extremities pointed; cells four times as long as broad, conjugation parallel, connecting processes very long; spores oval, contained within the cell.

I have only met with one specimen of this very distinct species.

Cheshunt.

*Mougeotia ovalis*. Filaments about two inches long, of rather less diameter than those of the preceding species, and conjugating parallelly; cells nearly twice as long as broad, those becoming inflated and oval which receive the spores, which are oval, and nearly fill the cavity of the cells.

Of this distinct little species I lately received two specimens from the Rev. David Landsborough, collected by that gentleman in the parish of Stevenston, Ayrshire: one of these happening fortunately to be in seed, I was enabled to ascertain its distinctness, which I otherwise could not have done with the same certainty. In young filaments the cells are so full that the joints are invisible.

*Mougeotia notabilis*. Filaments rather slender, not conjugating, at first cylindrical, but subsequently becoming angulated, the angle of flexion being situated in the centre of each cell; cells usually about eight or ten times as long as broad, but frequently longer; spores non-symmetrical, a single one being placed in the angle formed *in each of the cells*.

When I first noticed this singular species I was under the impression that it was to be regarded either as *Mougeotia glutinosa* in an incomplete state, with the filaments just about to unite to form the quadrangular sporangium, or as a distinct species that had not as yet arrived at the perfect stage of its formation; reflection, however, soon convinced me that neither of these ideas could be correct, but that it ought to be considered as a distinct and perfectly formed production, a view which I was at first most unwilling to adopt, for it presents in the circumstance of the formation of a spore *in each of the cells of all the filaments*, an anomaly which I am not able to account for physiologically; in all other cases the spores being the result of the union of the contents of two distinct cells, placed either in the same or different filaments. That

it is not *Mougeotia glutinosa* in an imperfect condition, is proved first by the smaller diameter of its filaments, but more especially by the position of the angles of flexion, these being placed indifferently on either side of the filaments, and not on one side, as would be the case were the filaments intended to unite with each other, so that this arrangement of the angles of the cells forms a positive obstacle to their union; for even were the cells all of the same length, which they are not, it would still be impossible for the angles of one filament to correspond so as to unite to form the sporangium with those of another filament: and that the species is in itself perfect and distinct in the condition indicated in the definition above, is established by the invariable presence of spores in all the filaments and the non-union of these.

Found in great abundance in ponds in some of the brick fields near Notting Hill.

The genera *Zygnema*, *Mougeotia*, and *Tyndaridea* merge through certain species into each other. Thus the genus *Zygnema* passes into the genus *Mougeotia* through *Zygnema curvatum*, this having relation with the one by its spiral tubes, and with the other by its angular mode of conjugation; and the genus *Mougeotia* into the genus *Tyndaridea* through the species regarded with doubt as the *Conjugata gracilis* of Vaucher, in which the cells are at first filled with endochrome, as in *Mougeotia*, which subsequently becomes divided into two roundish masses, as in the species of the genus *Tyndaridea*. This transition of one genus into the other does not, I think, affect the validity of either.

Accurate figures of all the above species have been preserved, as well as of those already described in British works, and all drawn to the same scale.

X.—*Excerpta Zoologica, or abridged Extracts from Foreign Journals.* By Dr. FELIX VON BÆRENSPRUNG.

To Richard Taylor, Esq.

DEAR SIR,

ANXIOUS on quitting Germany to possess myself as soon as possible of all information connected with physiology and natural history, and aware from experience of the difficulty of procuring many of the journals, and more especially the dissertations published in that country, some of which are of great value, I requested my friend Dr. F. von Bærensprung to forward to me short notices of what appeared from time to time. I have no doubt that these may be of as much interest



to some of the readers of the 'Annals' as to myself, and have therefore put them into English in order to place them at your disposal.

As many of the extracts may have a relation to papers previously published, but which have not been taken notice of in this country, I will endeavour to select some few passages which will bring the information on the subjects of which they treat down to the date of the notices communicated.

Soley Terrace, Pentonville.

Yours truly,  
W. FRANCIS, Ph. D.

#### ENTOZOA.

THE observations on intestinal worms are becoming daily more numerous, and all tend to show decidedly that there are yet many profound and dark mysteries, especially with regard to their metamorphoses and migrations, which have still to be unveiled.

Eschricht in a valuable memoir 'On the Origin of Intestinal Worms,' wholly rejects the notion of a *generatio æquivoca*, and maintains that intestinal worms originate in every case from individuals of similar genera; otherwise for what purpose would be the immense masses of eggs and young in the *Ascarides* and Tape-worms? In what form the intestinal worms find their way into other animals, it is not yet possible to say; but, as an answer to this question in part, it is very important to know that these creatures have recently been observed to undergo metamorphoses and to change their locality: we know of *Ligula* and *Bothryocephalus solidus*, that they only thrive and develop perfectly when they have passed from one animal into another. The observation that many fish have worms in their flesh only at certain periods of the year, seems likewise to indicate such migrations among Entozoa\*. Eschricht moreover regards, as of much importance, the question whether worm-diseases are contagious, as an explanation of the manner in which the contagion takes place can only be attempted when such is ascertained.

M. Streckeisen has communicated to the Naturalists' Society of Basle a notice in which he states that he had observed the number of Entozoa in the intestinal canal of several animals to decrease with the commencement of winter, and was thence led to conclude that most intestinal worms are annual, dying off towards winter, and being subsequently reproduced by eggs. This observation agrees perfectly with those of Eschricht, and we are now able to assert that the various periods of the year exercise an essential influence on the increase and decrease of Entozoa.

Prof. Mayer in Bonn (Müll. Archiv, 1842, p. 212. pl. 15.) found a

\* In Copenhagen, for instance, it is a common saying that no cod is fit to eat in those months which have no *r* in them, as their flesh then contains worms. Eschricht examined *Gadus Callarias* frequently in the months of May, June, July and August, and found *Echinorhynchi* in their flesh. Bearing in mind these facts, and the discoveries of Miescher, which will be subsequently communicated, there can scarcely be any doubt as to the migrations of the *Echinorhynchi*.—W. F.

*Tetrarrhynchus* inclosed in a distinct cyst beneath the peritoneal covering of the intestinal canal of a young *Testudo Mydas*, which confirms the view that the *Cestoidea* and *Cystica* are not essentially distinct, but can only be sections of the same family. Mayer calls this worm *Tetrarrhynchus cysticus*. Dr. Peters, in a note to the memoir in question, having compared it with Rudolphi's original specimen, pronounces it to be identical with *Tet. macrobothrias*.

Dr. Valentin (Müll. Arch. 1841, p. 435) found in the blood of *Salmo fario* a number of microscopical Entozoa possessing lively motions, effected by means of several variable appendages to one of the sides. Gluge has detected more recently a similar animal in the blood of a frog (ib. 1842, p. 140).

Vogt (ib. 1842, p. 189. pl. x.) has published some contributions to the history of the development of the *Filaria*. He found in the blood of several frogs a number of small worms resembling *Filaria*. In the same frogs were noticed in the ventral cavity several brown fibrous cysts, which were however all empty. In several other frogs were similar cysts filled with young *Filaria*, but in the blood none of these animals could be detected. In another frog several large *Filaria*, more than an inch in length, were situated in the ventral cavity. In the female sexual parts of these, Vogt found embryos which agreed in size and in form with the animals occurring in the blood. From these observations he considers himself justified in drawing the following conclusions: the young are deposited by the mother in the ventral cavity, bore their way into the vessels, circulate for a time with the blood, and are then deposited at suitable places for their development,—the viscera. From the inflammation of the tissues originate round about them fibrous cysts, in which they lie for a time, and then penetrate into the ventral cavity, and the young there produced by them now commence the same course of life.

#### ACARUS FOLLICULORUM.

Simon has described in Müller's Archiv, 1842, p. 278, an *Acarus* which lives in the diseased and normal hair-sacs of man. He calls the animal for the present *Acarus folliculorum*, from its occurring in the so-called comedones, diseased hair-sacs (*acne punctata*), which are frequent about the nose and mouth. It was noticed not only on corpses, but also on several healthy persons. Of ten living persons examined, it was found on three perfectly healthy and cleanly persons. It is on an average  $\frac{1}{10}$ ''' long, and  $\frac{1}{30}$ ''' broad, and occurs from two to thirteen in each comedon. Its motions are sluggish, and rarely for the purpose of changing its locality. The animal evidently belongs to the *Acari*; the parts of the mouth consist of a snout, the biarticulated palpi, and smaller bristle-shaped mandibles. The anterior part of the body is provided with four pairs of feet, which are three-jointed, and have three claws affixed to the last joint. Four distinct forms have been observed, probably different stages of development of the animal; the first is characterized by the presence of three pairs only of feet, while the other three forms have four pairs, and only differ by the relative size of the abdomen. At times heart-shaped bodies were met with, which Simon considers to be the eggs.

XI.—*The Birds of Ireland.* By WM. THOMPSON, Esq., Vice-Pres. Nat. Hist. Society of Belfast.

[Continued from vol. ix. p. 381.]

No. 13.—*Hirundinidæ* (continued).

THE HOUSE MARTIN, *Hirundo urbica*, Linn., is much more choice in his haunts than the swallow, and consequently is by no means so generally distributed over Ireland: in some of the less improved districts it may even be called a local species\*.

This species is, according to my observation, invariably later in its arrival in the north of Ireland than either the sand martin or the swallow, and generally appears about the middle of April †.

The "trim and neat" style of the generality of houses erected in the north of Ireland of late years does not present such facility for the nests of the martin as that of an older date, not only the "but-tress and coign of vantage" being wanting, but the less feudal, though to the martin equally useful appendage—the antiquated holdfast of the wooden spout, upon which its mud fabric was wont to be raised, and which afforded "ample room and verge enough" for the nest between its base and the spout that it supported. When in Ballymena in July 1833, I observed the predilection of the martin for the older houses to be so strongly marked, that against those in the older part of the town their nests were numerous, while not one was to be seen about any of the erections of late years. With reference to this propensity a second instance may be mentioned, which at the same time suggests another cause that to a certain extent influences the choice of site—that the martin is prone to return to its birth-place ‡. During a week's stay in the summer of 1833 in the picturesque sea-bathing village of Portstewart (co. Londonderry), which had been lately built, not one of these martins appeared, though the place was

\* In Scotland, on the other hand, the house martin, according to Mr. Macgillivray, "is more widely dispersed" than the swallow.—British Birds, vol. iii. p. 575.

† Mr. Blackwall states that the average time of the martin's appearance at Manchester is the 25th of April, as that of the swallow is the 15th of the same month. It is observed by Mr. Hepburn, that "the house martin arrives at the village of Linton on the Tyne in the last week of April, though in 1839 a few were seen by the 17th of that month."—Macgillivray's British Birds, vol. iii. p. 580. In the same work, p. 592, it is mentioned, on the authority of David Falconer, Esq., "that for the very long period of forty successive years, a pair of them had come to Carlowrie either upon the 22nd or 23rd of April."

‡ Mr. Jesse, in the second series of his 'Gleanings in Natural History,' gives the following extract from the unpublished journal of White of Selborne:—"July 6, 1783. Some young martins came out of the nest over the garden door. This nest was built in 1777, and has been used ever since." A friend has remarked that a nest built against a spout-head in York-street, Belfast, was occupied for four years successively. By Capt. King, R.N., and Mr. Weir, it has been proved that the same birds return annually to the same locality.—See Macgillivray's British Birds, vol. iii. p. 592.



in many respects peculiarly suited to them. Although they had not taken up their abode there, yet in the high and time-worn precipices which rise above the ocean at only a short distance to the eastward of the village, martins were always to be seen, seeming especially graceful as they glided to and from their nests, beneath the summit of the stupendous basaltic arch that rises at the base of the isolated rock on which the ruin of a castle is situated—a locality which I understood they had always frequented.

This *Hirundo* is so partial to the noble basaltic precipices which form the leading features of the north-east coast of Ireland, as in the more genial seasons of the year to be ever seen about them. Throughout their entire range, and against their gloomy cliffs, “its pendent bed” is erected\*. About the sea-girt rocks of the peninsula of the Horn in Donegal, those near to Ardmore in the county of Waterford, and other similar localities, I have remarked its presence †. Martins occasionally build against the arch of the bridge. Toome bridge (over the Bann) contained a great many of their nests in 1834, and for a long period is said to have been a favourite haunt: the most lofty edifices are also selected for this purpose.

“It has been observed (says White, in the sixteenth letter of his ‘Natural History of Selborne’) that martins usually build to a north-east or north-west aspect, that the heat of the sun may not crack and destroy their nests; but instances are also remembered where they bred for many years in vast abundance in a hot, stifed inn-yard, against a wall facing to the south.” On this subject the following note was made on the 15th July, 1832:—I this day observed twelve or thirteen nests of the *Hirundo urbica* built against a two-story house at Wolfhill. These were all on the north-west side or front, excepting one, which was at the north-east corner. The other two sides of this house have in part a southerly exposure (S.W. and S.E.), and being fenced in are consequently more private (a road passing those preferred by the martin)—on every side the facilities for its building operations are the same. In front of a thatched

\* Dr. J. D. Marshall, in his memoir ‘On the Statistics and Natural History of the Island of Rathlin,’ remarks, that the house martin “is the most numerous of the genus in Rathlin, where it is found in all parts of the island, as well inland as along the cliffs which overhang the sea.” Those preferred for nesting are said to be “the range of white [limestone] cliffs running along the north-western side of Church Bay.” In rocks of a similar kind, but in a very different scene, I myself observed a great number of the nests of the martin in June 1835. This was in the chalk-cliffs which rise above the river Derwent, near the village of Cromford in Derbyshire. The nests were built in as far as possible beneath the hanging rocks, in the same manner that they are under a projecting roof.

Dr. Marshall, in the same memoir, mentions that one of these birds which he shot “had its mouth completely filled with insects, among which were a large dragon-fly and one of the *Tipulæ* [*T. oleracea*].” White of Selborne states that swifts and sand martins feed on *Libellulæ*.

† “They breed in the Pyrenees in the rocks in vast numbers, as in the Alps, often far from the habitation of man.”—Cook’s Sketches in Spain, vol. ii. p. 275.

cottage not more than eight feet high, and which is not only at the side of the highway, but constantly resorted to as a public-house, I remarked several nests of the martin. In the rear of this cottage, which is fenced off from the road, and its walls (from the building being on the side of a hill) considerably higher than in front, none of the nests appear. I recollect that some years ago this species built annually in front of the dwelling-house at Wolfhill, not more than a single nest occupying either gable; and that in considerable numbers their nests were displayed in front of two lofty houses in Belfast. Judging from the situations selected by the martin for its nests on these five houses (the three first mentioned being only a few hundred yards apart), it would seem that the bird is more influenced by the front of a house than by aspect, as the first faces the north-west, the second and third the south-east, and the fourth and fifth the south. In innumerable other instances I have remarked that where facilities for building are similar on all sides the house, the front was thus preferred by the martin, although the nests were opposite every point of the compass, a fact which is particularly apparent in houses situated in streets which intersect each other at right angles. The aspect of the cliffs before mentioned as being tenanted by the martin is as different as that of the houses. One reason why the fronts of houses are thus preferred (and in the instances mentioned we find them to be equally so from the low cottage to the four-story house) is probably on account of the more open space in front allowing of a freer range of flight to and from the nest.

Mr. Selby remarks of this species, that the nest "is closed all around, except a small orifice, usually on the most sheltered side," &c. My observation on the side of the nest chosen for entrance in the north of Ireland does not accord with this, as in nests closely adjoining I find the aperture on every side; as an instance of which it may be mentioned, that of nine nests in front of a house before alluded to, the entrance appeared on the north, south, and west sides, the wall against which they were placed occupying the eastern. On this house—as is not unfrequently the case—several of these architects had, like certain other bipeds when erecting their habitations, taken advantage of their neighbours' gables, and it may be presumed, for a similar reason—that of being saved trouble and expense of labour. All the nests of the martin that I recollect to have seen, with a solitary exception, had the entrance close to the top; but in this instance, although the nest was built against the wall of the house, and beneath a projecting roof, the aperture was placed rather above the centre, in the same manner as that of the wren (*Troglodytes Europæus*). The entrances to other nests on the same house (which is four stories in height) were as usual.

Although the nest of the poor martin is often in this part of the country torn away from the houses of persons who imagine themselves to be possessed of good taste, yet there are others, who, disliking the harsh contrast between its clay-built shed and the snow-white walls of their mansions, and unwilling at the same time to

disturb the summer wanderer, have, for the sake of uniformity, had its domicile whitewashed at the same time with their own. I first noticed this in the town of Antrim, where on two houses several nests thus appeared, and was pleased to see their architects flying in and out, thus evincing their contentment with the change. In Hillsborough I afterwards remarked that the same practice had been adopted.

The statement of several continental authors, that house martins, on finding sparrows in possession of their nests, had been known to rise *en masse*, and fill up the entrance when the intruders were within, would seem from the silence of some of the latest British writers of authority on the subject, not to be credited by them. The compiler of the 'Architecture of Birds' sets it down as a "fanciful legend;" but I have unquestionable testimony that a case precisely similar to those related by the authors alluded to, occurred in the next farm to our own, near Belfast, in 1832.

When the house martin returned in that year to a long thatched cottage (belonging to Mr. John Clements) where they had built for many years (and which in that year displayed fourteen of their nests), a pair found that sparrows had taken possession of their domicile. On perceiving this, they kept up such "a chattering about the nest" as to attract the attention of the owner of the house. After its continuance for some time, apparently until they were convinced that the sparrow was determined to retain possession, they flew away, and did not return for a considerable time, when they re-appeared with about twenty of their kindred. With their assistance they immediately commenced "claying up the entrance to the nest." This was done in the course of the day, and next morning the pair of martins commenced the construction of a new nest against the side of their old one, and in it, undisturbed, reared their brood. After some time, the proprietor of the cottage, who had never heard of any similar case, had the curiosity to pull down both nests, and in that occupied by the sparrow found its "rotten corpse," together with several eggs. A particular note of the entire proceeding, as related by Mr. Clements, was made by my brother soon after the occurrence; but to make "assurance doubly sure" before publishing the account, I inquired today (November 2, 1841) of the same person whether he remembered such a circumstance, when he repeated it just as narrated nine years before. Some other persons too of our mutual acquaintance were witness to the chief parts of the proceeding, and saw the sparrow and its eggs in the sealed-up nest\*.

What appears to me the most singular feature in this case is, that the sparrow would remain in the nest, and allow itself to be entombed alive; but this bird was sitting on the full complement of eggs, and which were probably in the last stage of incubation, when we know that some birds leave the nest only to procure such a scanty

\* Three recent occurrences of a similar nature are recorded by Mr. Weir (Macgillivray, *British Birds*, vol. iii. p. 591), and two others are alluded to under the head of "Swallow" by the Bishop of Norwich, in his 'Familiar History of Birds,' vol. ii. p. 55, 3rd edition.



morsel as will barely support life, and will occasionally allow themselves to be lifted off their eggs, and when placed on again, continue to sit as intently as if they had not been disturbed. The filling up of the aperture is not in itself a singular proceeding on the part of the martin\*; but on this occasion, when the assistance of their neighbours was called in, would almost seem to be intended as an act of retributive justice on the sparrow. Their building against the side of the old nest is quite a common occurrence.

I have heard the call of this species exerted to the no little annoyance of persons engaged in the cruel task of pulling down their nests, when the sufferers become as vociferous as their "weak voices" will permit, and thereby attract their neighbours from all quarters, who make common cause with them, each and all endeavouring to deter the spoiler from his work of destruction, "occasionally flying boldly and at the risk of their lives within reach of his outstretched hand; and again, with all the eloquence they can master, seeming most piteously to claim the edifice as theirs †." Martins are generally silent birds, but when congregated for migration their call is often almost incessantly uttered.

This species generally rears two broods during its sojourn. So late as the 23rd of September several old birds were observed to fly so repeatedly to their nests, that I had no doubt they at the time contained young ‡. The second brood is generally reared in the same nest as the first, but it is probable that when the nest is not found suitable for the purpose, a second erection is undertaken, as on the 17th of July I remarked seven nests in front of a house, which in the month of October contained nine.

Notes in illustration of Mr. White's remark ('Hist. of Selborne,' letter 18), that the young swallows "at once associate with the first broods of the house martins, and with them congregate, clustering on sunny roofs, towers, and trees," need not be offered; but it may

\* Mr. Blackwall, in his 'Researches in Zoology,' states that a pair of martins, on returning in the spring to the nest of the preceding year, endeavoured to dislodge the bodies of their young, which had been deserted; but finding their efforts in vain, "closed up the aperture with clay, thus converting the nest into a sepulchre."

† Audubon (Ann. of Lyc., vol. i. p. 165) mentions a similar trait in the history of an American species, the *Hirundo fulva*, in the following words:—"The energy with which they defended their nests was truly astonishing. Although I had taken precaution to visit their nests at sunset, when I had supposed they would all have been on the sycamores, yet a single female happened to be sitting, and she gave the alarm, which immediately called out the whole tribe. They snapped at my hat, my body, and my legs, passed between me and the nests within an inch of my face, twittering their rage and sorrow. They continued their attacks as I descended, and accompanied me some distance."

‡ In a note contributed to Mr. Bennett's edition of White's 'Selborne,' p. 61, a particular instance is detailed of a pair of martins remaining behind for the purpose of bringing their progeny to adolescence, instead of migrating with the great body of their companions. That the young are often deserted at such times by their parents, has been fully proved by Mr. Blackwall.

possibly be worth observing, that more than once the martin has been noticed by me in company with the swallow in autumn, at places remote from its breeding-haunts. When with Mr. Wm. Sinclair at the Falls, on the 6th of September 1832, immense numbers of both species were seen in company, and flying so close to the ground as occasionally to stop for a moment, and apparently take their food from the very grass. They also alighted in multitudes on the fruit-trees in the garden, and notwithstanding their decided predilection for perching on dead branches, they on this occasion chose especially for that purpose two large cherry-trees in full foliage. Amongst these birds appeared a solitary sand martin, a species which, as well as the martin, was never before seen about the place, and near to which neither species has any nestling-place. From observing the swallow and the martin thus congregated for some time previous to migration, I have little doubt, great as is the disparity in their powers of flight, that they often leave this country together; indeed both species have been observed to alight in company on vessels very far out at sea\*.

Respecting the separate migration of the martin, it may be mentioned, that on the 24th of September 1834, when about Toome bridge, I observed about a hundred of these birds congregated, no other species of *Hirundo* being in the vicinity; and on the eighth of October, when riding near Belfast, a very strong south-west wind prevailing, about twenty martins in a loose flock flew across the road, and proceeded for some time against the wind, at not more than from fifteen to twenty yards' distance from the ground. They, probably from feeling the wind too strong against them, at length wheeled about, rose very rapidly until they attained a great elevation, and in the act of still mounting higher disappeared from my sight, all this time having the wind with them. These birds were believed to be migrating. Feeling the effects of a powerful contrary wind, they may, as some persons believe the *Hirundines* generally to do, have ascended thus high in search of a more favourable current. On this occasion, however, they may not have been successful, as the clouds (which were moderately high) were borne onwards in the same direction as the wind which swept the earth.

The martin is generally stated to remain to a later period in England than the swallow, but I do not recollect any year in which the swallow was not the last of its genus to depart from the north of Ireland.

In the spring and summer of 1841 I observed the house martin as follows:—When sailing from Malta to the Morea, and about fifty miles from Cape Passaro (the nearest land), on the 23rd of April, one of these birds flew into the cabin, and died soon afterwards: it had not met with any molestation on board. No more were seen until the morning of the 27th, when, nearly one hundred miles west of the Morea, a few appeared, and remained through the early part of the day, confining their flight to the lee side of the ship: in the afternoon

\* C. L. Bonaparte in Zool. Journ., and Bloxham in Mag. Nat. Hist.

still more were seen hawking about in company with *Hir. rustica*; as flies were numerous, they probably obtained plenty of food: at four o'clock p.m. all were gone. On the 30th of April this species was just commencing nest-building against the houses in the town of Navarino; in May I remarked it to be common about Smyrna; in June at Patras, where it was as usual building against the houses in the town; at Trieste in the same month it was numerous, as it likewise was in July about Venice, Verona, and Milan—in the last city having fine nestling-places about the magnificent Arch of Peace, where its “cradle” was supported on the sculptured leaves adorning the ceiling of the gateway. This notice, compared with that of the swallow, as seen during the same tour, shows that, as in our own northern climate, the *H. rustica* is much more generally distributed than the *H. urbica*.

The most complete history of this species, as observed in the British Islands, appears in the third volume of Macgillivray's ‘British Birds,’ where the author and his contributors, Mr. Hepburn and Mr. Weir, each and all treat very fully of it from personal observation, the two latter gentlemen having watched its progress of nest-building, frequency of feeding young, &c., with the most praiseworthy and extraordinary patience.

**SAND MARTIN, *Hirundo riparia*.** Linn. As the swallow is much more abundant than the house martin in Ireland, so again is that species considerably more numerous than the sand martin:—the last is everywhere a local species. It resorts to suitable places in all quarters of the island.

The sand martin arrives the earliest of the *Hirundinidæ* in the north of Ireland, appearing occasionally at the latter end of the month of March. In 1828 several were seen in a mountainous situation near Belfast by Mr. Wm. Sinclair and myself, on the 29th of that month, and when pointed out to the respectable farmer at whose place they appeared, he assured us they had been seen there several days before that time.

The observation of the eloquent Wilson (Amer. Ornit.), that the sand martin “appears to be the most sociable with its kind and the least intimate with man of all our swallows,” has been objected to as erroneous\*, but my observation leads me to consider it as critically correct. Although the sand martin never tenants the swift's favourite abode, the tower or the steeple, attaches not its nest to our dwellings like the martin, nor with the swallow claims the roof of our out-houses for its protection, yet it is in a considerable degree benefited by the operations of man. The excavations in the sand-pit are, when carried to such an extent as to form a high perpendicular front, the means of affording to this bird a place to rear its young in comparative security, and it appears to me that such banks are selected, whether adjacent to or remote from houses, solely from their adaptation to its purposes, and not because it either seeks or “shuns human neighbourhood.” The species is as partial to the precipitous

\* Rennie, in his edition of Montagu's Orn. Dict. p. 20.



banks which in the very wildest localities rise in picturesque beauty above the river or the lake, as to the stratum of sand which overlies the quarry, or to the sand-pit, where the respective operations of quarrying for stone or excavating for sand are daily in progress.

To the banks of a spacious sand-pit close to the old Malone road, and within a mile of Belfast, a colony of these birds annually repair. Here, in consequence of the sand being in great demand for building purposes, they have the labour of making entirely new excavations for their nests at least once, and occasionally twice, in the season. So great is the demand for this sand, that although the excavation made by the bird will, when the bank is soft, sometimes extend five feet inward, I have known the bank colonized by it to be required for use before the first brood had escaped; and in such case, the labour of forming a second burrow in the same season was commenced.

On the 29th of April 1832, an observant friend informed me, that, of the sand martins' excavations in this place, thirty-two were then made, and that about three days afterwards two more appeared; he also observed the birds employed in carrying hay and feathers into them. When visiting this place on the 18th September of the same year, I reckoned seventy of the perforations of this species.

May 18, 1833.—On the south side of the Malone sand-pit, the sand martins have, since their arrival this season, excavated above eighty holes towards the top of the bank\*, some of them not more than two inches apart, although there is an abundance of room; so much indeed that the colony does not occupy more than one-fiftieth part of the bank suitable for their nests.

May 27, 1833.—No excavations have been made here by the sand martin since the 18th inst. †

Of the places around Belfast resorted to by this species, are two, differing much in character; the one a portion of the bank of the

\* In this locality, where the birds have a choice of banks from thirty to forty feet in height, and the sand is of a similar nature throughout, they always select situations where they are most out of the reach of enemies of all kinds; so that it cannot here be said that "they exercise their propensity [for boring] without reflection."—Macgillivray's Brit. Birds, vol. iii. p. 599. Where they have not thus had a choice, I have frequently seen their burrows in places where they were subject to be destroyed.

† Sand martins were a full month later than usual in their arrival in the north of Ireland in the spring of 1836 (when all the spring migrants were late), and but comparatively few made their appearance even then. The sand-pit above alluded to, and their chief haunt in the neighbourhood of Belfast, was entirely deserted by them in the summer of that year; and, from the progress of the excavation, not a burrow of the preceding season remained to denote that the species had ever been there. In 1837 I omitted to look after them, but in 1838 they were in numbers here as usual. On visiting the locality on the evening of the 11th of May I saw not less than sixty of these birds flying about, and so many were giving utterance to their feeble note, as to produce a considerable noise. Their burrows of this season were scattered over the entire eastern façade of the sand-pit; and, as usual, all placed near to the top of the bank. At the entrance to three of these holes sparrows were stationed.

river Lagan, elevated not more than six feet above the usual level of the water; the other, a stratum of hard sand only a few feet in thickness, overlying the limestone of an extensive quarry, at an elevation of about 600 feet above the sea; but at these places a few pairs only breed\*.

Where banks suitable to the mining operations of the sand martin offer a secure abode in the vicinity of Lough Neagh, the species, as may be inferred from its partiality to water, is abundant. The precipitous sandy banks rising above this vast expanse of waters in Massareene deer-park, near Langford Lodge, and at Glenavy river †, three localities within the distance of a few miles, are resorted to by great numbers.

These birds are so widely distributed over Ireland, in similar situations to those described, that it would be needless to particularise them any further. The most exposed locality in which I have noticed them was about the banks where the river Bush joins the ocean near the Giants' Causeway ‡.

When at the Malone sand-pit on the 18th of September 1832, no sand martins appeared. Upon inquiry I learned that the whole colony, excepting a very few birds, had taken their departure about a fortnight before that time. When here on the 1st of October 1833, I was informed that they had departed ten or twelve days previously §. In both years, after the great body of these birds had mi-

\* September 1840.—The latter locality has for some years past been entirely deserted.

† Where this river falls into Lough Neagh, Mr. Hyndman, on the 16th of August 1836, remarked several hundreds of these birds congregated, and that about fifty at a time would alight on the beach of the lake, which is there earthy and gravelly. It was very stormy, and the wind blowing upon the shore. The birds did not appear to be feeding when on the ground. Sir Wm. Jardine witnessed a proceeding, similar in some respects, which he relates in the following words: "We once observed many hundreds of the sand martin resting on the sands of the Solway Firth, upon a space not exceeding two acres; a small stream entered the sea, and they seemed partly resting and washing, and partly feeding on a small fly that had apparently come newly to existence, and covered the sands in immense profusion."

‡ Of the seven burrows of sand martins in the county of Antrim, noticed in this paper, five are contiguous to water, to which I believe the species to be partial, although, to use the words of Mr. Macgillivray, they "take up their abode in situations favourable to mining, whether there be water near them or not."

§ On a visit to this place on the 10th of September 1840, not a bird was to be seen, but less than a mile distant I saw several associated with house martins and swallows, of which the latter especially were abundant. The burrows of the sand martin here, this year, are fewer than ever known to me, except in 1836, when there were none at all. Now there are but a few holes at the western and at the southern side, about a dozen at each place. The repeated injuries these poor birds have suffered here, from the banks where they nestled being excavated during their stay, led me to believe that they might have changed their quarters, but in the present season (1842) they are as numerous as ever. They were very late in arrival this year, but all at once on the 25th of April the whole colony—about seventy in number—appeared.

grated, I remarked a single individual, in one instance associated with the swallow, and in another with the martin and it together; and in both cases remote from their burrows. They alighted on houses and trees along with their congeners, as well as accompanied them in flight. In neither year were these sand martins seen after the other species were gone, whence it may be presumed that they set out with them on their migration.

Aristotle mentions the sand martin as frequenting the valleys of Greece, and it was with much gratification that in the first valley, or rather defile, of the Morea visited by me, I saw several of them. This was on the 30th of April, when walking between Navarino and Modon.

Audubon gives a very full and interesting account of this bird as an American species. In Macgillivray's 'British Birds' (vol. iii.) is a very good description of it by the author, enriched by valuable contributions from Mr. Weir and Mr. Duncan.

[To be continued.]

## XII.—*Information respecting Scientific Travellers.*

In a letter to a friend in Belfast, dated Syra, June 27, 1842, Mr. Forbes says:—

“This is the first opportunity I have had of writing to you, or any one else, since the end of February. After the *Beacon* left Xanthus, Spratt, Daniell, and I, struck into the interior, and wandered about Lycia in all directions until the first week in June. During all that time we had no communication with Europe, and heard no news of any kind—were even completely shut out of the world; but our tour was so intensely interesting, that we did not miss it. Every day we discovered the ruins of cities which have long been lost, and the geological and botanical features of the country were of the highest interest. Daniell has written a letter to the ‘*Athenæum*,’ giving a notice of our antiquarian discoveries, so that I need not detail them here\*.

“On arriving at Rhodes, after being as nearly lost as near could be, crossing the sea in a little Turkish caique, I found a parcel of letters\*\*\*. After waiting seven days at Rhodes we took our passage in a caique for Syra. The second day I was seized with fever, and for eight days lay in a dreadful state in the hold of the caique without medicine or advice. At last a providential wind blew us to Syra, where finding the *Isabella* accidentally in the port we made application through the consul to put her in quarantine, and go to Paros. This was at first refused, but afterwards granted, and my life was saved, for if I had remained two days longer in the caique I should

\* This appeared in a late number of the ‘*Athenæum*’; as in that of Aug. 6, did a notice of the winter tour of Mr. Forbes and Mr. Hoskin, communicated by the latter gentleman to the Geographical Society.



assuredly have died. I am now recovering under Harvey's charge, but must rest myself for a month to come on board the Beacon."

In another letter, dated H.M.S. Beacon, Paros, July 18, 1842, Mr. Forbes mentions his being then quite recovered from fever, though not very strong.

## BIBLIOGRAPHICAL NOTICES.

### *Ninth Annual Report of the Royal Cornwall Polytechnic Society.*

Amongst other valuable matter the present report contains an essay on the Zoophytes of the coast of Cornwall, by Mr. Couch, for which the first silver medal of the Society was adjudged. We noticed among other rare and local species there enumerated, the following: *Sertularia Ellisii*, *S. nigra* and *S. pinnata*, *Plumularia pennatula*, *P. Catharina* and *P. myriophyllum*, *Caryophyllia Smithii*, *Actinia bellis*, *Valckeria uva*, *Hippothoa lanceolata*, *Cellepora Skenei*, *C. lævis* and *Lepralia trispinosa*. *Lepralia hyalina* is placed amongst the *Tubuliporidae*, whereas there can be no question of its really belonging to the genus *Lepralia* of Johnston, as proved by the presence of opercula upon some of the cells. In addition to many rare species, we find also descriptions of some new ones, the characters of which we here subjoin.

#### Trailing Coral.—*Tubulipora trahens*.

*Spec. Char.* "Polypidom calcareous, creeping, adherent throughout, irregularly and sparingly branched, narrow, with one or two rows of tubes projecting from the upper surface.

*Hab.* "On stones and shells from deep water, not uncommon: Polperro.

"The polypidom varies from a quarter to one inch in length, but is very narrow and slender. The tubes are commonly single, but sometimes are in pairs and project considerably; sometimes in a straight and sometimes in a waved manner. When the tubes are in pairs they are always close together, but each pair are distant from each other in the lengthways of the polypidom. I am unable to refer this to any described species."

#### *Tubulipora deflexa*.

*Spec. Char.* "Polypidom erect, cylindrical, with waved tubes projecting from all parts.

*Hab.* "On shells from deep water, common: Polperro, Mevagissey Bay, and off the Deadman Point.

"This species is very common; it varies in height from one quarter to half an inch; it is calcareous, white, cylindrical, with sometimes an enlarged globular head. The tubes arise from all parts of the polypidom, and greatly project in a waved form; they are shorter above than below, and their apertures are even and unarmed. The base is slightly spreading, and of a darker colour than the upper portions. I have been unable to identify this with any described species."

#### *Tubulipora Fungia*.

*Spec. Char.* "Polypidom pedunculated, the upper portion expanded

into a flat, round surface; tubes projecting from the upper part of the circumference; centre nearly plane."

*Tubulipora penicillata?* Turton's Lin. vol. iv. p. 615.

"*Hab.* On shells and stones, and shells from deep water; common from the Eddystone Lighthouse to the Deadman Point.

"It is calcareous and about a quarter of an inch in height; the upper portion is expanded into a flat head, having on its superior surface one or two rows of projecting tubes round the circumference; the centre is either plain or marked with a few irregular cells. The cells are distant from each other, with slightly oblique unarmed apertures. The under surface of the head is furrowed without cells, and sloped into the footstalk."

*Flustra Peachii.*

*Spec. Char.* "Encrusting; cells radiating; apertures oval, unarmed, with two punctures at each extremity.

*Hab.* "On dead muscle and oyster shells, in the Fowey River, off the Deadman Point: common.

"Encrusting, membrano-calcareous; cells ovoid, having their longest diameter in the axis of growth; at each extremity two minute apertures; apertures even and unarmed. The cells, which have a radiating distribution, appear somewhat confused from their radiating from so many points and intermingling with each other.

"This species was first found by Mr. Peach of Gowan in the Fowey River; since that time, in company with him, I have found it abundantly encrusting almost every cell dredged up from Mixtow to the mouth of the river. I have since found it in deep water west of the Eddystone and nine leagues south of the Deadman. Not being able to refer this to any described species, and having submitted it to a gentleman well versed in the subject, who has pronounced it new, I beg to give it the name of its discoverer."

From an examination of Mr. Couch's paper it is evident, as might have been looked for from the rocky nature of the coast, that the calcareous species of zoophytes are particularly abundant on the Cornish shore.

## PROCEEDINGS OF LEARNED SOCIETIES.

### ROYAL ACADEMY OF SCIENCES OF BERLIN\*.

March 3, 1842.—M. Müller read a notice on some Pathologico-Anatomical Observations on Parasitical Forms made during a journey in Sweden in company with M. Retzius.

When occupied last August in Bohuslän in dissecting different sea animals, MM. Müller and Retzius had occasion to examine a dorse (*Gadus Callarias*) with a lean tail, which, according to the statement of the fishermen, was not eatable on account of sickness. The seat of the disease was the natatory bladder, in which was found a considerable quantity of a yellowish smeary matter without smell. Seen under the microscope it appeared of a very peculiar nature, containing

\* From the 'Berichte der Akademie der Wissenschaften zu Berlin.' Communicated by W. Francis.

small bodies of from 0,00058–0,00068" in length, which resemble in form the ribless *Navicula*, or Agardh's *Frustulia coffeiformis*. They consisted of two plates (*Schälchen*) united in the centre by a granular substance. The bodies are at the commencement undivided, they afterwards split lengthwise, and are only held together by the granular substance; at last they appear to separate completely. They are formed in cells, in which several were found together. From this and from the want of silica in the plates, they are perfectly distinct from the *Naviculae* and similar infusoria: they appear to belong, together with the Psorospermia of fishes, to a peculiar section of parasitical, vegetative organic forms of specific structure.

The authors have also instituted some inquiry into the development of fungi in the lungs and air-cells of birds. It is not the mould in the lungs of birds just dead, described by Messrs. C. Mayer, Jäger, Heusinger, Theile, and still more recently by M. Deslongchamps, but flat fungous bodies of a firm and uncommonly tough substance. M. Deslongchamps evidently had them before him, they formed the substratum of the mould filaments, which were developed in the lungs and air-cells of a diseased asthmatical eider duck; but he is mistaken with regard to the principal thing, as he considers this disease as an albuminous exudation. The fungoid bodies have been observed once in Stockholm and once in Berlin under quite similar circumstances. The first case was that of a *Stryx nyctea* from Lapland, which lived a part of the winter in Stockholm, but became sick and short-breathed, and then died. It was dissected by M. Retzius. The preparation has been preserved a long time in the Anatomical Museum at Stockholm. The lungs and air-cells are everywhere covered with fungoid, flat, circular, whitish yellow bodies, which have concentric rings on the surface, are in general somewhat hollowed out in the centre, and sometimes provided with cup-shaped corpuscles on the surface, of very small size, measuring from one to two lines and more in diameter. They have a firm hold, but may be removed without injury to the mucous membrane. Several adjacent ones also join, and then have the outer rings in common. At two places the air-cells were thickly covered with confluent bodies from 1 to  $1\frac{1}{2}$  line in depth, so that there was a continuous, firm, and almost cartilaginous layer. The second case observed in Berlin was that of an old marsh harrier, *Falco rufus*, which, after having been shot in this neighbourhood two years before, had been brought to the Zoological Museum. A student, M. Dubois, found several white, cup-shaped, flat bodies in the air-cells, and brought a piece of the ventral part of the trunk with the kidneys, which were lined with some of them, to the dissecting-room, asking what they could be. M. Müller could not perceive any structure in them. In Stockholm, last autumn, there was again an opportunity of inquiring into the structure, but it was not attended with success. The firm tough mass appeared under the microscope as if coagulated. M. Retzius since presented a half of the preparation to the Berlin Museum, which afforded M. Müller the opportunity of devoting a longer time to the microscopic investigation of these enigmatical bodies. They certainly possess some structure, but it is



not everywhere perceptible ; in many places, where fortunate sections were made, perfectly transparent and very minute ramified filaments in an amorphous substance were evident, of a nature so clearly vegetable, that they need but be seen to be convinced of such being the case. MM. Link and Klotzsch at once pronounced them to be vegetable. Still more doubtful are other less regular and thicker filaments, which are here and there ramified, and are characterized by their inflated margins ; they are also sometimes separated into single ball-shaped bodies. The vegetable nature of the disease is therefore not to be doubted. The mould filaments existing in two places on the confluent disease, which are nowhere else to be found on the hard surface, are evidently something secondary, as so often happens with regard to fungi. The mould filaments have no resemblance with the filaments in the interior of the disease, are thicker, and evidently articulated, which M. Deslongchamps overlooked ; in some spots, capitate asci may be seen, whose clavate ends are covered all round with green spores ; they are also found between the filaments. This mould is evidently an *Aspergillus*.

Organs of fructification were not perceived in the fungoid bodies ; the latter therefore remind us of the enigmatical *Sclerotia* : direct observations on the latter, namely, *Sclerotium semen*, and *complanatum*, showed however no agreement. *Dacryomyces stillatus* showed still less resemblance in the structure.

[The paper of M. Deslongchamps above alluded to appeared at p. 229. vol. viii. of this journal, and we then called the attention of our readers to the observations made by Mr. Owen in 1832, in his Notes on the anatomy of the Flamingo. In a subsequent number (56. p. 131) Mr. Yarrell communicated a notice of the observations of Col. Montagu on the same subject, which were published so early as 1813. All these observers seem to have overlooked the fungoid bodies on which the mould is developed.—ED. ANN.]

March 10.—M. Kunth read the first part of a treatise *On the natural group of the Liliaceæ taken in its widest sense*, in which his aim was to prove, that if the *Liliaceæ*, *Asphodeleæ* and *Asparageæ* of Jusieu are considered as mere divisions of a larger family, there is no reason to retain the *Melanthaceæ* and *Smilacææ* as distinct families. With this intention the author first reviewed these five groups, and defined their limits more accurately. The following are the results of the observations communicated.

The *Melanthaceæ*, which are characterized by the *antheræ extrorsæ*, divided pistil, and the capsular fruit, possess anatropous ovules. With the exception of *Colchicum* and *Bulbocodium*, in which they are hemianatropous, their embryo is very small, and lies hid in the albumen directly above the umbilicus ; in *Colchicum*, *Bæometra*, and *Ornithoglossum*, on the contrary, it is situated about a third of the periphery from the umbilicus. This family is divisible, according to the different nature of the anthers, stigmata, and fruit, into five groups, the *Colchiceæ*, (*Colchicum*, *Bulbocodium*, *Merendera*, *Monocaryum*, and *Weldenia* and *Leucocrinum* as doubtful), *Melanthææ* (*Androcymbium*,

*Erythrostictus*, *Melanthium*, *Anguillaria*, *Wurmbia*, *Bæometra* and *Burchardia*), *Tofieldiæ* (*Tofieldia* and ? *Pleea*), the *Heloniæ* (*Helonias*, *Chamælorium*, *Xerophyllum*), and the *Veratreæ* (*Amianthium*, *Schæno-caulon*, *Asagræa*, *Veratrum*, *Zygadenus*, *Stenanthium* and *Anticlea*, a new genus formed of *Zygadenus glaucus* and *Melanthium sibiricum*). The *Uvulariæ* of Dr. A. Gray are distinguished from the *Melanthaceæ* merely by their coherent pistils, and it would perhaps be more suitable to consider them as a section. Besides the genera mentioned by Dr. A. Gray, there also belongs to this division *Krey-sigia*, Reichenb. (*Tripladenia*, Don), *Melanthium indicum*, which constitutes a separate genus, *Streptopus*, *Hekorima* and *Prosartes*, as well as *Drymophila* notwithstanding the *antheræ introrsæ*. But *Tri-cyrtis*, Wall., is excluded, and approached to the *Liliaceæ*.

The *antheræ introrsæ*, coherent pistils, and the flattened seeds which are provided with a winged margin, distinguish the *Liliaceæ* of Jussieu from the *Melanthaceæ*, to which they are in other respects very nearly allied. Bernhardt's two divisions are retained, but *Fritillaria*, on account of its anthers, which are fixed internally, is placed near to *Lilium*. *Orithyia* is most nearly related to *Tulipa*, *Rhinopetalum* on the contrary to *Fritillaria*. *Medeola* has anthers like *Lilium*, and must be considered as belonging to the same family notwithstanding the berries. *Methonica* is but a doubtful *Liliaceæ*, and approaches in many of its characters to the *Melanthaceæ*. The formation of the seed is here the same as in *Colchicum*, and it may be mentioned that Gærtner has figured and described the embryo of *Methonica* quite incorrectly. The seeds have an acrid taste.

The *Asphodeleæ* of Jussieu are very similar to his *Liliaceæ*, but may easily be known from the black testa. Mr. Brown unites with them those genera of Jussieu's *Asparageæ* which have a *testa atra crustacea*, and raises the rest by the name of *Smilaceæ* to a separate family, on account of the thin membranaceous nature of this organ. M. Kunth, on the contrary, thinks that the former, which should keep the name of *Asparageæ*, ought to be placed equal with the *Smilaceæ* in a natural arrangement. In the *Asphodeleæ* three sections have been formed, the *Hyacintheæ*, *Alliæ* and *Anthericeæ*. The latter have tufted roots; both the former, on the contrary, are bulbous. The *Hyacintheæ* flower in clusters, the *Alliæ* are umbellated. To the first, besides the genera enumerated by M. Endlicher, *Ledebouria*, the Indian representative of *Scilla*, belongs, and *Cælanthus*, Willd., which differs from *Lachenalia* by the spur-shaped prolongation of the calyx.

In most of the *Hyacintheæ* the sepals are one-nerved, and only *Cyanotris*, *Ornithogalum*, *Myogalum*, *Albuca* and *Uropetalum* are provided with three or more nerves. *Bellevalia* is enriched with new species, and *Agraphis* again united to *Scilla*. In reference to the last genus, M. Kunth calls attention to the great difference in the number of ovules in the individual species, and also makes the generic character of *Drimia* to depend on the loculi of the ovarium, containing at all times only two ascending ovules near each other.

The *Alliæ* include, besides *Allium*, the genera *Hesperoscordium*, *Triteleja*, *Brodiaëu*, *Calliproa*, *Tristagma*, *Leucocoryne*, *Milla* and *Bes-*

sera, and form, according to M. Endlicher, the greater part of his *Agapantheæ*, whilst *Allium* is enumerated amongst the *Hyacintheæ*. Perhaps *Tulbaghia* likewise belongs here. In *Bessera*, *Triteleja* and *Calliproa*, the sepals have three nerves on the back, whilst in all other *Alliæ* they appear to have one nerve. The true *Alliæ* have two upright campylotropous ovules fixed near to each other at the base of the loculus; in *Allium Victoriale*, on the contrary, they are isolated. *A. fragrans*, *euosmium*, *striatum*, *striatellum* and *canadense* possess four to twelve two-rowed hemianatropous ovules, and form a distinct genus, which perhaps coincides with *Hesperoscordium*.

The *Anthericeæ* have a true stem, a clustered or paniced inflorescence, and numerous more or less tuberosely thickened radicular fibres. *Eremurus*, *Asphodelus*, *Asphodeline* and *Bulbine*, again form in these a small separate group, characterized by the position of the ovules. These are from two to six in number, having the aperture turned downwards, and grown to the inner angle of the loculus, almost the whole of their length, and more or less surrounded with a fleshy arilloid protuberance. The sepals appear one-nerved. To these genera, *Kniphofia*, *Aloë* and *Lomatophyllum* join on very naturally. In the two first, and probably also in *Lomatophyllum*, the arilloid base of the ovules forms a loose membrane at a later period, which quite envelopes the seed, spreads in the form of wings to the margins, and has been falsely considered as the testa. Accordingly the *Aloëineæ* of Endlicher must fall to the ground, as of the two genera *Sansevieria* and *Yucca*, still reckoned amongst them, the first is distinguished from *Dracæna* merely by solitary ovules, and belongs to the *Asparageæ*; the second, on the other hand, comes nearer to the *Liliaceæ*. *Hemerocallis*, *Czackia*, *Phalangium*, and all the remaining genera, which are considered by M. Endlicher as belonging to his *Anthericeæ*, have collectively anatropous ovules, and the sepals are furnished with three or more nerves.

To the *Conanthereæ*, which on account of the *Ovarium semi-inferum*, can hardly deserve to form a separate section of the *Anthericeæ*, besides *Zephyra*, *Conanthera*, *Cumingia* and *Pasithea*, *Cyanella* also belongs; but *Echeandia* must be removed and placed near to *Phalangium*. The latter likewise applies to *Anemarrhena*. *Sowerbæa* however does not belong here, but to Endlicher's *Aphyllantheæ*.

#### MICROSCOPICAL SOCIETY.

At a meeting of the Microscopical Society held July 20th, 1842, J. S. Bowerbank, Esq., in the Chair, a paper was read by Mr. John Quekett, "On the peculiar arrangement of the Blood-vessels in the Air-bladder of Fishes, and on the evidence they afford of the true function of that organ." The author, after alluding to three principal modifications of the air-bladder in fishes generally, went on to describe that of the cod-fish, which he stated to be a thick muscular bag without any opening externally, and provided on its ventral aspect with a highly vascular body, which has been supposed to perform the office of secreting the air contained in the bladder: the author described the minute arrangement of the vessels in this so-



called gland, the capillary system of which was composed of a great number of parallel vessels aggregated together in bundles, and forming loops on the free surface of the gland, and in the other part of the bladder the arrangement was also remarkable for the parallel manner in which the vessels were disposed; in this fish three, but in others as many as six, vessels ran parallel to each other. The fact of the air-bladder being subservient to the function of respiration was supported to a certain extent by the distribution found in the anterior compartment of the air-bladder of the eel; in this fish the vascular net-work approached more nearly that of the cellular lungs of the Batrachia than any other class of vessels. The author concluded by stating that the probable use of the gland in the closed air-bladders might be, not that of secreting air, but of keeping in a pure state the air already there, as those fish provided with a gland generally live in deep water, and from having no outlet to the bladder are unable to change the contents should they have become impure. The paper was accompanied with injected specimens and with diagrams of the most important parts alluded to by the author.

#### ENTOMOLOGICAL SOCIETY.

November 1, 1841 (*continued*).—W. W. Saunders, Esq., F.L.S.,  
President, in the Chair.

Descriptions of the Australian species of Lamellicorn Beetles, belonging to the family of the Sacred Beetles. By J. O. Westwood, F.L.S.

After noticing the *Circellium hemisphericum*, Latr., (Guérin, Icon. R. An. ins., pl. 21. f. 3.—*Coproëcus h.* Reich., Ann. Soc. Ent. France, 1842, pl. 5. fig. 2.), the *Aulacium carinatum*, Reich., (*Mentophilus Hollandiæ*, Laporte, Hist. Nat. Ins. Col. 2. pl. 4. fig. 4.), he describes the genus *Tessarodon*, Hope, in detail, giving characters of the type *At. Hollandiæ*, and of the two following new species:—

*Tessarodon angulatus*, W. *T. subovalis obscurè castaneus, capite et prothorace rudè punctatis, clypeo in medio dentibus duobus conicis, lateribus ante oculos valdè angulatis, tibiis posticis ad apicem appendiculatis.* Long. corp. lin. 3.—Hab. New Holland. Swan River? Mus. Hope.

*Tessarodon piceus* (Hope MSS.). *T. parvus subovalis castaneus, capite et prothorace rudè punctatis, capitis angulis ante oculos rotundatis, tibiis posticis simplicibus.* Long. corp. lin. 2½.—Hab. Port Essington. New Holland. Mus. Hope.

Descriptions are then given of the two following new genera:—

*CEPHALODESMIUS*, W. *Clypeus in medio 4-dentatus, dentibus intermediis valdè elongatis. Palpi labiales, articulo 2do tumido, ovato, 3tio minuto. Prothorax magnus, 8-angularis, elytra subcordata. Pedes valdè elongati. Tarsi antici distincti, breves. Tibiæ intermediæ bicalcaratæ, posticæ 1-calcaratæ.*

*Cephal. armiger*, W. *Niger, capite nitido, punctato, pronoto subopaco, elytris opacis subsulcatis intra marginem lateralem acutè carinatis.* Long. corp. lin. 5.—Hab. New Holland. Mus. Soc. Ent. Lond., &c.

TEMNOPECTRON, W. *Corpus breve subrotundatum nitidum.* Clypeus in lobos duos minutos obtusos productus. Palpi labiales, articulo 2do obconico, 3tio præcedenti dimidio breviori. Prothorax lateribus rotundatis (et cum elytris subcontinuis) anticè parùm angustior. Tarsi antichi minuti. Tibiæ posticæ curvatae intermediæ 2-, posticæ 1-calcaratæ. Ungues subtùs denticulo instructi.

Temn. rotundum. *T. nigrum, nitidum, tibiis anticis obtusè bidentatis, singulo elytro striis 8 tenuissimis, strid suturali punctatâ.* Long. corp. lin. 5.—Hab. Melville Island. Mus. Hope.

Descriptions of two new species of *Cremastocheilus*, from Northern India. By W. W. Saunders, Esq., F.L.S.

*Cremastocheilus Campbellii*, S. *Jet-black, somewhat glossy, antennæ and trophi somewhat piceous. Head elongate-quadrate, slightly emarginate, thorax orbicular, closely and deeply punctured. Mesosternum prolonged, elytra rather broader than the thorax, elongate, deeply punctured and rounded at the apex, legs long.* Length  $\frac{6}{10}$  of an inch. Mus. Saunders.

*Cremastocheilus brunneus*, S. *Head subquadrate, narrowed in front; antennæ black. Thorax more orbicular, with a deep impressed line thickly and deeply punctured, and dark pitchy brown. Mesosternum terminating in a strong, somewhat curved hairy spine. Elytra rather broader than the thorax, elongate; apex angular, slightly punctured, dark brown; legs long, pitchy brown.* Length  $\frac{5}{10}$  of an inch. Mus. Saunders.

[These two species enter into Burmeister's new genus, *Cænochilus*, all the species of which hitherto described are natives of Southern Africa.—J. O. W.]

In allusion to Mr. Hope's observations on the habits of the Australian *Coleoptera*, Mr. Edward Doubleday mentioned that he had observed with great surprise, when in North America, that several tribes of insects appeared to possess habits quite at variance with those of the European species of the same groups, *Ips* (for example) being coprophagous, and *Onthophagus* found under carrion.

December 6th.—W. W. Saunders, Esq., F.L.S., President, in the Chair.

Mr. S. Stevens exhibited British specimens of *Notaris Serpi*, a Curculionideous insect new to the British Fauna, which he had obtained from bullrushes at Hammersmith; also various other insects found in bullrushes, and a new species of *Omius* from Ascham Bryant, Yorkshire.

Captain Parry exhibited a small collection of *Coleoptera* from New Zealand, including a new genus of *Lucanida*, and many curious *Lonicornes*, upon which Mr. Hope made various remarks.

Mr. Westwood exhibited the Coleopterous portion of Mr. Coffin's collection of Mexican insects, and various insects from Sierra Leone from the collection of Mr. Raddon.

Mr. J. Gould exhibited a large and very beautiful wasp's nest, formed by *Vespa holsatica* in a glazed case, accompanied by a note from

Mr. Elliott, detailing the manner of its formation; the case having been placed on the top of a steam-boiler, and some portions of the comb containing grubs, and a number of perfect wasps having been introduced into the case, and an aperture formed at the back for the ingress and egress of the wasps which immediately covered in the grubs, and finished the nest in about five weeks. Mr. Hope stated that he had noticed that wasps are very partial to situations near to chimneys.

A cocoon of very beautiful silk resembling molten gold threads from the Philippine Islands was presented by H. Cuming, Esq.

The following memoirs were read:—

Descriptions of two new genera of *Curculionidæ*, closely allied to *Rhynchites*. By G. R. Waterhouse, Esq., of which the following are the characters:—

MINURUS, Wat. *Rostrum elongatum ad apicem dilatatum. Antennæ elongatæ tenues versus medium rostri insertæ, 11-articulatæ, articulis basalibus subæqualibus; 3bus ultimis remotis, clavam formantibus. Caput elongatum, collo crasso. Thorax subcylindricus basi apiceque truncatus. Elytra oblonga, abdomen tegentia.*

Minurus testaceus, Wat. *Testaceus, oculis nigris capite thoraceque punctatis, elytris profundè punctato-striatis.* Long. corp. lin.  $1\frac{1}{6}$ .—Hab. Chiloe.

METOPON, Wat. *Rostrum elongatum ad apicem subdilatatum. Antennæ tenues ad basin rostri insertæ, 11-articulatæ, articulis basalibus subæqualibus, tribus ultimis clavam subsolidam formantibus. Caput latum pone oculos paulld elongatum. Oculi laterales rotundati prominuli. Thorax transversus, basi apiceque truncatis. Elytra oblongo-ovata, humeris subrectangulis.*

Metopon suturalis, Wat. *M. testaceus, punctatus, scutello nigro, elytris ad suturam nigricantibus.* Long. corp. lin.  $1\frac{1}{3}$ .—Hab. Van Diemen's Land.

Descriptions of a new species of *Parastasia*. By J. O. Westwood, F.L.S.

*Parastasia rufo-picta*, W. *Nigra nitida tenuissimè punctata, fasciâ irregulari ad basin singuli elytri, anticè biramosa, et posticè in medio latè emarginata, pygidio piceo, opaco.* Long. corp. lin. 11.—Hab. Sylhet, East India. Mus. D. Parry.

Notice of a hitherto unobserved character distinguishing the sexes in certain *Cetoniidæ*, consisting of a strong spine at the extremity of the lower lobe of the maxillæ in the females. By J. O. Westwood, F.L.S. (since published in the 'Annals of Natural History').

January 3rd, 1842.—W. W. Saunders, Esq., in the Chair.

The following memoirs were read:—

On *Aporocera*, a new genus of *Coleoptera* allied to *Clythra*, from New Holland. By W. W. Saunders, Esq.

APOROCERA, S. *Antennæ two-thirds of the length of the body, 11-jointed, the 3rd and following joints subtriangular, broad and flattened, the 5th being somewhat the largest and broadest. Thorax gibbous in front, as broad as the elytra. Body cylindrical.*



*Ap. bicolor*, S. Head red-brown; antennæ black; thorax smooth, shining, deep reddish-brown, with a transverse furrow. Scutellum and elytra black shining green, deeply and coarsely punctured in regular striæ, each elytron with a deflexed lateral humeral lobe; legs reddish-brown, with the tips of the femora and tibiæ, and the tarsi black. Length  $\frac{1}{4}$  inch.—Hab. New South Wales. Mus. Hope.

*Ap. apicalis*, S. Head red-brown; antennæ rather shorter and more slender than in the preceding. Thorax red-brown, as broad as the elytra, with a wide transverse furrow. Scutellum and elytra red-brown, the latter deeply and coarsely punctured in regular striæ, with the apex black; each elytron with a deflexed lateral humeral lobe. Legs red-brown, with the tips of the femora and tibiæ, and the tarsi black. Length  $\frac{1}{4}$  inch.—Hab. New South Wales. Mus. Hope.

Some account of the natural history of a fossorial hymenopterous insect from Port Lincoln, South Australia. By J. O. Westwood, F.L.S.

The insect in question is a new species belonging to the *Pompilidæ*, and apparently to that division of *Pompilus* allied to *Aporus* in the large size of the collar.

*P. audax*, W. *P. ater*, *pubescens*, *prothorace magno*, *quadrato*, *antennis albis*, *tibiis tarsisque fusco-albidis*. Long. corp. lin.  $5\frac{1}{2}$ .

Specimens of this insect in the pupa state (almost fully developed) were found in the cells, each of which was about an inch long and half an inch in diameter: several of these cells were attached together, and seemed formed of a succession of short transverse layers of a shining material which had dried into rounded or elongated nodules. It appeared evident that these nests had not been enclosed in a burrow, but were external, the materials having been brought from a distance; thus differing from the habits of the majority of the family. In one of the cells, the remains of a very large spider, which had evidently served as the food of the enclosed larva, were found.

Mr. Newport communicated extracts from various letters which he had received from Mr. Wheekes, of Sandwich, detailing a series of galvanic experiments whereby he had obtained specimens of *Acarus hystrix* (or *A. Crossii*) from mineral solutions acted upon by voltaic currents, in the same manner as Mr. Crosse had obtained the same insect. In this case distilled water had been used, the mineral had been previously submitted to a white heat, and the apparatus had been insulated by being placed in mercury; notwithstanding which a number of the *Acaris* had been produced. Mr. J. E. Gray stated that Mr. Children had also instituted a series of experiments at the British Museum precisely similar to those of Mr. Crosse, without obtaining a single *Acarus*.

February 7th.—W. W. Saunders, Esq., in the Chair.

Mr. Westwood exhibited two extremely rare British *Noctuidæ* from the collection of Mr. T. Reeves, Jun., of Carlisle; namely, *Agrotis cinerea*, a beautiful variety, with the ground colour of the

fore wings of a more fulvous brown hue than in Mr. Curtis's figure, the base darker, and the bar across the middle of the wing dark brown, the hind wings with a slight fascia running across them entirely; and *Graphiphora depuncta*, a species which had been hitherto doubtful as British.

The following memoirs were read:—

Descriptions of two new Coleopterous genera allied to *Cryptocephalus*, from New Holland. By W. W. Saunders, Esq.

MITOCERA, S. *Antennæ*  $\frac{1}{2}$  as long again as the body, filiform, 2nd joint small, 3rd and 5th very long, equal, 4th half as long as the 3rd. *Eyes reniform.* Head vertical; thorax subquadrate; body subelongate, flattened.

*Mitocera viridipennis*, S. Head light red-brown, with the crown and antennæ black. Prothorax red-brown, with slightly raised lateral margins, coarsely punctured. Scutellum and elytra dark shining blue-green, and irregularly punctured; apical margins red-brown. Legs black; femora red-brown. Length  $\frac{5}{10}$  inch. —Hab. Swan River. Mus. Hope.

DICENOPSIS, S. Body short, robust, cylindrical. Antennæ short, not half the length of the body, subclavate, 3rd, 4th, and 5th joints slender and long, the remainder short, forming a kind of lengthened club. Head vertical; eyes reniform. Thorax rounded in front, very convex.

*Dicenopsis hæmatodes*, S. Shining brownish-red, deeply and coarsely punctured; clava of antennæ black-brown; legs brownish-red, apex of tibiæ and the tarsi black. Length  $\frac{7}{10}$  inch.—Hab. New Holland and Van Diemen's Land. Mus. Hope and Westwood.

Descriptions of some new *Longicorn* and *Rhynchophorous* Beetles from the Philippine Islands. By G. R. Waterhouse, Esq.

*Doliops* (Waterh.) *geometrica*, Wat. *D. splendide viridi-æneus*, capite lineis tribus; thorace lineis marginalibus et suprâ tribus (und abbreviatâ) notato; elytris lineis duabus transversis mediis; areâque transversâ basali irregulari; alterâque triangulari apicali lineis circumdatis, his lineis albo-squamosis. Long. corp. lin.  $6\frac{1}{2}$ .

*Pachyrhynchus rufo-punctatus*, Wat. *P. niger*, brevis, capite maculis tribus, thorace maculis duabus discoidalibus maculâque und ad utrumque marginem; elytris guttis 22 rufo-squamosis ornatis. Long. corp. lin.  $8\frac{1}{2}$ . Nearly allied to *P. venustus*.

*Pachyrhynchus elegans*, Wat. *P. splendide cupreus*, capite maculis 3, thorace 2 discoidalibus, undque ad utrumque marginem; elytris maculis 10 magnis subocellatis pallide viridi-squamosis.

*Pachyrhynchus latifasciatus*, Wat. *P. splendide æneus*, thorace fasciâ transversâ, elytris fasciis 2 (in medio interruptis) maculisque 3 apicalibus viridi-squamosis. Long. corp. lin. 6.

*Pachyrhynchus concinnus*, Wat. *P. ater*, elytris punctato-striatis; thorace medio lineâ transversâ lineâque longitudinali posticâ; elytris lineâ transversâ centrali, lineis duabus longitudinalibus, et lineâ marginali; his lineis pallide viridibus. Long. corp. lin. 6. Resembles *P. chlorolincatus*.

Description of a new British genus of Apterous insect. By J. O. Westwood, F.L.S., &c.

The insect described in this paper had been already brought before the Society, (see Journal of Proceedings, November 2nd, 1840) when it was regarded by Mr. Westwood as an undeveloped *Myriapodous* insect. The researches of Mr. Newport upon the development of the *Myriapoda*, subsequently published, having shown the incorrectness of this opinion, Mr. Westwood refers the insect to the order *Thysanura*, (from all of which it differs generically) under the name of

CAMPODEA, W. *Corpus elongatum parallelum, depressum, molliusculum apterum 13-annulatum. Caput obovatum horizontale. Antennæ 2 elongatæ multiarticulatæ, submoniliformes. Os inferum mandibulis minutis planis latis 4-dentatis. Prothorax brevis, meso- et metathorax majores æquales. Pedes 6, elongati, cursorii. Abdomen segmentis subtus utrinque appendiculo minuto apiceque setis duabus elongatis setosis instructum.*

Campodea staphylinus, W. *Alba, mollissima, agilis, antennis articulis ultra 20 instructis. Long. corp. lin. 2½. Inhabits damp garden earth. Hammersmith, October 2, 1840. July 12, 1842.*

Catalogue of the entomological collections, with notes on the habits of the species found in Chusan and the adjacent parts. By Dr. Cantor.

#### BOTANICAL SOCIETY OF LONDON.

July 1, 1842.—J. E. Gray, Esq., F.R.S., President, in the Chair.

Numerous donations of plants, specimens of woods, &c., were announced, many of them purchased at the sale of the botanical museum of the late A. B. Lambert, Esq., and presented by some of the members. Mr. Arthur Henfrey (Curator) presented a monstrous specimen of *Scrophularia aquatica*, found by him on 30th June last on an island in the Thames above Teddington. The plant was about three feet high, having a flat riband-like stem, rather more than half an inch broad and scarcely an eighth thick. The flower-stalks grew chiefly out of the flat surfaces, nearly perpendicular to them, a very few only being at the edges and not in any regular order. These flowering-stalks extended over about eighteen inches of the stem, being about forty in number, exclusive of a very dense cluster at the summit of the plant. The flowers all appeared perfect, and the peculiarity of growth seemed to have resulted from a natural grafting of two plants.

Mr. T. Sansom (Librarian) exhibited a monstrous specimen of *Cynoglossum omphalotes* (Linn.), in which three peduncles were united longitudinally from the base to the extremity, terminated by two calyces; the first being 6-partite, bearing a corolla of six segments, five stamens, one pistil, and four seeds. The second 9-partite, formed from the uniting of two calyces respectively 4- and 5-partite, bearing two distinct petals placed side by side, each 5-lobed, and each with five stamens, and each containing one pistil and a set of four seeds.



Mr. Sansom also exhibited a specimen of *Galeobdolon luteum* (Smith), in which the terminal petal was salver-shaped, 5-lobed, stamens four.

A paper was read from Mr. T. Sansom, being "Notes of the First Excursion of the Members of the Society into Kent in June last; containing the habitats of the rarer species of flowering plants, and also notes on the most interesting specimens collected."

#### AMERICAN PHILOSOPHICAL SOCIETY.

Nov. 5, 1841.—The Committee, consisting of Dr. Horner, Mr. Wetherill, and Dr. Goddard, to whom Dr. Harlan's paper, entitled, "Description of the Bones of a Fossil Animal of the Order Edentata," was referred at the last meeting, made a report recommending its publication in the Transactions, which was ordered accordingly.

These bones form part of the extensive collection of fossils recently exhibited in Philadelphia by Mr. A. Koch, by whom they were obtained in Benton County, Missouri.

Among them, more or less perfectly preserved, are two ossa humeri, two tibiæ, two portions of the radius, two of the clavicle, parts of several ribs, twelve vertebræ, a cubitus, twenty-four teeth, eight of them in their sockets, two fragments of a lower jaw, with two and three teeth *in situ*, two fragments of the upper jaw, five ungual phalanges, the sternum of four articulated pieces, and a part of the ilium and sacrum.

These specimens apparently belonged to three individuals of the same species. They were found, with portions of a mastodon, in company with numerous tropical vegetable remains. They are friable and light, not petrified, but destitute of animal matter.

The teeth are very similar in structure to those of the *Megalonyx*, though the pieces of the lower jaw are stouter: the jaws may have contained six or seven teeth on each side.

The largest os humeri is twenty inches long and fourteen in diameter; it is of a massive structure, and deeply grooved by the muscular attachments. In place of a foramen, as in the humerus of the *Megalonyx*, the exterior surface, near the elbow joint, has a deep groove, for the origin of the flexor muscles. The condyles are of great breadth, as in the *Megatherium*. The inferior articulating surface consists of two facets, one exterior and convex, the other described by Dr. Harlan as concavo-convex, admitting a ginglymous and rocking motion.

The cubitus or ulna is a short and strong bone, with strong marks of muscular attachments: this was part of an animal of less size than that to which the large humerus belonged. A peculiarity of this bone consists in the position of its superior articulating surface, which is nearly in the middle of its shaft; the olecranon process being very long, and extending upwards. The lower articulating surface was articulated with the carpal bones, as well as the radius. The total length of this bone is sixteen inches.

There are four claws, or phalangeal bones of the fore-foot of a small-sized individual: in general form these bones approach nearest to those of the *Orycteropus*.

There are two tibiæ belonging to different individuals of different sizes: one is ten inches five-tenths in length, the other ten inches. This is a short, thick and strong bone. Its upper articulating surface is nearly a circular concave disc. Its lower anterior extremity is marked by a peculiar deep ovoid depression or hollow, for the reception of a corresponding hemisphere, projecting upwards from the astragalus, forming together a structure of joint altogether unique. The motions of the ankle joint were rotatory, but the articulating surface of the lower aspect of the astragalus admitted of ginglymous motion with the os calcis.

The clavicle and ribs, portions of which only exist, are not distinguished by any remarkable characters: but the foramen for the passage of the spinal marrow, in the vertebræ, is exceedingly small, an unaccountable feature in a skeleton, which in all other respects demonstrates great physical strength as one of its most remarkable characteristics.

The portion of sternum belonged most probably to the largest of the three individuals; the animal being apparently less than the *Megatherium*, and larger than the *Megalonyx*.

Dr. Harlan proposes to name this animal "*Orycterotherium Missouriense*."

## MISCELLANEOUS.

### LYMPH-GLOBULES OF BIRDS.

It is well known that the blood of vertebrate animals contains, besides the red discs, a few pale globules, which have commonly been regarded as those of lymph. But in birds I have found that the majority of the globules of the juice of the lymphatic glands are rather smaller than the pale globules of the blood, and the same fact is observable in mammals; yet the descriptions since Hewson's time of the lymph-globules of birds have always been drawn from the pale globules of their blood.

This distinguished man states that the particles of the fluid of the lymphatic glands of birds are oval, like the nuclei of their blood-corpuscles. In the 'Phil. Mag.' for February 1840, I described the lymph-globules of the Napu Musk Deer as hardly differing from those of Man, although the blood-discs of this little ruminant, as I had discovered and described in November 1839, are the smallest yet known; and although the *Camelidæ* have oval blood-discs, I found that the globules in the juice of the thymus and of the lymphatic glands, and of the pus of these animals, had the usual circular figure and nearly the same size as the corresponding globules of other Mammalia. [See Med. Chir. Trans. vol. xxiii.] It was to be expected, therefore, that the lymph-globules of birds would have a similar form; and such is the case, as I have lately ascertained. In a few instances from one

to five of the globules were enclosed with granular matter in a cell. The following table exhibits, in fractions of an English inch, the average size of the lymph-globules of birds. For the numerous measurements from which these averages are deduced, the original observations may be referred to.

Columba Livia, <i>Briss.</i> . . . . .	$\frac{1}{3274}$
Turdus musicus, <i>Linn.</i> . . . . .	$\frac{1}{3090}$
Gallus domesticus, <i>Briss.</i> . . . . .	$\frac{1}{5261}$
Strix flammea, <i>Linn.</i> . . . . .	$\frac{1}{3227}$
Ardea cinerea, <i>Lath.</i> . . . . .	$\frac{1}{3150}$
Corvus frugilegus, <i>Linn.</i> . . . . .	$\frac{1}{3053}$
—— monedula, <i>Linn.</i> . . . . .	$\frac{1}{3238}$
{ —— Pica, <i>Linn.</i> . . . . .	$\frac{1}{3001}$
{ Pale globules of the blood of the same . .	$\frac{1}{3555}$
Fringilla Chloris, <i>Tem.</i> . . . . .	$\frac{1}{4924}$
—— domestica, <i>Linn.</i> . . . . .	$\frac{1}{4682}$
Emberiza Citrinella, <i>Linn.</i> . . . . .	$\frac{1}{4572}$
Sturnus vulgaris, <i>Linn.</i> . . . . .	$\frac{1}{3152}$
Garrulus glandarius, <i>Flem.</i> . . . . .	$\frac{1}{4414}$

The difference in size between the white globules of the blood and the lymph-globules is considerable, as shown, for example, in the magpie (*Corvus Pica*); but the magnitude of the lymph-globules does not differ much in different birds, although these globules are generally slightly smaller than those of Mammalia.—*Mr. Gulliver's Contributions to Minute Anatomy*, London and Edinb. Philos. Magazine for June 1842.

#### SCARABUS CASTANEUS.

*To the Editors of the Annals of Natural History.*

GENTLEMEN,—In my paper entitled 'Monograph of the Genus *Scarabus*,' a small group of pectinibranchiate mollusks, published in No. 57 of your Journal, I noted, especially in speaking of the *Scarabus castaneus* of Lesson, that it was the only species I had not faithfully identified. I registered it as a species, relying solely upon a figure under that name in the 'Zoologie de la Coquille'; it appeared to me so characteristic and distinct from any other. It is therefore pleasing to me to be able to announce that I have lately discovered two unquestionable specimens of it in a collection of shells lately made by Richard Brinsley Hinds, Esq. in New Ireland, a rich and very remote portion of the globe, from whence we may yet expect much that is valuable and new.

This interesting series of shells was collected during a voyage of more than seven years in company with Lieut. Capt. Belcher, a gentleman well known in the conchological world for his zeal and great practical ability in knowing exactly how and where to dredge for good shells.

It would perhaps be considered premature to speculate upon what



shells may have been brought home by Capt. Belcher himself; it is a satisfaction, however, to know that they are in good hands, and we only hope that the zoology of his expedition will be published in a style of elaborate illustration, equal to the 'Voyage de la Coquille' of Lesson, the 'Voyage de l'Astrolabe' of Quoy and Gaimard, or the 'Voyage dans l'Amérique Méridionale' of D'Orbigny. We are sadly behind our continental neighbours in this respect, and one can scarcely wonder at the very low ebb of conchological science in this country. If the labours of Mr. Cuming had been made the source of a national undertaking, what a glorious and important work would have been the result,—a light for all nations and a credit to our country in particular!

Yours, &c.,

LOVELL REEVE.

August 20, 1842.

ARCTIC TERN.

*To the Editors of the Annals of Natural History.*

GENTLEMEN,—I observe in the last number of the 'Annals of Natural History,' that Mr. Strickland reverts to the subject of the Arctic Tern, but as I do not doubt the correctness of that gentleman's observations as to the species he examined, further reply is unnecessary.

As a knowledge of the habits of animals is as essential to the naturalist as it is to be acquainted with their forms, my object in first addressing you on the subject was to correct what appeared to me to be an error as to the birds in question being on their way to the "northern regions." Though, no doubt, many of them do penetrate to the higher northern latitudes during the warmer months, yet as the tern in question appeared inland so exactly at the time when they usually take up their summer quarters, the true inference to be deduced therefrom seemed to be, that they were prevented reaching their accustomed haunts around our own shores by the strong gales which prevailed at the time.

It is not very easy at all times to distinguish between the *S. arctica* and *S. hirundo*, for some of the points relied on by ornithologists as specific may be sometimes observed in birds of the same flock, and may perhaps depend on age or sexual difference. The birds of the season are easily distinguished from the old ones by their gray heads, the black feathers never appearing till the birds are in full summer plumage.

I am, Sir, yours, &c.,

T. AUSTIN.

GALIUM CRUCIATUM.

From a paragraph in the last number of the 'Annals,' vol. ix. p. 519, it would appear that in consequence of the *Galium cruciatum* not being noticed in the 'Flora Hibernica,' it has hitherto been unknown as a native of Ireland; yet K'Eogh, who published in 1735, describes the plant under the English name 'Crosswort,' so minutely as not to admit of any mistake. Harris, who partially investigated the botany of the county of Down in 1743, enumerates the plant in

his catalogue, and gives the *identical habitat* where Dr. Hodges found it, and where I have annually for many years observed it growing.

Belfast, Aug. 13, 1842.

FRANCIS WHITLA.

*On a new species of Lagomys inhabiting Nepal.* By B. H. Hodgson, Esq., Resident at the Court of Nepal\*.

Two fine specimens, male and female, lately received from Gossainthan, enable me to add the genus *Lagomys* to the Catalogue of Nepalese Mammals; and it may be remarked as characteristic of the enormous and sudden inequalities of elevation proper to this kingdom, that the tropical genus *Rhizomys*, and the arctic genus *Lagomys*, have been taken within forty miles of each other.

The specimens of the latter genus just procured by me were shot by my hunters on the margin of the sacred lake whence the Trisal Ganga River issues, and close to the verge of perpetual congelation. There were but a pair, of which both were obtained, as they moved about in the vicinity of the small natural cavity or rocky fissure that formed their abode. Their stomachs were full of fresh vegetable matter, like the contents of a hare's belly; nor was there near their abode any evidence of the hoarding propensities of the genus, or of a habit of digging for food. The height of the summer being the season at which the animals were taken, may explain the former circumstance however, but not the latter; and though it is said that these rat-hares dig for their food occasionally, I fancy this must be a mistake.

My species appears to be nearly allied to *Roylii*, and possibly may be identical, but I think not. The male of the pair is seven inches long from snout to vent, and the female half an inch less. The general appearance of the species is that of a guinea-pig, but the natives of India, who know no such animal, liken it to a rat; and as its Leporine teeth and soles (of the feet) are not obtrusive signs, the association of it to the Murine race seems natural enough. Its general likeness, for instance, to the *Rhizomys*, or bamboo rat, is very noticeable, particularly as the latter is apt to hide its tail. But a nice observer will at once mark the greater superior massiveness of the head in *Rhizomys*, together with the smaller eyes and ears, and will not be slow to refer these peculiarities to the highly fossorial habits of that genus.

Our present subject, which we shall name provisionally "*Nepalensis*," has a moderate hare-like head, but ears quite similar to those of the common rat, with the exception of that small internal process near the conch, which seems proper to the *Lagomides*. The ear is rather less than half the length of the head, is truncated, rounded, and nearly nude, except on the anterior and incurved edge of the helix, where very short hairs are pretty closely set. The upper and outer pair of front teeth have a very deep longitudinal groove, so as to look like four instead of two; but neither these nor the inferior pair are at all remarkable for size or strength, offering in this respect

\* This and the following notice are taken from the Journal of the Asiatic Society of Bengal, No. 35.

a strong contrast to *Rhizomys*. The inner pair of upper teeth are palpable, but minute. The whiskers are long and firm, reaching to the shoulders; the lips and the muzzle entirely furred; the eyes medial; the body full and cylindrical; no vestige of tail; the limbs short, but fine, and of nearly equal length and strength before and behind; pentadactylous before, tetradactylous behind; the nails acute; the soles fully clad, except the termino-digital balls, and a tiny carpal pad placed a little behind the elevated thumb. The last-named are the sole parts of the whole body which are denuded of fur. The fur of the animal is Leporine in the general character, but softer and more silky. It is of one sort, about an inch long, and of uniform structure throughout each pile, or hardly perceptible, harsher in its apical portion. On the head and limbs the fur is shorter, more adpressed, and less silky. The general colour internally is blue-black, but externally is deep bay from the snout to the mid-body, and black freckled with paler rufous thence to the vent. Below the chin and belly are pale bay, and the limbs are the same. There is a pale spot, or tuft rather, at the outer base of each ear, and the mustachio is half dark and half light.

The following specific character may, for the present, indicate the animal:—

*Lag. Nep.* with broad, rounded, nudish ears, nearly half the length of the head; soles nude on the termino-digital balls only, and soft equable fur, which is dark bay from the snout to waist, and rufescently freckled black thence to the vent; below and the limbs paler bay; snout to vent 7 inches; head 2; ears  $\frac{7}{8}$ ; palm (with nail)  $\frac{3}{4}$ ; planta (with nail)  $1\frac{1}{4}$ ; female similar, smaller,  $6\frac{1}{2}$  from snout to vent. Habitat, Himalaya of Nepal.

*Notice of a new form of the Glaucopinæ, or Rasorial Crows, inhabiting the Northern region of Nepal.* By B. H. Hodgson, Esq.

Amongst the very numerous forms\* presented by the 850 species of birds already known to me as inhabitants of Nepal, there is one which I believe to be still new to science, and to belong to a group, of the occurrence of which, either in these mountains or in the plains at their base, I know of no other instance, save that of the ubiquitous tree-magpies.

The group alluded to is the Glaucopin, or finch-billed crows of Swainson; and the single species I am acquainted with tenants exclusively the immediate neighbourhood of the perpetual snows.

In the lower and central regions our bird appears to be represented

\* One of the most remarkable of these is the Cochoa of Nepal, and which was characterized by me under that name in the Journal for June 1836. The expert naturalist would immediately perceive what my inexperience then noted not, viz. that this is a typical *ampeline* form, requiring to be placed between *Ampelis* and *Casmarhynchus*, though Swainson asserts that the group is exclusively American.

To this genus we have since given the classic name of *Proserpinia*. In the same number of the Journal is the description of another rarity, first discovered and described therein, and which Swainson has since called *Nyctiornis*. It is our *Bucia*, *hodie Napophilus*, a forest-haunting bee-eater. Mr. Swainson's name must merge in ours.



by the *Timaliæ* and *Crateropi*, to both of which, and especially to the former, it bears in much of its structure the same close resemblance that it does also in its manners; for all these birds alike have lax feeble plumage, short rounded wings, longish, broad, frail, subgradated tails, and very large, yet not typically, terrestrial feet, though the habits are essentially terrene and rasorial. But whereas the *Timaliæ* and *Crateropi* have a more or less meruline bill, slender, and provided with membraned and open nares, the present birds, which we shall denominate generically *Conostoma*, have the massive bill and simple concealed nares of the magpies. The bill of the *Crypsirinæ* vel *Dendrocittæ*, or tree-magpies in particular, has much resemblance to that of the *Conostomæ*, owing to the clear arcuation of its whole commissure, and to the perfect entireness of its tip. There are differences, however, between the two even in the bills, inasmuch as that of *Conostoma* is more compressed, with sides less tumid yet broader ridges; while in *Crypsirinæ* the other members, such as the long gradated tail, short tarsi, and considerably pointed wings, indicate habits less terrestrial than those of our bird. *Conostoma* is clearly a typical example of the *Glaucopinæ* of Swainson, and its natural position would seem to be between *Glaucopis* and *Crypsirinæ*. In manners the present species is a shy forester, adhering to the wilds, and tenanting the skirts of forests where brush-wood as well as trees abound. Five or six birds are usually found together, chattering, hopping and scraping on the ground, and resorting to the trees and shrubs chiefly for shelter. Their food is principally insects of the soft and imperfect kind in summer; but in winter they doubtless take some vegetable food. Their essential form may be characterized thus:—

Bill short, strong, conico-compressed, with broad rounded ridges and vertical sides; the culmen and commissure entirely arched; the tips equal, obtuse, and entire. Nostrils circular, unfossed, furnished with a membranous raised edge all round, and concealed by incumbent setaceous plumuli. Rictus provided with a close series of short bristles. Wings short, feeble, almost entirely rounded; the 6th, 7th and 8th quills usually equal and longest. Tail slightly elongated, rounded, consisting of twelve broad simple plumes. Feet very large and strong, yet not typically ambulatory. Tarsi elevate, nearly or quite smooth, exceeding much the central toe and nail. Toes medial, unequal; fores basally connected, and outer lateral considerably longer than the inner. Hind-toe large, depressed, exceeding the outer fore, and with its large nail reaching to the middle of the central toe and nail. Nails simple, large, scarcely so acute or so curved as in *Crypsirinæ*.

Habitat, the northern region close to the perpetual snows.

Type, *Conostoma Emodius*, Nob. new.

*Spec. Char.*—*Conostoma* with head, neck and body above dull olive-brown, clearest on the secondary alars; below paler, and passing into sordid slaty blue, which forms everywhere the interior colour of the plumage. Iris brownish. Bill dull orange. Legs slaty gray. Sexes alike. Bill to tail  $11\frac{1}{2}$  inches; bill  $\frac{7}{8}$ ; tail  $4\frac{7}{8}$ ; tarsus  $1\frac{11}{16}$ . Central toe and nail  $1\frac{4}{16}$ ; hind-toe and nail  $1\frac{2}{16}$ . Weight  $3\frac{1}{4}$  oz.

Mr. Henry Denny, the author of the valuable work on British *Anoplura* noticed in our last number, is desirous of being assisted in his further investigation of the subject, by being furnished with specimens of foreign Lice. He is also anxious to obtain specimens of Intestinal Worms, as he is collecting materials for a Manual of British Entozoa. In a note which we have received from him he remarks :—" If persons possessing specimens of any of these animals obtained from British fishes, quadrupeds or birds, &c., would send me word what they had, I should know whether it would be necessary to forward them for drawing. They can be easily sent by letter; and it is not from recent 'birds, &c. alone that they are to be procured, but upon skins sent from abroad; they may frequently be obtained, sticking to the feathers either under the wings or at the base of the beak: any of these, I need scarce say, would be of great service to me; each, however, must have the *name* of the *bird*, &c. put upon the pill-box or scrap of paper in which they are placed."

METEOROLOGICAL OBSERVATIONS FOR JULY 1842.

*Chiswick*.—July 1. Heavy rain: fine. 2, 3. Very fine. 4. Densely overcast. 5. Dry and windy: showery: clear and fine. 6. Very fine. 7. Overcast: rain. 8. Cloudy: heavy rain at night. 9—11. Fine. 12—14. Cloudy and fine. 15. Fine: dry haze. 16. Dry and clear. 17. Slight haze. 18. Sultry. 19. Slight rain. 20. Fine: showery. 21. Densely overcast. 22, 23. Very fine. 24. Cloudless and hot. 25, 26. Very fine. 27. Slight rain in the morning: lightly overcast and fine. 28. Thunder-storm early in the morning, most violent between five and six A.M.: sultry: cloudy and fine. 29. Densely clouded: clear at night. 30. Cloudy: fine. 31. Cloudy and fine: clear at night.

*Boston*.—July 1. Rain: rain early A.M. 2. Fine: stormy, with rain, thunder and lightning P.M. 3. Fine: rain P.M. 4. Cloudy. 5. Stormy. 6. Windy. 7. Fine. 8. Fine: rain P.M. 9—12. Fine. 13. Cloudy: three o'clock thermometer 76°. 14—16. Fine. 17. Cloudy. 18. Fine. 19. Cloudy. 20, 21. Cloudy: rain early A.M. 22. Cloudy: rain P.M. 23. Cloudy. 24. Fine: twelve o'clock thermometer 78°. 25. Cloudy. 26. Fine. 27. Fine: rain P.M. 28. Fine. 29. Cloudy: rain early A.M. 30. Windy. 31. Cloudy.

*Sandwick Manse, Orkney*.—July 1, 2. Cloudy. 3. Cloudy: clear. 4. Cloudy: rain. 5. Cloudy: showers. 6. Cloudy. 7. Clear: cloudy. 8. Rain: fine. 9. Bright: drops. 10. Bright. 11. Cloudy: rain. 12. Bright and warm. 13. Damp: showers. 14. Showers. 15. Cloudy: drizzle. 16. Clear. 17. Clear: cloudy. 18. Bright: cloudy. 19. Clear: cloudy. 20. Clear: fog. 21—23. Cloudy. 24. Cloudy: damp. 25. Cloudy. 26, 27. Bright. 28. Showers. 29. Cloudy. 30, 31. Cloudy: damp.

*Applegarth Manse, Dumfries-shire*.—July 1. Showers. 2. Wet nearly all day. 3, 4. Showery. 5. Rain and wind. 6. Fair and fine. 7—11. Heavy showers. 12. Fair and fine. 13. Showery. 14. Fair and fine. 15. Very fine. 16. Very fine: thunder. 17. Very fine, but cloudy. 18. Showers. 19—21. Fair and fine. 22—24. Very fine. 25. Very fine: sultry. 26. Very fine: cloudy. 27. Cool and cloudy. 28. Cool but fine. 29. Cloudy and threatening. 30, 31. Very fine.

Sun shone out 30 days. Rain fell 12 days. Thunder 1.

Wind North-north-east 1 day. North-east 2 days. East 4 days. South-east 1 day. South-south-east 1 day. South 4 days. South-west 1 day. West-south-west 2 days. West 9 days. West-north-west 1 day. North-west 3 days. North-north-west 2 days.

Calm 13 days. Moderate 8 days. Brisk 6 days. Strong breeze 3 days. Boisterous 1 day.

Mean temperature of the month .....	56°·95
Mean temperature of July 1841 .....	54·35
Mean temperature of spring-water .....	50







5



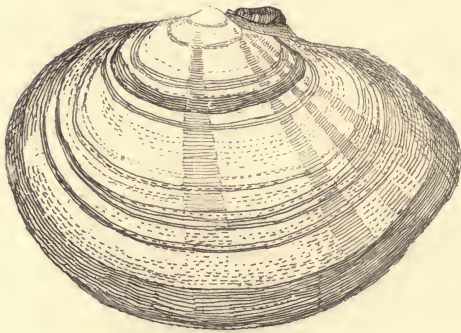
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THE ANNALS  
AND  
MAGAZINE OF NATURAL HISTORY.

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XIII.—*Descriptions of new Shells.* By RICHARD BRINSLEY  
HINDS, Esq., Surgeon R.N.

[With a Plate.]

*Psammobia decora.* Testa oblonga, tenui, cinnamomeo-brunnea; striis concentricis; valva dextra planiuscula, sinistra ventricosa; pallide violacea radiata; intus violacea. Pl. VI. fig. 1.

Long. unc. 1·9, lat. unc. 2·8.

*Hab.* San Diego, California.

This is a shell with a fine cinnamon-brown epidermis, and four pale violet rays showing through. One of these traverses nearly the centre of the valve, and the other three are clustered towards the slope on its posterior margin. The right valve is nearly plane, but the other is somewhat ventricose.

1. *Cyrena obesa.* Testa ovata, turgida, flavo-virente, transversim striata; natibus integris; dentibus lateralibus serrulatis; latere antico convexo acuto; intus pallide violacea.

Long. unc. 1·9, lat. unc. 2·5.

*Hab.* Rivers, Feejee Islands.

The umbones of this shell are so perfect as to be nearly entire, and only sufficiently erose to bear out one of the features which forms a portion of the character of the genus. Towards the slope the epidermis is thrown into several small angular waves, and is everywhere of a fine yellowish green colour.

2. *Cyrena tenebrosa.* Testa ovata, fusco-virente, transversim striata; natibus valde erosis, dentibus lateralibus serrulatis; latere antico rectiusculo; intus violacea.

Long. unc. 1·8, lat. unc. 2·4.

*Hab.* Rivers, Feejee Islands.

Both these species are from the same locality, and were for some time placed together in my collection, but a very slight examination is sufficient to establish their distinctness. This is a flatter shell, of a darker colour, with some disposition to send an angle from the umbones, which again are much erose. Within, on the broad extremity of the valves and towards the hinge, it is of a deep violet colour.



*Neritina Armstrongiana.* Testa subglobosa, striata, nigra, aureo-guttata; anfractu ultimo spinis coronato; apice eroso; labio interno unico dente obtuso munito; apertura cærulescente. Pl. VI. fig. 2.

*Hab.* Streams, Marquesas Islands.

This pretty species I have much pleasure in naming after my esteemed friend Dr. Armstrong, the Deputy Inspector of the Naval Hospital at Plymouth. The spines are much in the same state as in *N. brevispinosa*, and the exterior is covered with a number of small spots of a golden colour. I never saw it in any other group of the Pacific Islands, so that it is most probably confined to the Marquesas, which generally have very little of novelty either for the botanist or zoologist.

*Patella insessa.* Testa conica, ovali, fusca, tenue transversim striata, intus alba; apice maculis albis ornato. Plate VI. fig. 3.

*Hab.* On sea-weed, San Diego, California.

A small horny brown shell, remarkable for the white markings on the apex, usually three, but sometimes four in number, the central being rather the larger. It was always found imbedded in the fronds of a *Laminaria*, which it was often necessary to cut with a knife before the shell could be liberated.

*Patelloida depicta.* Testa minima, lineari, diaphana, alba, lineis rufis apice radiantibus; lateribus compressis; longa quadruplo quoad longitudinem. Pl. VI. fig. 4.

*Hab.* On sea-weed, San Diego, California.

This is a small delicate shell, white, with irregular brown rays diverging from the apex, about eight in number on each side, sometimes disposed to fork; clouded with a dark spot anteriorly; and the sides much compressed, so as to make the shell four times longer than broad. My largest specimen is only four-tenths of an inch long. They were found abundant on the surface of *Zostera*. The British Museum, Messrs. Cuming, S. Hanley, and Lovell Reeve have specimens from me, which I mention that they may at once identify them.

In some respects a similar shell has been described by Conrad from the coast of Massachusetts, under the name of *Patella alveus*, in the 'Journ. Acad. Nat. Sciences,' vol. vi. p. 267. t. 11. f. 20; and as *Patelloida alveus* by Couthouy in the Boston 'Journ. Nat. Hist.,' vol. ii. p. 177. But this shell is only twice as long as broad, and is described with "finely radiating striæ," and some other characters not found in our shell.

*Scarabus pollex.* Testa ovata, compressa, fusco-castanea, longitudinaliter valde striata; striis subarcuatis; anfractu ultimo confuse fasciato. Pl. VI. fig. 5.

*Hab.* Feejee Islands.

In size this shell approaches *S. Lessoni*, but is distinguished from it by its coarsely striated surface, and by its different markings. It is larger than *S. castaneus*, of a much darker colour, more striated, and further distinguished by the two dark yellowish bands on the upper part of the last whorl. Some difference of opinion exists as to the propriety of considering some of these shells as distinct species, but I think the specimens in my possession are sufficient to remove any doubts on the subject. The locality of this species is the most eastern of the genus; and it may be as well to mention that *S. imbricum* and *S. castaneus* are found in New Ireland, and *S. Lessoni* in New Guinea.

1. *Pupina aurea*. Testa ovali, nitida, aurea; suturis obsoletis; apertura infra incisa, supra emarginata et dentata; fissura sursum ascendente. Pl. VI. fig. 6.

*Hab.* In the soil, New Guinea.

This and the following species belong to the section of *Pupina*, with two notches in the margin of the aperture. The inferior one is in all cases a notch of more or less depth, but the upper is not correctly either notch, fissure, or incision. On the last whorl, near the outer lip, is a tooth, which together form a channel or sinus, and here there is a slight degree of emargination on the lip itself, so that at first appearance there would seem to be much more of a notch than there really is. This is a fine golden-coloured species; the notch is so deep as to become a fissure, and takes an upward and backward direction.

2. *Pupina mitis*. Testa ovali, parva, nitida, brunnea; suturis obsoletis linea rubra monstratis; apertura infra incisa, supra emarginata et dentata; fissura recta. Pl. VI. fig. 7.

*Hab.* In dead wood, New Ireland.

The appearance of my specimens is different as they are living or dead shells; the latter are as transparent as glass, but the others are of a reddish brown or even of a grayish colour. But after attentive examination I cannot doubt that they are all one species. Nor is the reddish line which traces the course of the sutures always very decided in the living shells, and in the dead the colour of it has entirely disappeared. The descriptive character of these two species is somewhat similar, but when together they are very different. This is much smaller, wants the fine golden colour of *P. aurea*, and has only a straight notch, for here it is no more. Mr. Cuming has specimens of both from me.

*Paludina seminalis*\*. Testa obtuse turrita, solidula, cornea, lævi;

\* I have thought it expedient to publish descriptions of the above shells; but they are not to be regarded as a portion of the extensive collection of Captain Belcher, C.B., about which I am now occupied.

apice erosa; anfractibus quatuor, apertura cærulescente, effusa.  
Pl. VI. fig. 8.

*Hab.* Rio Sacramento, California.

Distinguished from *P. nuclea* of Mr. Isaac Lea, which is from a neighbouring locality, by its somewhat smaller size, bluish instead of white mouth, having one whorl less, the aperture more expanded, and being without the black line round the mouth, which, when present, is so good a character in his shell, but which, in my numerous specimens of it, I do not find at all constant, and usually only to be seen in those better developed.

August 1, 1842.

XIV.—*On the spongy origin of Moss Agates and other sili-  
ceous bodies.* By J. S. BOWERBANK, Esq., F.G.S.

[Concluded from p. 18.]

IN the green jaspers the organic structure of the tissue is often preserved in the most extraordinary manner. The whole of the sponges that are found in this substance that I have examined are referable to that division, which I have proposed, in the paper "On the structure of the keratose sponges of commerce," to designate *Fistularia*, from the fibre being furnished with a central cavity like that seen in *Spongia fistularis* of Lamarck. In one case, especially, which is represented by Pl. II. fig. 5, the dimensions of the fibre and of its central tubes, the size of the interstices, of the network and its mode of arrangement, are, as far as can be ascertained from the small specimen in which they are imbedded, so exactly similar to those of *Spongia fistularis*, Pl. II. fig. 6, as to render it exceedingly difficult to believe them not to be the remains of the identical species in a fossilized state. In the paper on the keratose sponges of commerce read before the Microscopical Society\*, I have described one species of the Turkey sponges, and some of the Australian ones as having their solid fibres surrounded by a horny sheath, in which a system of minute anastomosing vessels were imbedded; and as before stated, we find in *Spongia fistularis* the fibre furnished with a continuous central cavity; but I could not detect in either of the two specimens of this sponge that I have had the opportunity of examining any traces of a vascular sheath on the external surface of the fibre. The existence of the combination of these two interesting forms of structure in the

\* Trans. Microscopical Society of London, vol. i. p. 37. pl. 3. figs. 11, 12 and 13.



same species remains to be demonstrated from the fossil species found in the green jaspers of India.

On examining a thin polished slice of one of the series of seventy before mentioned, I found a portion of the structure in an exceedingly fine state of preservation. The greater part of the tissue is composed of minute pellucid sponge-tubes, but among these there are occasionally others of much larger dimensions. The central tubular cavities in these are large and exceedingly distinct, and their external surface is furnished with a sheath or coat of a darker green than the other parts of the fibre, in the manner represented in Pl. III. fig. 1, seen with a power of sixty linear as a transparent object. This green coat to the fibre is evidently analogous to the vascular sheath, described in my paper "On the keratose sponges of commerce," as portions of a reticulated structure; is occasionally to be indistinctly observed even with this low power; and when the same parts are examined with a power of 120 linear, the presence of the reticulated structure can be proved beyond a doubt to an observer conversant with the similar tissue in the recent sponges; but fortunately there is one piece of the tissue which demonstrates its existence in the most satisfactory manner. In this piece, which is represented by Pl. III. fig. 2, as seen with a microscopic power of 120 linear, a portion of the fibre has undergone a slight degree of decomposition sufficient to remove the horny or fleshy part of the sheath, but leaving the reticulated vascular structure in a state of preservation almost as perfect as the similar tissues that occur in the recent sponges; for the vessels are as beautifully distinct when viewed with a microscopic power of 500 linear, as represented in Pl. III. fig. 3, as they are in the Australian and Mediterranean sponges.

There are two other specimens in which the reticulated vascular coat of the sponge fibre is preserved, for which I am indebted to my friend Mr. Chas. G. White of Poplar, who found them in two fragments broken out of a diluvial flint. In this case, it is evident that the two small pieces of fibre upon which it is seen are extraneous parts of another sponge which were imbedded in the one that originally gave form to the mass in which they were found. The vascular structure in the smallest piece represented by Pl. III. fig. 4, as seen with a microscopic power of 120 linear, is very like that coating the fibre of one species of the sponges of commerce from the Mediterranean; it possesses the same bold and distinct character, and, like it, throws off short branches, which terminate abruptly in *cæca*; but in the second piece, represented by Pl. III. fig. 5, the character varies somewhat, and resembles the more complex mode of disposition of the analogous tissues in one of the

Australian species, although it differs from it in having a bolder form of vessel. The occurrence of this minute and beautiful tissue in the fossil state, and its perfect accordance in structural character with the recent types, afford the most indisputable evidence of the animal origin of the fibrous structures inclosed within the bodies that are under consideration. The tissues which we have just described are not the only vascular structures that are to be found in these interesting remains. Upon examining the great central cavity of the sponge-fibre represented by Pl. III. fig. 2, at the point *a*, with a power of 120 linear, there is a dark spiral thread or line seen passing down the surface of the cavity for a considerable distance; and when this is examined with a power of 500 linear, it assumes the appearance of a spiral tubular thread, frequently obscured by irregular patches of what appears to have been a glutinous animal matter. In another specimen of green jasper in which this curious tissue occurs, and which is represented by Pl. III. fig. 6, its spiral course is much less obscure, and when examined with a microscopic power of 800 linear its tubular nature is evident. The same structure is also seen lining the cavity of almost every fibre of the sponge in the specimen of green jasper that I have before described as having its structure arranged in foliaceous plates, like the skeletons of the leaves of some endogenous plants.

Another exceedingly remarkable tissue occurs in a moss agate which is probably from Oberstein. In this specimen the sponge-fibre differs materially from any other that I have met with in the fossil state. It is arranged in the same complex mode that we observe in the sponges of commerce; but the fibre is exceedingly large, and appears to have been surrounded by a villous coat. It has either been furnished with a cavity whose size has been but very little less than its external diameter, or it has had a solid fibre like the greater number of the recent keratose sponges; but it is exceedingly difficult to decide under the present circumstances which form of structure it was that prevailed previous to its becoming fossilized. In cutting and polishing the specimen, half or a third of the substance of some of the fibres have been removed, so as to afford clear sections of them in a longitudinal direction; and wherever this has occurred, there are one or two minute vessels to be seen nearly in the centre of the fibre, running in the direction of its axis. These vessels are uniform in diameter and simple in their structure, and but very rarely dividing or sending off a branch. Within these vessels, at intervals, there are pellucid round globules, which entirely fill, or very nearly so, their internal diameters, as seen in Pl. III. fig. 7. The vessels represented in this case are from the



1000th to the 2000th of an inch in diameter, and the globules vary from the 1000th to the 2380th of an inch. In other parts of the interior of the fibre which are exposed by these sections, there are globular bodies occasionally to be seen of a much larger diameter, some of them measuring the 300th of an inch: these are frequently quite opaque; but occasionally they are somewhat semipellucid at their margins, and possess all the characters which are usually observed in the young gemmules in a very early stage of their development, as they are seen in other similar fossil specimens. Upon examining other parts of the agate, there are large round opaque bodies seen imbedded in considerable numbers amid the fibres of the sponge, which present all the characters both of structure and situation that are observed in the numerous cases of the occurrence of the gemmules in the fossil state which I have before described. From the whole of these circumstances it appears exceedingly probable that these minute vessels are true ovarian ducts: the situation in which they are found, the simplicity of their structure, and the nature of their contents strongly favour this supposition. That they are not vessels of circulation may be inferred by the existence of another vascular system which I have described as occurring in both the recent and the fossil species on the external surface of the fibre, and within which vessels in the recent state numerous very minute particles were observed, that have all the characters which the true molecules of circulation in animals so low in the organic scale might be expected to possess. In another agate, that we have had occasion to refer to before, and from which a few fibres are figured to prove the existence of the gemmules in the fossil state, there are some appearances of a curious nature that seem to illustrate the idea of the vessels I have just described being ovarian ducts. In this agate to which I allude, there are no appearances of well-defined anastomosing fibres, but in place of these we have numerous long and simple thread-like fibres (Pl. I. figs. 5 and 6.), which appear to have suffered very much by decomposition, as their substance consists not of a regular tube or of a solid fibre, but of a congeries of minute separate particles of matter, as if resulting from the undisturbed decomposition of a vessel *in situ*. Sometimes even the indication of the former vessel is not present, but its original situation is pointed out by the existence of lines of minute black bodies arranged in straight or curved lines, such as they would assume if they were inclosed within vessels which had taken such directions. In other cases, these strings of incipient gemmules are seen as represented in some parts of Pl. I. figs. 5 and 6, contained



within the boundaries of the tubes. In this state there are rarely more than single gemmules following each other in succession, but sometimes, although not often, the vessels appear to have been much enlarged in diameter, and the gemmules are then indiscriminately dispersed within its cavity. In other cases they are considerably larger in size than those we have just described, and exceed in their diameter the vessel or its remains which accompany them, as if they had outgrown and burst their natural boundaries, or that the partial decomposition of the walls of the vessel had reduced its size beneath that of the globular bodies contained within it. From the structure of this series of vessels and their contents, and their close resemblance in every respect to those which I have described as being contained within the large sponge-fibres in the former case, there can be but little doubt, that whatever may have been their nature and purpose in the living animal, they are at any rate the same tissue, but under somewhat different circumstances.

I have examined a considerable number of cut and polished specimens of Egyptian jaspers: they consist of numerous layers of various colours, which are generally concentric, but not always so; for it is frequently evident that the manner in which the material forming the layers was disposed has been suddenly changed, and the stratification has assumed a direction which is nearly at right angles to other lines of the deposit, as if the finely comminuted material had been washed by small quantities at a time, and from different directions, into the cavity which may have formed the mould which had given the external shape to the mass. Upon examining polished specimens of these pebbles with a microscopic power of 150 linear, as opaque objects by direct light, they are seen to consist of finely comminuted granules cemented together by a semi-transparent siliceous matter, very much resembling in its appearance that state in which the siliceous matter exists in the flints of the chalk and the cherts of the greensand formations. These granules are usually of a light buff or brown colour, irregular in their form, but varying very little in size; and the colouring matter with which we find the various strata of the pebble tinted appears to exist in the cementing matter, and not in the granules; for there is always a considerable mixture of light granules even in the darkest coloured bands of the stone, and this form and mode of disposition in no case appears to have been influenced by the varieties of colour.

Amid this mass of agglutinated matter, in many cases there are to be found imbedded hundreds of beautiful little foraminated shells of about the same size, and closely resembling in

form those which are found imbedded in the chalk flints ; and some of the species so closely resemble those found in the Grignon sand of the calcaire grossier, as to render it very difficult, if not impossible, to decide whether they are or are not absolutely the same species. These organic remains are frequently found in much greater quantities in some of the strata of the pebbles than in others, which would seem to indicate that they had been accidentally cast in and there imbedded ; and it often occurs that in the very next stratum to the one in which they abound few or none are to be seen.

I have examined a considerable number of specimens of Mocha stones, but have in no case observed any indication of organic remains in them ; the moss-like appearance in many of them being evidently of dendritical origin. Occasionally there are appearances, as if beautiful thin organic tissues, somewhat similar to the reticulated cuticles of plants, had been imbedded in the mass. Sometimes they assume a nearly regularly reticulated form, while at others they present a series of irregularly shaped rings and spots much like those in the skin of the leopard ; but in almost all such cases these appearances are accompanied by an evident fracture in the mass ; and upon a careful examination of many specimens of this description, I am convinced that these appearances of organic structure are but some of the many curious results that arise from the infiltration between two closely approximating surfaces of fluids containing solutions of metallic substances. A mass of Hertfordshire pudding-stone which I examined appeared to consist entirely of large and small rolled pieces and fragments of chalk flints cemented together by crystalline quartz. The larger of the imbedded masses, especially, presented all the characteristic spongy structure, spicula, and *Foraminifera* which are to be observed in almost every true chalk flint.

In all the specimens of agates and jaspers which I have examined, there are very frequently considerable spaces in which no remains of spongy texture is to be seen ; and these are filled up with silex, which in some cases assumes the form of chalcedony, while in others it has the banded appearance of the Scotch pebbles or agates, being arranged in a series of layers, which are more or less conformable to the shape of the surface presented by the surrounding spongy mass. When the silex has a predisposition to the latter mode of arrangement, it frequently happens that we find the decomposed and free particles of the animal matter have assumed a form in accordance with the law which affects the disposition of the silex ; but when the arrangement assumed is that of chalce-

dony, the effect is different; the radiating crystals of the chalcidony are then frequently found to have their terminations surrounded by a mass of molecules of the decomposed spongy matter which has been driven before them during the process of crystallization, in the same manner that the decomposed cellular structure of fossil wood is frequently observed to be driven before the radiating crystals either of siliceous matter or carbonate of lime, whichever may form the fossilizing medium; and it not unfrequently happens, that both modes of arrangement of the siliceous matter may be observed in the same specimen, the radiating or chalcidonic arrangement of crystals being often based upon the agatized portion of the specimen.

In conclusion, I may be allowed to observe, that there are circumstances attending the elucidation of the subjects treated of in this paper, which envelopes them in a greater degree of difficulty than that which attends the investigation of other organic remains, inasmuch as the structure of recent sponges has been very little studied by modern naturalists, and then, excepting in very few instances, only in such a state and manner, as to throw, comparatively speaking, but very little light on their structure, either in the recent or fossil condition. The aspect of a spongy body, when viewed without the assistance of a high magnifying power, is so widely different from its appearance beneath the microscope, as to render it highly probable that it would never be identified in the fossil state, unless the eye of the observer had been previously well practised in the investigation of the structure of the recent sponges, as well as of the fossil ones; and even then it must be remembered that we are viewing but the skeleton of the sponge. In the recent keratose species, the horny fibres, when alive, are surrounded by a mucous coat, and imbedded in fleshy matter, very little of which can be expected to remain *in situ* in the fossils; and we can only hope to find but obscure indications of its remains in the form of a turbid semi-decomposed mass, in which the more durable parts of the animal are imbedded, preserving, in some instances, their pristine form and beauty; more frequently in such a disorganized and confused state, as to surround their identification with many doubts and difficulties, and to require much patient investigation, and an acquaintance with their recent types, both in a state of perfect preservation and of nearly entire decomposition.

That the remains of sponges thus found in such abundance should almost in every case prove to be those of the keratose tribe, is what we might naturally expect to be the case; as in



the genus *Halichondria*, where the spicula form the skeleton in place of the horny fibre, the rapid decay of the fleshy matter which cemented them together would naturally lead to so quick a decomposition as to render their preservation in a fossilized state extremely improbable, when compared with those of the keratose tribe.

The results arising out of the investigation of these siliceous bodies, will not, I trust, be deemed unimportant to the science of geology. We find the layers of cherty nodules in the greensands of the Isle of Wight and other localities comprising nearly a third or a fourth of the whole mass of them: the numerous layers of flints in the chalk form also a most important portion of the deposit, and in other strata we find similar siliceous deposits prevail to a great extent; so that in reality, the sponges, by their continued attraction and solidification of the silex in solution in the water of the ancient ocean, have performed even a more important part in the gradual elevation of the land than the corals have accomplished during the countless ages of the past period.

XV.—*On some new Insects from Western Africa.* By the  
Rev. F. W. HOPE, F.R.S., F.L.S.

[Continued from vol. ix. p. 496.]

Sp. 14. *Calochroa Strachani*, Hope. Long. lin. 9; lat. lin.  $2\frac{1}{2}$ . Nigra, elytris lateribus elytrorum flavo-vittatis interneque irregulariter lineatis, macula aurantia ad humeros posita, lineaque longitudinali suturali flava, ante apicem terminata. Corpus infra violaceum, lateribus abdominis utrinque albidis capillis obsitis, pedibus concoloribus.

The above insect I received from Mr. Strachan of Sierra Leone: it seems closely allied to one received from Cape Palmas, which is much broken; as it is a remarkably fine species, it is here introduced. The following species are also from Cape Palmas: *Cicindela regalis*, *concinna*, *interrupta*, and *vittata*, all of Fabricius.

Sp. 15. *Desera viridipennis*, Hope. Long. lin.  $3\frac{5}{8}$ ; lat. lin.  $1\frac{1}{4}$ . Viridis, antennis articulis binis primis atro-piceis, reliquis fusco-flavis et pilosis. Caput cyaneum, punctatum, mandibulis obscure ferrugineis. Thorax elongatus et cyaneus, Elytra viridia. Corpus infra concolor, femoribus flavis apicibusque atris. Tibiæ fusco-piceæ tarsis concoloribus.

This elegant insect inhabits Cape Palmas, and there are also other species in my collection from Sierra Leone and Equinoctial Africa, namely, *ruficollis* of De Jean, and *tropica* and *ioptera* of Hope.

Sp. 16. *Galerita anthracina*, Hope. Long. lin. 8; lat. lin.  $2\frac{1}{4}$ . Nigra, antennarum quatuor articulis primis atris et pilosis reliquis fusco-

atris. Caput fere ovale, oculis nigris. Thorax elongatus et subcordiformis, angulis anticis rotundatis, disco eroso subvariolo. Elytra sulcata nigra, lineis elevatis, conspicuis, interstitiis striarum subtilissime punctulatis. Corpus infra nigrum quarto annulo abdominis postice flavo-marginato. Femora tibiis atris et pilosis, tarsisque infra piceo-comatis.

This is the third species only which has yet been described I believe as really African; it cannot be confounded with the Baron De Jean's *africana* or Schönherr's *interstitialis*.

Sp. 17. *Calleida nigriventris*, Hope. Long. lin.  $4\frac{1}{4}$ ; lat. lin.  $1\frac{1}{4}$ . Cyanea, duobus primis articulis antennarum rubris reliquis atro-piceis. Caput atrum et punctatum. Thorax elongato-ovalis, antice et postice abrupte truncatus. Elytra viridia striato-punctata. Corpus infra pectore rufo, quatuor ultimis segmentis abdominis nigris. Femora rubra, geniculis nigris tibiis pallide flavis, tarsis supra piceis infraque flavo-pilosis.

Sp. 18. *Eurydera 2-fasciata*. Long. lin. 6; lat. lin. 3. Nigra, antennis marginibusque thoracis brunneis, elytris atris, binisque flavis oblique irregularibus fasciis ornatis. Corpus infra brunneum femoribus tibiisque nigris, tarsis brunneo-piceis.

This species was captured at Cape Palmas.

Sp. 19. *Orthogonius latus*, Hope. Long. lin. 10; lat. lin. 5. Niger nitidus, antennis fusco-pilosis. Thorace convexo, marginibus lateralibus depressis. Elytra marginata et sulcata, sulcis fortissime punctatis. Corpus infra nigrum femoribus tibiis concoloribus, tarsisque infra auri-comatis.

*Hab.* In Sierra Leona.

This insect was given to me by Lieut. Sayers with other insects collected in that colony.

Sp. 20. *Orthogonius longipennis*, Hope. Long. lin. 8; lat. lin.  $3\frac{1}{2}$ . Præcedenti affinis, at minor. Nigra, antennis obscure atris, thorace concolori, disco crebris rugis insignito, marginibus depressis. Elytra thorace fere quadruplo longiora, sulcata, sulcis haud fortiter punctatis. Corpus infra atrum tarsisque infra nigro-piceis.

*Hab.* In Sierra Leona.

A peculiarity of this insect is worthy of notice: the second elevated ridge on each side of the suture, nearly about the middle of the elytra, is abruptly traversed by a transverse ridge, thereby dividing the stria in two parts; all the rest are entire. It is probably only a sport of nature.

Sp. 21. *Orthogonius Strachani*. Long. lin. 6; lat. lin. 3. Niger, antennis articulo primo rubro, reliquis fusco-piceis et pilosis. Thorax convexus, in medio ater, marginibus externis depressis et brunneis. Elytra sulcata, nigra, nitida, interstitiis punctulatis. Corpus infra atrum tarsis solummodo piceis.

*Hab.* In Sierra Leona.

Sp. 22. *Orthogonius dubius*. Long. lin.  $4\frac{1}{2}$ ; lat. lin. 2. Ater, antennis submoniliformibus testaceis, thorace angulis anticis rotundatis,

lateribus, marginibusque elevatis insignito. Elytra sulcato-punctata sulcis fortiter impressis. Corpus infra flavum femoribus tibiisque luteis palpis tarsisque obscurioribus.

This species inhabits Cape Palmas as well as Sierra Leone: as it verges from the type of *Orthogonius* chiefly in the antennæ, I have not regarded it, as some entomologists would, as a subgenus; the leading characters pertain to *Orthogonius*.

Sp. 23. *Catascopus Savagei*. Long. lin.  $6\frac{1}{2}$ ; lat. lin.  $2\frac{1}{4}$ . Viridis, capite cyaneo, thorace læte virescenti, elytris striato-punctatis, colore saturatori. Corpus infra violaceum femoribus in medio rubris, tibiis nigris tarsisque fusco-piceis.

The above species was taken in the vicinity of Cape Palmas.

Sp. 24. *Catascopus jucundus*, Hope. Long. lin.  $4\frac{1}{4}$ ; lat. lin.  $1\frac{3}{4}$ . Viridis, capite aureo-virescenti, thorace concolori. Elytra cyanea, lateribus læte viridibus et punctatis. Corpus infra piceum antennis pedibusque obscurioribus.

This insect I received from Mr. Strachan, who took it at Sierra Leona; and as it is allied to the foregoing species, it is here introduced.

Sp. 25. *Ozana lutea*, Hope. Long. lin. 4; lat. lin.  $1\frac{1}{2}$ . Pallide flava, capite nigricanti antennisque brunneis. Thorax testaceus elytris concoloribus. Corpus infra flaveolum pedibus luteis geniculisque fuscis.

*Hab.* Circa Palmas.

Sp. 26. *Scarites Savagei*. Long. lin. 16; lat. lin. 5. Niger, capite antice foveis binis fortiter impressis. Thorace fere lunæformi linea longitudinali in medio impresso. Elytra lineato-punctata punctis leviter impressis. Corpus infra concolor. In honorem Savagei denominatus.

*Hab.* Circa Palmas.

Sp. 27. *Panagæus Savagei*, Hope. Long. lin.  $11\frac{1}{2}$ ; lat. lin. 5. Niger, antennis pilosis elytris oblongo-ovatis, convexis sulcato-punctatis maculis duabus magnis flavis, altera antica transversa, irregulari, altera postica, fere rotundata. Thorax hexagonus concavo-excavatus et varioloso-punctatus. Corpore infra nigro, pedibus concoloribus.

*Hab.* Circa Palmas.

By carefully examining the yellow spots on the elytra, the species of *Panagæus* may readily be determined. In the present insect the spot covers five interstitial spaces, and all are united.

Sp. 28. *Panagæus Raddoni*, Hope. Long. lin. 11; lat. lin.  $4\frac{3}{4}$ . Niger, antennis atro-pilosis, thorace fere hexagono concavo excavato et varioloso-punctato, elytris sulcato-punctatis, quatuor maculis flavis insignitis pedibusque nigris. In honorem Raddoni denominatus.

*Hab.* Circa Palmas.

The two anterior yellow spots in this species cover five interstitial spaces and half of a sixth, and the two posterior only four similar spaces.



Sp. 29. *Panagæus Sajersii*, Hope. Long. lin.  $10\frac{1}{2}$ ; lat. lin.  $4\frac{1}{4}$ . Niger, antennis valde pilosis, thorace hexagono, haud fortiter excavato, at varioloso-punctato, elytris sulcato-punctatis quatuor maculis flavis insignitis pedibusque atris.

*Hab.* Circa Palmas.

It is named in honour of Lieut. Sayers, an assiduous collector of insects when resident at Sierra Leone. The two yellow anterior spots, as well as the posterior, cover five interstitial spaces and a part of a sixth.

Sp. 30. *Panagæus Klugii*, Hope. Long. lin.  $9\frac{1}{4}$ ; lat. lin. 4. Niger, antennis tribus primis articulis atris, reliquis fusco-rubris et pilosis, thorace hexagono concavo excavato et subtilissime punctulato. Elytris sulcatis, quatuor maculis flavis insignitis pedibusque nigris.

*Hab.* Circa Palmas. In honorem celeberrimi Klugii denominatus.

In this species the two anterior spots cover five interstitial spaces, and these are in shape nearly triangular, the base being situated nearly at the outer margin of the elytra with the apex directed towards the suture. The two posterior markings are more rounded, and cover only four interstitial spaces.

Sp. 31. *Panagæus tropicus*, Hope. Long. lin. 8; lat. lin.  $3\frac{1}{2}$ . Niger, antennis atris, thorace semicirculari haud excavato, subdepresso et creberrime punctulato. Elytris sulcato-punctatis quatuor maculis subquadrato-flavis pedibusque nigris.

*Hab.* In Sierra Leona.

This species has the two anterior spots covering six interstitial spaces, whilst the posterior cover only five.

Sp. 32. *Panagæus Erichsoni*, Hope. Long. lin. 8; lat. lin. 3. Niger, tribus primis articulis atris nitidis, reliquis fusco-pilosis, thorace semilunari, angulis anticis rotundatis, posticis abrupte truncatis, disco varioloso-punctato. Elytris sulcato-punctatis quatuor irregularibus maculis insignitis, corpore infra pedibusque nigris.

*Hab.* Circa Palmas.

This elegant species is named in honour of Dr. Erichson of Berlin, the author of a valuable work on the Brachelytra or Rove Beetles. In the above insect only four interstitial spaces are covered with the yellow spots, and all of them are irregularly shaped.

Sp. 33. *Panagæus Strachani*, Hope. Long. lin.  $9\frac{1}{2}$ ; lat. lin.  $3\frac{1}{2}$ . Niger, antennis nigro-pilosis. Thorace fere hexagono angulis anticis rotundatis posticis abrupte truncatis, disco fortiter excavato et punctulato, elytris parum elongatis sulcato-punctatis, maculisque quatuor flavis irregulariter insignitis corpore pedibusque atris.

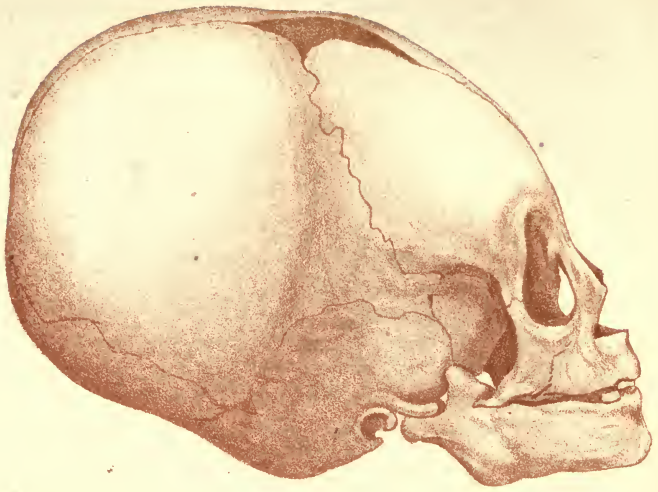
*Hab.* In Sierra Leona.

This remarkable species is named after my friend Strachan, some years a resident in the above colony. To his exertions zoologists are much indebted for many valuable additions to their museums and cabinets. In the above species each of the four spots cover five interstitial spaces.

Sp. 34. *Panagæus grossus*, Hope. Long. lin. 11; lat. lin.  $4\frac{1}{2}$ . Niger,



1



2



3





antennis atris, thorace fere hexagono angulis anticis rotundatis, posticis abrupte truncatis, disco subconvexo punctato, lateribus parum depressis et marginatis, elytris sulcato-punctatis, quatuor maculis rubro-miniatis insignitis corpore pedibusque nigris.

The above insect was lately received from the Ashantee country, and was sent to me by Capt. Parry of Cheltenham for description.

From the number of rare species already described, some faint idea may be formed of the richness of African entomology. I regret to add that several others of equal rarity are passed by, as being too mutilated for description. Various new types of form have also lately reached me from the country of the Ashantees as well as the Gold Coast; the most remarkable of them at a future time I propose to publish.

August 25, 1842.

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XVI.—*A brief Account of two Peruvian Mummies in the Museum of the Devon and Cornwall Natural History Society.*  
By P. F. BELLAMY, Surgeon, of Plymouth\*.

[With a Plate.]

THESE interesting relics were brought to England by Captain Blanckley of the Royal Navy, who in the year 1838 presented them to the Society under the incorrect denomination of Peruvian Mummies. Of the exact locality whence they were procured I am at present unable to furnish information; but on presenting them, Capt. Blanckley stated to me in conversation, that he exhumed them himself from an elevated tract of land in the mountainous district of Peru, but at a considerable distance from the lake Titicaca. He also informed me that such remains were very abundant there, that they were found very near the surface, the light sandy soil having been removed by the wind, so as to expose many of them (a circumstance which led to their discovery), and that each was observed to have an upright posture in the soil, and to have under it a piece of matting†.

Each mummy (for so, in order to avoid a confusion of terms, I will continue to call them,) presented the appearance of a rudely shaped oval bundle, secured by numerous lashings of a coarse rope, made of a kind of flag or rush, passed two or three

\* Read to the Zoological Section of the British Association, Aug. 3, 1841.

† One of the specimens was packed in a tin case with some of the sand taken from the spot; it is impregnated with marine salts to such an extent as to impart to the whole a strong smell somewhat resembling iodine; so that there is reason to believe that the preservation of the remains is accidental, and principally attributable to the presence of these extraneous anti-putrescents.

times round the neck, and then in a variety of directions over the trunk, and knotted together at each intersection so as to form a network with broad interspaces; every part but the head being thus firmly compressed. The first and principal envelope proved to be an article of dress, made of a scarlet-coloured stout cloth, consisting of a single piece, sewn together up the sides, and with a hole for the head and each arm; thus resembling a loose frock without sleeves, and not much unlike a ponsha or mantle. The one preserved is of capacious size, and was no doubt at one time worn by an adult, perhaps the father of the deceased. As a wrapper for the dead, a portion of it was drawn smooth over the head and face, then allowed to fall in large irregular folds over the body, and the superfluous portion folded up at the feet. The second and innermost envelope consisted in one of a thin coarse cotton, and in the other of a piece of woollen cloth wrapped rudely round the body, but, like the former, drawn smooth over the head and face. Between the two wrappers were found the model of a raft or catamaran, two small bags made of a neatly striped cloth, filled with ears of an undescribed variety of Indian corn, and two small earthen pots, one of which probably at the time of deposit contained a little water, and the other it is not unlikely was intended for a cooking utensil. Such were the models found in conjunction with these remains; but with others which Captain Blanckley examined on the spot, they were of various descriptions, and the earthen vessels of different patterns: thus we have presented by him three flat dishes or baskets of neat wicker-work; a fishing line with a float made of reeds matted together, and with a small black oval-shaped pebble for a weight; a very rudely made fishing basket; the half of a small gourd, probably intended for a lamp; and as many as nine sorts of earthen vessels, some of which are neatly painted.

Here we may remark, that two of the pots and two of the bags contain leaves of one of the *Musaceæ*; and that in two or three others Capt. Blanckley found a quantity of a blackish powder, and lying loosely not far from one of the mummies he presented, a piece of sugar-cane about 18 inches long.

By a coincidence, the mummies under our immediate notice are the remains of children, one of which was not more than a few months old, and the other could not be much more than one year; and judging from their relative size and figure, male and female. Pl. IV. figs. 1 and 3.

Of the first examined all the soft parts had mouldered into dust, and nothing but the bones and a small portion of hair remained. In the other the skin was hard and shriveled, the

hair black and silky, but both much discoloured by the putrefactive process, and the soft tissues melted down to a brown-coloured unctuous kind of matter, by which means the face was so distorted that not a feature was discoverable. This one however displayed the manner in which the body was arranged for interment.

The principal object appears to have been to give to it a sitting or crouching attitude; for this purpose the thighs were pressed up against the abdomen and the legs flexed upon them, and then secured by a bandage made to encircle the trunk and the bent limbs two or three times. In addition to this, the arms were brought across the body and tied together at the wrists by a piece of cord, and the head was pressed down upon the chest so as to throw the occiput uppermost.

From each mummy I selected the bones of the skull, and by a little mechanical contrivance restored them to their natural position.

On examining these skulls it will be found that the face is short and projecting, the chin square and protruding, the malar bones large and prominent, the nostrils large and open, the orbits large and squared, and the orbital margins thick and rounded; but the crania, from the singularity of their form, deserve the most marked attention: the frontal bone is narrow, recedes at once from the superciliary ridges, and presents a flattened aspect as far as the coronal suture; the parietal bones rise for about two-thirds of their length till they reach the vertex, at which point they suddenly round off to form the occiput; and the occipital bone, which is irregularly flattened, forms principally the under part of the skull, only a small portion of it occupying the back of the head, and that being turned up rather suddenly to meet the parietal bones. Thus it will be observed that the whole skull is thrown back, has a remarkably large posterior development, and is of an ovoid form, with its long axis from before to behind.

Corresponding with this configuration, all the large bones of the skull are considerably elongated; and this will be better displayed by contrasting them with those of an infant of the Caucasian variety, whose cranium is of the ordinary globular figure; thus the frontal bone, measured from its junction with the nasal to its line of junction with the parietal, is in the Caucasian 4 inches, in the Peruvian  $4\frac{1}{2}$  inches; the parietal, from the extremity of the angle in the temporal fossa to the postero-superior angle in the Caucasian, is  $5\frac{1}{2}$  inches, whilst in the Peruvian it is  $6\frac{1}{4}$  inches; and the occipital, from its junction with the sphenoid to the apex of the lambdoidal suture in the Caucasian, measures 5 inches; and in the Peruvian  $5\frac{3}{4}$



inches. In making these measurements I have chosen the skull of the elder mummy, because its form is not so exaggerated as in the younger, in which the bones, from the greater projection of the occiput, are comparatively longer.

It will also be found, that even if the circumference of the two skulls be the same by measurement in a transverse direction over the vertex from one occipital condyle to the other, the Peruvian through its long axis is  $5\frac{3}{4}$  inches, whilst that of the Caucasian is but  $4\frac{3}{4}$  inches. The position of the foramen magnum too is remarkable, for it will be found to be considerably anterior to the centre of gravity; thus, from the centre of the condyle of the occipital bone to the alveoli of the front incisors, the distance is but 3 inches, whilst from the same point to the line described by the greatest posterior projection it is  $3\frac{5}{8}$  inches; nor is the facial angle less remarkable: in one it does not exceed  $85^\circ$ , and in the other it is as little as  $82^\circ$ ; being in the former  $5^\circ$ , and in the latter  $8^\circ$  less than in the Caucasian of the same age.

Here I will venture to call the attention of the Section to the formation of the occipital bone, for in each skull the same peculiarity exists; that is, in the addition of a fifth rudimentary portion of the same figure, and occupying the same position in both, viz. between the occipital portion of the bone commonly so called, and the parietal bones, but below the lambdoidal suture; in this particular differing essentially from the adventitious os triquetrum sometimes found. In the younger of the two individuals it is, like the other rudiments, distinct and separate (Pl. IV. fig. 2.); whilst in the elder, in which the ossific process is more advanced, the junction of it with the occipital portion is nearly complete, the suture only remaining open at either extremity for little more than an inch, but traceable through its entire length. Does this exist by a strange coincidence as an anomaly of structure, or is it to be considered as a normal formation peculiar to this race of beings?

It will be manifest from the general contour of these skulls that they are allied to those in the Museum of the College of Surgeons in London, denominated Titicacans. Those adult skulls are very generally considered to be distorted by the effects of pressure; but in opposition to this opinion Dr. Graves has stated\*, that "a careful examination of them has convinced him that their peculiar shape cannot be owing to artificial pressure;" and to corroborate this view, we may remark that the peculiarities are as great in the child as in the adult, and indeed more in the younger than in the elder

\* Dublin Journal of Med. and Chem. Sciences, No. 15.

of the two specimens now produced : and the position is considerably strengthened by the great relative length of the large bones of the cranium ; by the direction of the plane of the occipital bone, which is not forced upwards, but occupies a place in the under part of the skull ; by the further absence of marks of pressure, there being no elevation of the vertex nor projection of either side ; and by the fact of there being no instrument nor mechanical contrivance suited to produce such an alteration of form (as these skulls present) found in connexion with them\*.

The remarkably flattened forehead, indicative of the very small size of the anterior lobes of the brain, is worthy of remark ; and it will be for phrenologists to reconcile this fact with those now recorded, which bespeak for this people a tolerably advanced state of civilization : they were manufacturers and agriculturists ; bestowed their dead with peculiar care, paying particular attention to their imaginary wants, and had certain superstitious notions connected with their departure to some distant region. Are these marks of intellect the result of original powers of invention, or are they the result of intercourse with other and more civilized people ?

This peculiar race were in all probability the aborigines of the country ; and it is possible that these mummies may be the relics of some of the last of the Titicacans, deposited after the invasion of the country by those enlightened conquerors, who subdued them, not by the sword, but by moral agencies, and imparted to them a knowledge of their arts and rites and superstitions. But it will be for the ethnologist to show how far the facts now stated are found to accord with the manners, customs and attainments of eastern nations ; and to say to what people the first emigrants to this part of the western shores of America belonged. Failing in this however, it will, I think, be fair to attribute to the indigenæ a mental capacity equal to originate such inventions, and to arrive at such attainments as the specimens before us manifest.

It is probable that the extinction of this once typical variety of the human family was produced gradually by an intermixture of blood with those who afterwards became the lords of the soil, and whose line of princes, untainted by such intercourse, formed the Incas dynasty so remarkable in the history of Peru.

Lastly, I would suggest that the adult skulls of Titicacans before alluded to are of two kinds, the one possessing all the peculiarities of the race in its unalloyed form—the true Titicacan ; and the other being of a spurious character, resulting

\* See the note at the end of this communication.

from the union of the indigenæ with the settlers of Asiatic origin, the companions of Manco Capac of traditionary fame. Accordingly in the former we observe the receding forehead, the elongated cranium, and the horizontally-placed occipital bone; and in the latter a modified form, in which, combined with the receding forehead and elongated cranium, there is an elevated vertex and flattened occiput, formed principally by an altered position of the occipital bone; which, instead of lying on a plane with the horizon, rises in a sloping direction upwards and backwards to meet the parietal bones.

*Note.*—After the reading of this paper, Prof. Owen stated that he entertained an opinion that their peculiar form was given to them by pressure, such as might be applied by a bandage passed round the head; and he suggested that a short fillet (about 16 inches long) found with the younger of the two mummies might have been employed for this purpose. This bandage, however, I consider was used to secure the lower extremities to the trunk, and on consideration I am disposed to maintain the same opinion as I have stated above: 1st, because this fillet is but  $1\frac{1}{2}$  inch wide, whereas the flattened portion of the skull is more than 3 inches, extending over the os frontis from immediately above the superciliary ridges to an inch beyond the coronal suture, so as to involve the anterior portion of the parietal bones; 2nd, the line of depression in these skulls has a direction over the middle of the os occipitis, and then over the anterior third of the parietal bones, first where the angle dips down between the frontal temporal bones, and then immediately behind the coronal suture, and not at all over the os frontis; 3rd, because, if pressure had been used in this direction, it would have contracted the great fontanelle, of which there is no mark whatever; indeed in the elder of the two, in which the depressed line is most visible, the fontanelle is most open; and lastly, if a circular bandage had been applied, it would have given a circular form to that portion at least compressed by it; whereas however a transverse section, taken by measurement, shows that the skulls have a compressed pyriform figure, the larger extremity representing the flattened and upper surface, and the smaller corresponding with the contracted aspect of the occipital bone.

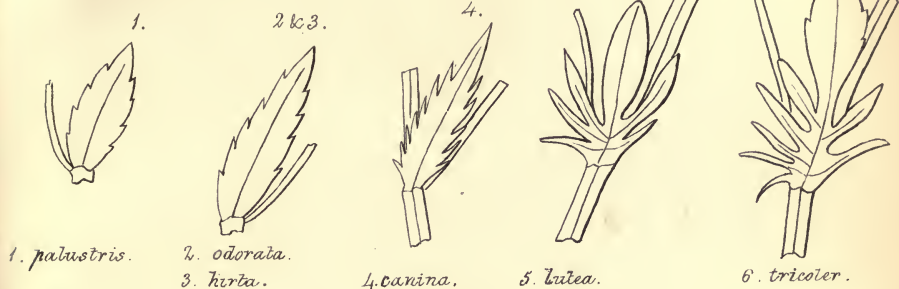
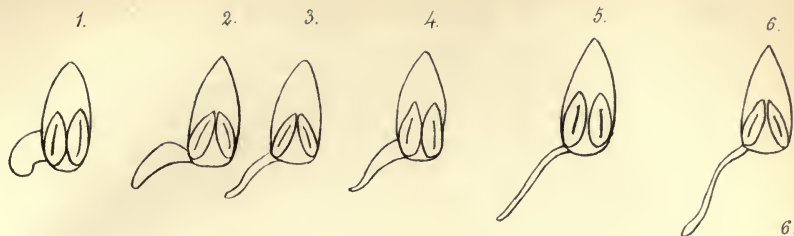
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XVII.—*On the characters of the British Violets.* By CHARLES C. BABINGTON, M.A., F.L.S., F.G.S., &c.

[With a Plate.]

THE remarkable difference which exists between the value of characters in different orders of plants, and sometimes even in genera,—the form or structure of any particular organ being of generic value in one order, specific in another, and sometimes not even sufficiently constant to distinguish varieties in a third,—must always give considerable interest to an investi-





1. palustris.

2. odorata.

3. hirta.

4. canina.

5. lutea.

6. tricolor.

*Viola.*

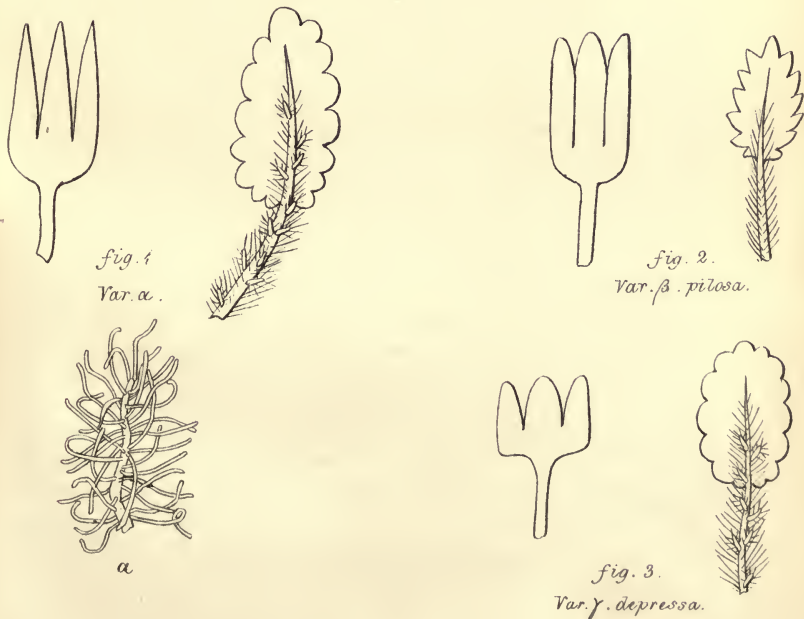


fig. 1

Var.  $\alpha$ .

fig. 2.

Var.  $\beta$ . pilosa.

fig. 3.

Var.  $\gamma$ . depressa.

a

*Dryas octopetala.*



gation of minute external differences, the examination of which would probably appear to be little better than a waste of time to a superficial observer; more particularly when, as is often the case, they are so minute as to escape the notice of all except the practised descriptive botanist. It is scarcely necessary to mention instances in proof of so well-known a fact, but still it may be perhaps as well to produce a single example, before entering upon the peculiar subject of this communication. The form and sculpture of the external coat (*testa*) of the seed is found to distinguish some few orders amongst the Monocotyledons; it is occasionally of generic value; in the *Chenopodiaceæ* and *Polygoneæ* it distinguishes species, but amongst the *Caryophyllaceæ* it does not appear to possess sufficient constancy to point out even varieties.

But to proceed to the subject more particularly before us. In a communication to the Botanical Society at Edinburgh, my friend Mr. Edward Forbes has directed attention to the form of certain curious spurs or appendages attached to the base of two of the stamens and extending into the spur of the corolla, as affording excellent characters for the formation of sections in the genus *Viola*\*, but he has not applied them in the distinction of species. He finds three different forms to pervade all the Violets that have come under his notice, namely, 1st, a rounded spur, such as is found in *V. palustris*; 2ndly, a lancet-shaped spur, which occurs in *V. odorata*, *V. canina*, and *V. hirta*; and 3rdly, a filiform spur, as in *V. tricolor* and *V. lutea*. In the course of a series of observations which had for their object the application of these characters to the British Violets, I soon found that the direction of the cells of the anthers differed considerably in the several species, and I have been led to the conclusion that they also may be employed with great advantage in the discrimination of nearly allied species. I have found the cells of the anthers to be always nearly parallel to each other in *V. palustris*, *V. canina*, and *V. lutea*; and constantly distant below, but converging upwards, until their apices nearly, if not quite, touch each other in *V. odorata*, *V. hirta*, and *V. tricolor*. If now we look to the form of the stipules and the presence or absence of an elongated stem, we shall have four sets of characters by which six species may be satisfactorily distinguished in Britain, nor does it appear to me to be advisable to divide our native Violets into a greater number of species.

I shall now endeavour to point out the characters of these plants, and hope, by the help of the accompanying illustration,

\* See Ann. Nat. Hist. vol. vii. p. 157.



to make the subject easily understood. In *Viola palustris* we have a stemless plant with ovate acute stipules, a short rounded spur, and the cells of the anther nearly parallel. Its want of stem and short spur distinguish it from *V. canina* and *V. lutea*, as do also its stipules; the parallel cells and the spur separate it from *V. odorata* and *V. hirta*; and all these characters from *V. tricolor*. In *V. odorata* and *V. hirta* we have stemless plants with lanceolate stipules and diverging cells to the anthers, their antherine spurs also belonging to the lancet-shaped section; but the spur of *V. hirta*, by its near approach to a linear form, satisfactorily distinguishes that plant from *V. odorata*, in which it is truly lancet-shaped. We now come to *V. canina*, under which I include the *V. flavicornis* and *V. lactea* of Smith; here we find lanceolate inciso-dentate stipules combined with a decided stem, parallel antherine cells, and a lancet-shaped spur. This combination of characters clearly separates it from any of the foregoing. The two remaining species, *V. tricolor* and *V. lutea*, are distinguished from all the others by their filiform spurs and palmate-pinnatifid stipules, and are severally characterized by the parallel cells and almost palmate-pinnatifid stipules, of which the terminal lobe is linear-lanceolate, or lanceolate and quite entire, of *V. lutea*; and the diverging cells and lyrate-pinnatifid stipules with a more or less dentate or crenate terminal lobe of *V. tricolor*. Under *V. lutea* I include the *V. Curtisii* of the 'Supplement to English Botany,' as its differences are, according to my views, of but slight value; and I also consider *V. arvensis* as only a variety of *V. tricolor*.

The following is the manner in which I consider that the British species should be characterized and arranged:—

#### Genus VIOLA, Linn.

A. *Antherine spur rounded, stipules ovate-acute, stems scarcely apparent.*

1. *V. palustris* (Linn.). Cells of the anthers nearly parallel; spurs short, thick, rounded; spur of the corolla very short, obtuse; leaves reniform-cordate, glabrous. Pl. VII. fig. 1.—*Eng. Bot.* 444. *Reich. Icon. Fl. Germ.* f. 4491.

Antherine spurs concave below, convex above. Cells of the anthers slightly separated below. Fl. pale lilac, with purple streaks. Sometimes the petioles are slightly hairy, but usually they are glabrous.— $\mu$ . June, July, bogs and marshes in mountainous districts.

B. *Antherine spurs lancet-shaped, stipules lanceolate, stems scarcely apparent, leaves cordate.*

2. *V. odorata* (Linn.). Cells of the anthers diverging below; spurs lancet-shaped, blunt; spurs of the corolla obtuse, straight; lateral

petals entire, lower one emarginate; leaves cordate, scions creeping. Pl. VII. fig. 2.—*Eng. Bot.* 619. *Reich. f.* 4498.

Antherine spur narrowed to an obtuse point; spur of the petals inflated towards the end, slightly channeled above. Flowers purple, often white. Bractees above the middle of the flower-stalk. Petioles with deflexed hairs. Lateral petals with a hairy line, which is sometimes wanting (*V. imberbis*, Leight.).— $\mathcal{A}$ . March, April, common.

3. *V. hirta* (Linn.). Cells of the anthers diverging below; spurs nearly linear, obtuse; spur of the corolla obtuse, hooked at the point; petals entire or slightly emarginate; leaves cordate, scions wanting. Pl. VII. fig. 3.—*Eng. Bot.* 894. *Reich. f.* 4493.

Antherine spur scarcely broader at the base than the apex; spur of the petals compressed, not channeled; sepals obtuse. Flowers pale blue, sometimes white; lateral petals usually with a hairy line. Bractees below the middle of the flower-stalk. Petioles with spreading hairs.

Var.  $\beta$ . *calcareae*. Flowers smaller, peduncles much longer than the leaves, sepals oblong-ovate, obtuse.— $\mathcal{A}$ . April, May; common on a limestone soil.  $\beta$ . Gogmagog Hills, Cambridgeshire.

C. *Antherine spurs lancet-shaped; stipules lanceolate, an evident stem; leaves cordate or lanceolate.*

4. *V. canina* (Linn.). Cells of the anthers parallel; spurs lancet-shaped, acute, spurs of the corolla obtuse; leaves cordate-ovate or oblong; stipules entire, ciliate or dentate; stems ascending. Pl. VII. fig. 4.—*Eng. Bot.* 620.

Spurs of the petals inflated in their lower half, slightly channeled above. Flowers blue or rarely white.— $\mathcal{A}$ . April to August; common on banks, in woods, &c.

The leaves are cordate-ovate, or somewhat oblong-acute, not acuminate; the stipules usually oblong-lanceolate, and the fruit truncate-obtuse or apiculate in the typical variety; leaves cordate-ovate or subreniform-acuminate; stipules lanceolate-attenuate, and the fruit acuminate in var.  $\beta$ . *sylvatica*; leaves roundish-cordate, rather acute, small; flowers large, base of the stem woody in  $\gamma$ . *pusilla* (*V. flavicornis*, Sm.) ‘*Eng. Bot.*’ 2736; similar to the last, but with the leaves cordate-oblong in  $\delta$ . *montana* (*V. montana*, Linn.?)\*; leaves cordate-ovate, subattenuated above, and slightly narrowed into the petiole; stipules large, incised, base of the stems woody in  $\epsilon$ . *Ruppii*; leaves ovate-lanceolate, narrowed into the petiole, the lowermost cordate; stipules large, incised; flowers cream-coloured in  $\zeta$ . *lactea* (*V. lactea*, Sm.) ‘*Eng. Bot.*’ 445. Notwithstanding the great difference which exists between the

\* The specimens of *V. montana* in the Linnæan Herbarium appear to me to belong to *canina*, being a large upright form of that plant, with immense stipules and cordate-lanceolate leaves.

extreme forms of this plant, I cannot but agree with Bertoloni ('Fl. Ital.' ii. 705) in considering the above as only varieties of one species.

D. *Antherine spurs filiform, stipules\* palmate-pinnatifid, stems evident.*

5. *V. lutea* (Huds.). Cells of the anthers nearly parallel; spurs elongated, filiform, spur of the corolla as long or longer than the calycine appendages; sepals acute; leaves crenate-serrate, lower ones ovate-cordate, upper ovate or lanceolate; stipules palmate-pinnatifid, the terminal lobe linear or linear-lanceolate, entire; stems ascending. Pl. VII. fig. 5.—*Eng. Bot.* 721. *Reich.* f. 4519. Flowers wholly yellow, yellow with the two upper petals purple, or wholly purple, varying greatly in size; capsule globose.— $\mathcal{A}$ . June, July; common in mountainous pastures.

Distinguished from *V. tricolor* by its stipules, which have all their lobes of nearly equal size, the lateral ones (usually one, sometimes two on the side next the stem, and three on the other) all springing from near the base of the stipule and the terminal one, which is sometimes considerably larger than the others, narrow, and always quite entire. *V. Curtisii* (Forst.), 'Eng. Bot.' 2693, appears to me to differ from this only in the lower part of the stipules being more elongated, so as to separate the lateral lobes and give them a more pinnatifid form. In *V. grandiflora* (Linn.!), to which this has been sometimes referred, the spur is twice as long, the corolla much larger, and the sepals bluntish, as in *V. calcarata*; and in the specimens contained in Sir J. E. Smith's Herbarium, and called by him *V. grandiflora*, the stipules are remarkably large, with five acute narrow lobes close to the base on the outside, and a single similar one near the top of that side; on the inner side the lower half is without any lobes, but there are two acute lobes in the upper half, the terminal lobe not being larger than the others. One of the specimens has very peculiar stipules, extremely long and narrow, with three small narrow acute lobes externally at the base, and one rather larger at about the middle of the inner side. The late lamented Prof. Don was disposed to consider *V. grandiflora* (Linn.) as a form of *V. calcarata* (Linn.). The *V. grandiflora* (Vill.), of which I possess specimens from the original locality, namely, the Vosges Mountains (gathered and named by Schultz), is identical with the *V. lutea* (Sm.) and *V. grandiflora* (Huds.) from the Clova mountains; and although the Scottish specimens have usually smaller flowers, still in one or two of them the

\* The stipules on or about the middle of the stem should always be examined in determining the species of *Viola*.



corolla is nearly as large as in those from France. *V. sude-tica* (Willd.) I believe to be the same plant. In a communication to the Botanical Society on the 13th of January, 1842, Mr. A. Seton appears to be of opinion that *V. lutea* is not distinguishable from *V. tricolor*, and most correctly states that the characters usually employed to distinguish these plants are not sufficiently constant. I cannot however agree with him in his conclusion that they are forms of one species, as I believe them to be constantly distinguishable by attending to the characters given above; neither can I agree with him in separating *V. arvensis* (Murr.) from the following species.

6. *V. tricolor* (Linn.). Cells of the anthers diverging below; spurs elongate, subclavate-filiform, spur of the corolla about equal to the calycine appendages; leaves crenate-serrate, lower ones ovate-cordate, upper ovate or ovate-lanceolate; stipules lyrate-pinnatifid, the terminal lobe spathulate-crenate; stems ascending. Pl. VII. fig. 6.—*Eng. Bot.* 1287. *Reich. f.* 4517.

Flowers with the upper petals purple, lateral ones bluish, lower one yellow; capsule ovate.

Var.  $\beta$ . *arvensis* (*V. arvensis*, Sibth.), *Eng. Bot.* 2712, has the petals shorter than the calyx and whitish, and the capsules nearly glo-bular.— $\odot$ ? May, September, common;  $\beta$ . in corn-fields.

A very variable plant, both in the colour and size of its co-rol-la, and the size and outline of the terminal lobe of its sti-pules, which is sometimes copiously crenate, but often with only one or two notches upon each side. I have never seen it quite entire.

The following table will perhaps place in a clearer light those characters to which this paper more particularly refers :

		1. palustris.	2. odorata.	3. hirta.	4. canina.	5. lutea.	6. tricolor.
Antherine spur	rotund . . . . .	*					
	lancet-shaped ..	....	*	*	*		
	filiform . . . . .	....	....	....	....	*	*
Antherine cells	parallel . . . . .	*	....	....	*	*	
	diverging . . . . .	....	*	*	....	....	*
Stipules . . . . .	ovate-acute . . . .	*					
	lanceolate . . . . .	....	*	*	*		
	palmate-pinnatifid	....	....	....	....	*	*
Stems . . . . .	obscure . . . . .	*	*	*			
	apparent . . . . .	....	....	....	*	*	*

XVIII.—*Proposed Arrangement of the Echinodermata, particularly as regards the Crinoidea and a Subdivision of the Class Adelostella (Echinidæ).* By THOMAS AUSTIN, Esq., and THOMAS AUSTIN, Jun.

HAVING been engaged for several years past in investigating the *Crinoidea*, both recent and fossil, as well as the *Echinodermata* generally, we have arrived at the conviction that the existing classification cannot with propriety be applied to fossil species, we therefore purpose to adopt in our proposed monograph on the *Crinoidea* the arrangement as now submitted.

The numerous works which have already appeared, or are in progress, respecting the *Echinodermata*, would, it might be supposed, render further observations on the subject superfluous; but as these works are mostly at variance with each other, and not unfrequently with themselves as regards the extent and limits of the different families belonging to this extensive and highly interesting class of animals, we are induced to offer a few observations on the want of a proper general arrangement of the *Echinodermata*, whereby every attempt at their classification on a sure and solid foundation has in every instance signally failed. Professor Forbes has, it is true, in his very interesting work (*History of British Starfishes and other animals of the class Echinodermata*) thrown them into natural groups, but then the characters he has assigned to the *Crinoidea* and *Echinidæ* would, if followed, exclude our numerous fossil species from their proper station in the animal kingdom.

It is with considerable diffidence we venture to dissent from such justly approved authors as Mr. Forbes and some others who have written on the *Echinodermata*; but as their views, if strictly observed, would place our interesting fossil species "nowhere," we have no choice left but to propose an arrangement of our own, founded on characters which we hope will exclude none that properly belong to the *Echinodermata*; and though we feel diffident as to our abilities in being able to make our proposed classification sufficiently intelligible, we feel none whatever as to our motive, which is, if possible, to place the nomenclature relating to the *Echinodermata* on a solid basis, whereby the views of the zoologist and the palæontologist may be in unison, and not run counter to each other as is too frequently the case; and also to plead in behalf of an interesting and much maligned class of animals, and to demand that they may be allowed to take rank and precedence in the animal kingdom according to strict justice,

and that their inalienable natural rights may be preserved intact.

Our objections to Professor Forbes's arrangement chiefly apply to the characters of his divisions, which, however natural they may be as regards the recent animals, are wanting in reference to the calcareous framework of fossil species, by which alone we can study their organization and arrive at satisfactory conclusions respecting their probable manner of growth, propagation, alimentation, in a word their habits, and the structure and functions of their numerous organs.

The aquiferous system, with its connexion with the organs of progression, which Mr. Forbes makes the sole distinguishing character of his orders, and which he has shown to be wholly wanting in his sixth order *Vermigrada* (*Sipunculidæ*), would, if adopted, exclude our proposed first order *Cionacineti* (fixed *Crinoidea*) from our class *Pinnastella*, as would the distinguishing characteristics of his fourth order *Cirrhi-Spini-grada* (*Echinidæ*) exclude our order *Columnidæ* or fixed *Echinidæ*, which contains several genera and species of our class *Adelostella*.

In our proposed arrangement of the *Echinodermata*, we have endeavoured to obviate the difficulties referred to, and to establish our divisions on a combination of anatomical and zoological evidence adduced from the comparison of recent and fossil species.

Synopsis of the proposed arrangement :—

Subkingdom CENTRONIÆ, *Pallas*.

Section ECHINODERMATA.

Body more or less protected by a shelly covering, composed of variously shaped calcareous plates imbedded in the substance, or attached to the surface of the skin. These pieces are formed by the deposition of earthy particles round certain central points, so that when fully developed they observe a well-defined arrangement which is easily traceable into certain distinct forms, each peculiar to its kind. This external covering, though formed of numerous pieces, continues firmly united during the animal's life ; but after death, in consequence of the liability of the investing membrane to destruction, the bone-like plates become incoherent. By the mode of structure pointed out, the increase of the animal as regards the size and number of the plates is duly provided for, and injuries of the shelly coat from external violence are readily repaired by the renewed deposition of calcareous matter.

All the known Echinodermes are marine, and are sustained by animal food.



Class 1. PINNASTELLA (*Austin's MS.*) CRINOIDEA. PINNIGRADA, *Forbes.*

Character of the class. Viscera protected by an external skeleton formed of calcareous plates; mouth surrounded by pinnated rays composed of calcareous joints. Sometimes free, but more frequently permanently attached (dorsally) to other bodies by a jointed flexible column.

Order 1. *Cionacineti*, *Austin's MS.*

Fixed to extraneous objects by a jointed flexible column.

Family 1. APIOCRINOIDEA, *Gray.*

Genus 1. *Eugeniocrinites*, *Miller.*

- |  |   |
|--|---|
| Sp. 1. <i>E. caryophyllatus</i> , <i>Goldfuss.</i> | Sp. 5. <i>E. moniliformis</i> , <i>Münst.</i> |
| 2. <i>E. nutans</i> , <i>Goldf.</i>                | 6. <i>E. Hoferi</i> , <i>Münst.</i>           |
| 3. <i>E. compressus</i> , <i>Goldf.</i>            | 7. <i>E. mespiliformis</i> , <i>Goldf.</i>    |
| 4. <i>E. pyriformis</i> , <i>Münster.</i>          |   |

Genus 2. *Solanocrinites*, *Goldf.*

- |  |  |
|--|--|
| Sp. 1. <i>S. costatus</i> , <i>Goldf.</i>  | Sp. 3. <i>S. Jaegeri</i> , <i>Goldf.</i> |
| 2. <i>S. scrobiculatus</i> , <i>Münst.</i> |  |

Genus 3. *Apiocrinites*, *Miller.*

- |   |   |
|---|---|
| Sp. 1. <i>A. rotundus</i> , <i>Mill.</i>  | Sp. 5. <i>A. rosaceus</i> ??? <i>Schloth.</i> |
| 2. <i>A. intermedius</i> , <i>Pearce.</i> | 6. <i>A. mespiliformis</i> ? <i>Goldf.</i>    |
| 3. <i>A. elongatus</i> , <i>Pearce.</i>   | 7. <i>A. Milleri</i> ?? <i>Schloth.</i>       |
| 4. <i>A. ellipticus</i> , <i>Mill.</i>    | 8. <i>A. flexuosus</i> ? <i>Goldf.</i>        |

Genus 4. *Holopus*, *D'Orbigny.*

- Sp. 1. *H. Rangii*, *D'Orbigny.*

Family 2. POTERIOCRINOIDEA, *Austin's MS.*

Genus 1. *Poteriocrinites*, *Miller.*

- |   |   |
|---|---|
| Sp. 1. <i>P. crassus</i> , <i>Mill.</i>     | Sp. 7. <i>P. rostratus</i> , <i>Aust. MS.</i>   |
| 2. <i>P. tenuis</i> , <i>Mill.</i>          | 8. <i>P. quinquangularis</i> , <i>Aust. MS.</i> |
| 3. <i>P. granulatus</i> , <i>Phillips.</i>  | 9. <i>P. plicatus</i> , <i>Aust. MS.</i>        |
| 4. <i>P. Dudleyensis</i> , <i>Aust. MS.</i> | 10. <i>P. dactyloides</i> , <i>Aust. MS.</i>    |
| 5. <i>P. minimus</i> , <i>Aust. MS.</i>     | 11. <i>P. conicus</i> , <i>Phillips.</i>        |
| 6. <i>P. radiatus</i> , <i>Aust. MS.</i>    |   |

Genus 2. *Isocrinites*, *Phillips.*

- |   |   |
|---|---|
| Sp. 1. <i>I. Egertoni</i> , <i>Phill.</i>         | Sp. 5. <i>I. brevidactylus</i> , <i>A. MS. n. sp.</i> |
| 2. <i>I. nobilis</i> , <i>Phill.</i>              | 6. <i>I. quinquangularis</i> , <i>Aust. MS.</i>       |
| 3. <i>I. tuberculatus</i> , <i>Mill.</i>          | n. sp.  |
| 4. <i>I. longidactylus</i> , <i>A. MS. n. sp.</i> | 7. <i>I. macrodactylus</i> , <i>Phill.</i>            |

Genus 3. *Synbathocrinites*, *Phillips.*

- Sp. 1. *S. conicus*, *Phill.*

Family 3. ENCRINOIDEA, *Austin's MS.*

Genus 1. *Encrinites*, *Miller.*

- Sp. 1. *E. moniliformis*, *Mill.*

Genus 2. *Eucalyptocrinites*, *Goldf.*

- |   |  |
|---|--|
| Sp. 1. <i>E. rosaceus</i> , <i>Goldf.</i> | Sp. 2. <i>E. decorus</i> , <i>Phill.</i> |
|---|--|

Genus 3. *Cupressocrinites*, Goldf.

- Sp. 1. *C. crassus*, Goldf.                      Sp. 3. *C. tesseratus*, Goldf.  
 2. *C. gracilis*, Goldf.

Genus 4. *Euryocrinites*, Phillips.

- Sp. 1. *E. concavus*, Phill.

Family 4. PENTACRINOIDEA, *Austin's MS.*

Genus 1. *Pentacrinites*, Miller.

- |                                       |                                       |
|---------------------------------------|---------------------------------------|
| Sp. 1. <i>P. Caput Medusæ</i> , Mill. | Sp. 7. <i>P. moniliferus</i> , Goldf. |
| 2. <i>P. Briareus</i> , Mill.         | 8. <i>P. subsulcatus</i> , Münst.     |
| 3. <i>P. Johnsonii</i> , Aust. MS.    | 9. <i>P. subteres</i> , Münst.        |
| 4. <i>P. basaltiformis</i> , Mill.    | 10. <i>P. Milleri</i> .               |
| 5. <i>P. tuberculatus</i> , Mill.     | 11. <i>P. lepidotus</i> , Aust. MS.   |
| 6. <i>P. pentagonalis</i> , Goldf.    | 12. <i>P. rotundus</i> , Aust. MS.    |

Family 5. MARSUPIOCRINOIDEA, *Austin's MS.*

Genus 1. *Marsupiocrinites*, Phillips.

- Sp. 1. *M. cælatus*, Phill.

Genus 2. *Crotalocrinites*, *Austin's MS.*

- Sp. 1. *C. rugosus*, Mill.

Family 6. PLATYCRINOIDEA, *Austin's MS.*

Genus 1. *Platycrinites*, Miller.

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|---------------------------------------|--|
| Sp. 1. <i>P. lævis</i> , Mill.        | Sp. 8. <i>P. microstylus</i> ? Phill.      |
| 2. <i>P. rugosus</i> , Mill.          | 9. <i>P. laciniatus</i> , Gilb.            |
| 3. <i>P. striatus</i> , Mill.         | 10. <i>P. mucronatus</i> , Aust. MS.       |
| 4. <i>P. granulatus</i> , Mill.       | 11. <i>P. antheliontes</i> , Aust. MS.     |
| 5. <i>P. elongatus</i> , Gilbertson.  | 12. <i>P. spinosus</i> , Aust. MS.         |
| 6. <i>P. gigas</i> , Phill.           | 13. <i>P. trigintidactylus</i> , Aust. MS. |
| 7. <i>P. interscapularis</i> , Phill. | 14. <i>P. ellipticus</i> , Phill.          |

Genus 2. *Cyathocrinites*, Miller.

- |                                   |                                     |
|-----------------------------------|-------------------------------------|
| Sp. 1. <i>C. planus</i> , Mill.   | Sp. 6. <i>C.?</i> conicus, Phill.   |
| 2. <i>C. geometricus</i> , Goldf. | 7. <i>C. bursa</i> , Phill.         |
| 3. <i>C. distortus</i> ? Gilb.    | 8. <i>C.?</i> capillaris, Phill.    |
| 4. <i>C. mamillaris</i> , Phill.  | 9. <i>C.?</i> goniodactylus, Phill. |
| 5. <i>C. calcaratus</i> , Phill.  | 10. <i>C. pinnatus</i> , Goldf.     |

Genus 3. *Caryocrinites*, Say.

- Sp. 1. *C. ornatus*, Say.                      Sp. 2. *C. loricatus*, Say.

Family 7. ACTINOCRINOIDEA, *Austin's MS.*

Genus 1. *Actinocrinites*, Miller.

- |  |   |
|--|---|
| Sp. 1. <i>A. lævis</i> , Mill.         | Sp. 7. <i>A. cataphractus</i> , Aust. MS. |
| 2. <i>A. triacontadactylus</i> , Mill. | 8. <i>A. aculeatus</i> , Aust. MS.        |
| 3. <i>A. polydactylus</i> , Mill.      | 9. <i>A. crassus</i> , Aust. MS.          |
| 4. <i>A. Gilbertsoni</i> , Mill.       | 10. <i>A. granulatus</i> , Aust. MS.      |
| 5. <i>A.?</i> retarius, Phill.         | 11. <i>A. lævissimus</i> , Aust. MS.      |
| 6. <i>A. elephantinus</i> , Aust. MS.  | 12. <i>A. longispinosus</i> , Aust. MS.   |

Genus 2. *Rhodocrinites*, Miller.

- |                                      |                                       |
|--------------------------------------|---------------------------------------|
| Sp. 1. <i>R. calcaratus</i> , Phill. | Sp. 5. <i>R. costatus</i> , Aust. MS. |
| 2. <i>R.?</i> echinatus, Goldf.      | 6. <i>R. granulatus</i> , Aust. MS.   |
| 3. <i>R. mamillaris</i> , Phill.     | 7. <i>R.?</i> mutabilis, Aust. MS.    |
| 4. <i>R. bursa</i> , Phill.          |                                       |

Genus 3. *Melocrinites*? Goldf.

- Sp. 1. *M.* ? hieroglyphicus, *Goldf.* Sp. 3. *M.* ? gibbosus, *Goldf.*  
 2. *M.* ? lævis, *Goldf.*

Genus 4. *Tetracrinites*, Austin's MS.

- Sp. 1. *T.* formosus, *Aust. MS.*

Family 8. PERIEOCRINOIDEA, *Austin's MS.*

Genus 1. *Perieocrinites*, Austin's MS.

- Sp. 1. *P.* costatus, *Aust. MS.* Sp. 3. *P.* globosus, *Aust. MS.*  
 2. *P.* articulatus, *Aust. MS.*

Genus 2. *Sagenocrinites*, Austin's MS.

- Sp. 1. *S.* expansus, *Phill.* Sp. 2. *S.* giganteus, *Aust. MS.*

Family 9. MEROCRINOIDEA.

Genus 1. *Dimerocrinites*, *Phill.*

- Sp. 1. *D.* decadactylus, *Phill.* Sp. 2. *D.* icosidactylus, *Phill.*

Genus 2. *Tetramerocrinites*, Austin's MS.

- Sp. 1. *T.* simplex, *Aust. MS.*

There are several other families and genera containing many species under consideration.

Order 2. *Liberidæ*, Austin's MS.

The animals of this order differ but slightly in their general structure from those in the preceding one. They however possess the power of free motion; are either permanently unattached or become so in their mature state. Some species are furnished with a tapering column, which enables the animal to attach itself to extraneous objects, or to detach itself at will, and move freely through the water.

Family 1. GNATHOCRINOIDEA, *Austin's MS.*

Genus 1. *Gnathocrinites*, Austin's MS.

- Sp. 1. *G.* fusiformis, *Aust. MS.*

Family 2. ASTRACRINOIDEA, *Austin's MS.*

Genus 1. *Astracrinites*, Austin's MS.

- Sp. 1. *A.* tetragonus, *Aust. MS.*

Genus 2. *Aporocrinites*, Austin's MS.

- Sp. 1. *A.* gyratus, *Aust. MS.*

Family 3. COMASTELLA, *Austin's MS.*

Genus 1. *Comatula*, Lamarck.

- Sp. 1. *C.* pinnata, *Goldf.* Sp. 4. *C.* filiformis, *Goldf.*  
 2. *C.* tenella, *Goldf.* 5. *C.* rosacea, *Link.*  
 3. *C.* pectinata, *Goldf.* &c. &c.

Genus 2. *Marsupites*, Mantell.

- Sp. 1. *M.* ornatus, *Miller.*

Class 2. OLENESTELLA, *Aust. MS.* SPINIGRADA, *Forbes.*

Body covered with calcareous scales or plates; mouth surrounded



by simple or dichotomous rays (not pinnate) furnished with spines, which are used as organs of motion.

Class 3. LOBISTELLA, *Austin's MS.* CIRRHIGRADA, *Forbes.*

Body more or less covered with calcareous scales or plates; mouth not surrounded by arms; body lobed and channeled for cirrhi.

Class 4. ADELOSTELLA, *Austin's MS.* CIRRHI-SPINIGRADA, *Forbes.*

Body covered with closely-jointed calcareous plates, not lobed, and without arms, sometimes furnished with a calcareous flexible jointed column, but most of the class are free.

Order 1. *Echinidæ.*

Animal free, furnished with series of ambulacral pores for the protrusion of cirrhi, which, in connection with spines attached by ligaments to the plated skeleton, constitute the organs of motion.

Order 2. *Columnidæ,* *Austin's MS.*

Animal attached by a jointed flexible calcareous column to extraneous bodies; ambulacral pores sometimes wanting, in other instances they are scattered irregularly among the plates?, but they are usually in regular series, as in the order *Echinidæ*; surface mostly covered with spines, though occasionally smooth.

Family 1. SPHÆRONOIDEÆ, *Gray.*

Genus 1. *Sphæronites.*

- |  |                         |
|--|-------------------------|
| Sp. 1. <i>S. tessellatus, De la Beche.</i> | Sp. 3. <i>S. pomum.</i> |
| 2. <i>S. aurantium.</i>                    | &c. &c.                 |

Genus 2. *Sycocrinites,* *Austin's MS.*

- |                                     |   |
|-------------------------------------|---|
| Sp. 1. <i>S. clausus, Aust. MS.</i> | Sp. 3. <i>S. anapeptamenus, Aust. MS.</i> |
| 2. <i>S. Jacksoni, Aust. MS.</i>    |   |

Family 2. ECHINOCRINOIDEA, *Austin's MS.*

Genus 1. *Echinocrinus,* *Agassiz.*

- |                                  |                                      |
|----------------------------------|--------------------------------------|
| Sp. 1. <i>E. pomum, Agass.</i>   | Sp. 3. <i>E. anceps, Aust. MS.</i>   |
| 2. <i>E. spinosus, Aust. MS.</i> | 4. <i>E. cidariformis? Aust. MS.</i> |

Genus 2. *Pentremites,* *Say.*

- |                               |                                      |
|-------------------------------|--------------------------------------|
| Sp. 1. <i>P. inflatus.</i>    | Sp. 5. <i>P. acutus, Gilb.</i>       |
| 2. <i>P. pyriformis, Say.</i> | 6. <i>P.? astriformis, Aust. MS.</i> |
| 3. <i>P. florealis.</i>       | 7. <i>P. pentangularis.</i>          |
| 4. <i>P. ovalis, Goldf.</i>   |                                      |

Genus 3. *Orbitremites.*

- |                               |                                   |
|-------------------------------|-----------------------------------|
| Sp. 1. <i>O. globosus.</i>    | Sp. 4. <i>O. angulatus? Gilb.</i> |
| 2. <i>O. Derbiensis, Sow.</i> | 5. <i>O. oblongus, Gilb.</i>      |
| 3. <i>O. ellipticus, Sow.</i> |                                   |

Class 5. ASCIDIASTELLA, *Austin's MS.* CIRRHI-VERMIGRADA, *Forbes.*

The animals of this class deviate considerably from those in the preceding ones. As spines are wanting, motion is effected by rows

of cirrhi, aided by the contraction and extension of the animal's body. The tentaculated mouth forms a prominent feature in its organization.

Class 6. VERMISTELLA, *Aust. MS.* VERMIGRADA, *Forbes.*

The cirrhi, which constitute in part the organs of motion in the fifth class, are wholly wanting in this; the alternate contraction and extension of the animal's body alone effecting progression.

It will be seen on reference to the foregoing arrangement of the *Crinoidea* that several genera and species have been suppressed or unacknowledged. This has not been done without due consideration, but as it would extend this paper, already too long, to an unreasonable length to discuss all the facts which have led to the proposed alteration, we shall merely observe, that some writers on the *Crinoidea* have founded genera and species on imperfect evidence, such as minute fragments of columns, seldom to be relied on, while others have taken the shape, into which the particular specimen they described from may have been squeezed into or contorted by violence at its death, or during its subsequent entombment in the strata, as the data on which to found generic and specific distinctions. If such evidence as this is to be admitted as legitimate grounds to proceed on, we could undertake to double the number of species heretofore described without going beyond the limits of our own cabinet for specimens. Others, in their anxiety to correct the errors of preceding writers, have sometimes fallen into mistakes of equal importance when re-founding genera. When this has been clearly the case, we have retained the original name whenever it could be done with propriety. In other cases we have retained the specific name only as given by the founder of the species.

Several unnoted genera and many species are still under consideration.

Among the varied forms observable in the *Crinoidea*, we can trace them step by step as it were merging from their ancient prototypes to their existing analogues of the recent seas. The genus *Echinocrinus*, founded by Professor Agassiz, is not the least remarkable among these forms as the precursors of the *Echinites*. Another genus (*Astracrinites* of our MS.) offers so many affinities to the recent and fossil *Echinodermata*, that we consider it the most remarkable of all the known genera. By its being lobed it approaches to the *Lobistella*; its ambulacra, spines and anus mark it as allied to the *Echinites*, while the arrangement of its calcareous plates connect it with the Lilies of the ocean. In short it possesses the lobes of a star-fish, the ambulacra and spines of a sea-urchin, and the plates

of a Crinoid. It is further remarkable by deviating from the quinary type so prevalent in the *Echinodermata*: the lobes and ambulacra of this new genus are each four in number.

We have taken the number and arrangement of the plates surrounding the body as the leading characters on which to found our genera, as we have the variations in their form and other observable peculiarities, together with the number of rays or arms to distinguish the different species. Though the mouth of some of our species is central and but slightly protrusive, and in others it assumes the form of an elongated proboscis, yet we have not at present deemed this difference sufficient to found new genera on, when the plates surrounding the body agree in number, shape and general arrangement; nor have we separated those with the mouths placed laterally, if the other points coincide generally. Had these characters been acted on, we must have divided some long-established genera into no less than three, each differing in this particular. The question is however under consideration as to the propriety of continuing the present arrangement in the cases alluded to.

XIX.—*Descriptions of Chalcidites discovered by C. Darwin, Esq., near Valparaiso.* By FRANCIS WALKER, F.L.S.

*Torymus*, Phormio, Fem. *Viridi-æneus*, antennæ nigræ, pedes rufi, femora viridia, alæ sublimpidæ.

Corpus viridi-æneum, convexum, nitens, scite squameum, parce pubescens: caput transversum, breve, thorace vix latius; vertex sat latus; frons abrupte declivis, excavata: oculi rufi, mediocres, non extantes: antennæ nigræ, subclavatæ, pubescentes, thorace paullo breviores; articuli approximati: thorax longi-ovatus: prothorax transversus, mediocris, antice non angustior: mesothoracis scutum latitudine paullo longius; parapsidum suturæ bene determinatæ, postice approximata; scutellum subovatum: metathorax mediocris, declivis, obconicus: petiolus brevissimus: abdomen longi-ovatum, subcompressum, subtus carinatum, thorace paullo brevius: oviductus exertus, rufus; vaginæ nigræ, abdomine vix breviores: pedes pallide rufi; coxæ virides; femora viridia; ungues et pulvilli fusci; metafemora subtus unidentata, metatibiæ pallide fuscæ, apice spina longa arcuata armatæ: alæ sublimpidæ; squamulæ piceæ; nervi fusci; nervus humeralis ulnari fere duplo longior; radialis ulnari brevior, cubitalis brevissimus; stigma minutum. (Corp. long. lin.  $1\frac{1}{2}$ ; alar. lin.  $2\frac{3}{4}$ .)

Callimome Nonacris, Fem. *Viridi-cyaneus*, antennæ nigræ, pedes fusci, femora viridia, alæ sublimpidæ.

Corpus viridi-cyaneum æneo-varium, convexum, scite squameum, parum nitens, parce pubescens: caput transversum, breve, thoracis latitudine; vertex sat latus; frons abrupte declivis: oculi rufi, mediocres, non extantes: antennæ nigræ, validæ, clavatæ, pubescentes, thorace non longiores: thorax longi-ovatus: prothorax sat magis longitudine paullo latius, antice angustior: mesothoracis scutum latitudine paullo longius; parapsidum suturæ bene determinatæ, postice approximata; scutellum subovatum: metathorax



mediocris, declivis, obconicus: petiolus brevissimus: abdomen ovatum, subcompressum, nitens, subtus carinatum, thorace paullo brevius et angustius: oviductus rufus; vaginæ nigræ, abdominis longitudine: pedes fuscii; coxæ virides; femora viridia; tarsi pallide fuscii: alæ sublimpidæ; squamulæ virides; nervi picei; nervus humeralis ulnari longior, radialis ulnari multo brevior, cubitalis brevissimus; stigma minimum. (Corp. long. lin. 1; alar. lin. 1 $\frac{1}{4}$ .)

Callimome Eumelis, Mas. *Viridi-cyaneus, antennæ nigræ, pedes nigro-fuscii, femora viridia, alæ sublimpidæ.*

Corpus sublineare, convexum, viridi-cyaneum, scitissime squameum, parum nitens, parce pubescens: caput transversum, breve, thorace paullo latius; vertex sat latus; frons abrupte declivis: oculi rufi, mediocres, non extantes: antennæ nigræ, crassæ, thorace vix longiores: thorax longi-ovatus: prothorax transversus, brevis: mesothoracis scutum longitudine vix latius; parapsidum suturæ sat bene determinatæ; scutellum subovatum: metathorax obconicus, mediocris, declivis: petiolus brevissimus: abdomen sublineare, supra planum, thorace brevius: pedes simplices, subæquales, virides; trochanteres picei; genua fusca; tibiæ nigræ; tarsi fuscii: alæ sublimpidæ; squamulæ piceæ; nervi fuscii; nervus humeralis ulnari multo longior, radialis ulnari multo brevior, cubitalis brevissimus; stigma minutum. (Corp. long. lin. 3 $\frac{1}{4}$ ; alar. lin. 1 $\frac{1}{4}$ .)

Asaphes vulgaris? Fem. *Æneus, abdomen atrum, antennæ nigræ, pedes fusco-flavi, femora nigro-cincta, alæ limpida.*

*Asaphes vulgaris*, Ent. Mag.

Corpus convexum, æneum, nitens, fere læve, parce pubescens: caput transversum, breve, thorace paullo latius; vertex latus; frons impressa, abrupte declivis: oculi picei, mediocres, non extantes: antennæ nigræ: thorax longi-obconicus: prothorax transversus, mediocris: mesothoracis scutum longitudine latius; parapsidum suturæ bene determinatæ, postice approximatae fere conniventes; scutellum subconicum: metathorax obconicus, declivis, mediocris: petiolus gracilis: abdomen longi-ovatum, atrum, læve, glabrum, subtus carinatum, apice acuminatum, thoracis longitudine: pedes simplices, subæquales, flavi; coxæ æneæ, femora nigro-cincta; tarsi apice fuscii; mesotibiæ et metatibiæ pallide fusca: alæ limpida; squamulæ piceæ; nervi fulvi; nervus humeralis ulnari multo longior, radialis ulnari brevior, cubitali longior; stigma minutum. (Corp. long. lin.  $\frac{3}{4}$ ; alar. lin. 1 $\frac{1}{4}$ .)

Lamprotatus Cæcina, Fem. *Cyaneus, antennæ nigræ, pedes flavi, femora fusco-cincta, alæ limpida.*

Corpus convexum, cyaneum, scitissime squameum, parum nitens, parce pubescens: caput transversum, breve, thoracis latitudine; vertex sat latus; frons impressa, abrupte declivis: oculi mediocres, non extantes: antennæ nigræ: thorax ovatus: prothorax brevis, antice angustior: mesothoracis scutum transversum; parapsidum suturæ sat bene determinatæ; scutellum obconicum: metathorax declivis, mediocris, obconicus: petiolus sat longus: abdomen ovatum, nitens, læve, fere glabrum, supra convexum, subtus carinatum, thorace brevius: pedes simplices, subæquales, flavi; coxæ virides; femora fusco-cincta; tarsi apice fuscii: alæ limpida; squamulæ piceæ; nervi fuscii; nervus humeralis ulnari multo longior, radialis ulnari brevior, cubitali longior; stigma parvum. (Corp. long. lin. 1; alar. lin. 1 $\frac{1}{4}$ .)

Lyrcus (n. g.) Origo, Fem. *Nigro-cyaneus, antennæ nigræ, pedes fuscii fulvo-cincti, alæ sublimpida.*

Corpus breve, crassum, convexum, nigro-cyaneum, scitissime squameum, parum nitens, parce pubescens: caput transversum, breve, thoracis latitudine; vertex latus; frons abrupte declivis, vix impressa: oculi rufi, medio-

eres, non extantes: antennæ subclavatæ, graciles, 9-articulatæ? nigræ, thorace paullo longiores; articulus 1<sup>us</sup> longus, gracilis; 2<sup>us</sup> longi-cyathiformis; 3<sup>us</sup> et sequentes breves; clava fusiformis: thorax brevi-ovatus: prothorax transversus, brevissimus; mesothoracis scutum longitudine latius; parapsidum suturæ non bene determinatæ, postice approximata; scutellum obconicum: metathorax longi-obconicus, declivis: petiolus brevissimus: abdomen ovatum, nitens, breve, supra planum, subtus carinatum, apice acuminatum; thorace paullo angustius, vix longius: pedes graciles, simplices, subæquales, fuscii; coxæ nigræ; genua fulva; tibiæ apice basi que fulvæ; tarsi fulvi apice fuscii, articulus 1<sup>us</sup> longus, 2<sup>us</sup> multo brevior, 3<sup>us</sup> adhuc brevior, 4<sup>us</sup> 3<sup>o</sup> longior; unguis et pulvilli minuti: alæ sublimpidæ, mediocres; coxæ piceæ; nervi fulvi; nervus humeralis ulnari multo longior, radialis ulnari longior, cubitalis longissimus ulnari vix brevior. (Corp. long. lin.  $\frac{2}{3}$ ; alar. lin.  $1\frac{1}{4}$ .)

*Pteromalus Gryneus, Fem. Cupreus, antennæ piceæ, pedes flavi, alæ limpidæ.*

Corpus cupreum, convexum, scitissime squameum, parum nitens: caput thorace vix latius, subtus æneo-viride; vertex sat latus; frons abrupte declivis, excavata: oculi picei, mediocres, non extantes: antennæ piceæ, subclavatæ, thorace non longiores: thorax ovatus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum transversum; parapsidum suturæ vix conspicuæ; scutellum sat magnum, subrotundum: metathorax brevis, declivis, postice angustus: petiolus brevissimus: abdomen ovatum, nitens, læve, fere glabrum, supra planum, subtus carinatum, apice acuminatum, thorace paullo angustius, vix longius: pedes flavi; coxæ virides; tarsi apice fuscii: alæ limpidæ; squamulæ fulvæ; nervi flavi; nervus humeralis ulnari multo longior; radialis cubitali multo longior, ulnari non brevior; stigma minutum. (Corp. long. lin. 1; alar. lin.  $1\frac{1}{2}$ .)

*Entedon Bedius, Mas. Æneo-viride, abdomen basi viridi-cyaneum, antennæ nigræ, pedes flavi, alæ flavescentes.*

Corpus convexum, læte viride, æneo-varium, nitens, scitissime squameum, parce pubescens: caput transversum, breve, thorace paullo latius; vertex sat latus; frons impressa, abrupte declivis: oculi rufi, mediocres, non extantes: antennæ nigræ, hirtæ, setacæ, thorace non longiores; articulus 1<sup>us</sup> longus, gracilis; 2<sup>us</sup> et sequentes breviores, lineares: thorax ovatus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum longitudine latius; parapsidum suturæ bene determinatæ, postice approximata; scutellum magnum, subovatum: metathorax magnus, obconicus, declivis: petiolus longus, cylindricus: abdomen brevi-ovatum læve, glabrum, quasi contractum, basi viridi-cyaneum, subtus convexum, thorace brevius; segmentum 1<sup>um</sup> maximum, 2<sup>um</sup> et sequentia brevia: pedes graciles, simplices, subæquales, pallide flavi; coxæ virides; tarsi apice fuscii: alæ flavo-tinctæ, sat latæ; squamulæ fuscæ; nervi fulvi; nervus ulnaris humerali fere duplo longior, radialis humerali brevior, cubitalis brevissimus; stigma minutum. (Corp. long. lin. 1; alar. lin. 2.)

*Entedon Flacilla, Mas. Viride, cyaneo aut cupreo varium, antennæ nigræ, pedes flavi, alæ flavo-limpidæ.*

Corpus convexum, læte viride, nitens, scitissime squameum, parce pubescens: caput transversum, breve, viridi-æneum, thorax paullo latius; vertex sat latus; frons abrupte declivis: oculi rufi, mediocres, non extantes: antennæ nigræ, graciles, subfiliformes, thorace paullo breviores; articulus 1<sup>us</sup> gracilis, sublinearis; 2<sup>us</sup> et sequentes ad 5<sup>um</sup> breviores, subæquales; clava fusiformis, acuminata, articulo 5<sup>o</sup> multo longior: thorax ovatus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum longitudine latius; parapsidum suturæ bene determinatæ; scutellum viridi-æneum, subovatum:

metathorax magnus, declivis, obconicus: petiolus sat longus: abdomen brevi-ovatum, læve, fere glabrum, subtus convexum, basi viridi-cyaneum, thorace brevius: pedes pallide flavi, graciles, simplices, subæquales; coxæ virides; tarsi apice fuscii: alæ flavo vix tinctæ; squamulæ fuscæ; nervi fulvi; nervus ulnaris humerali multo longior, radialis brevis, cubitalis brevissimus; stigma minutum. (Corp. long. lin.  $\frac{1}{2}$ ; alar. lin. 1.)

*Var. β.*—Antennis articulus 1<sup>us</sup> basi flavus: alæ flavescentes.

*Var. γ.*—Corpus cupreo-varium.

Found also in Valdivia.

Eulophus Rhianus, Fem. *Nigro-æneus, pedes fuscii, alæ sublimpidæ.*

Corpus sublineare, convexum, nigro-æneum, nitens, scite squameum, parce pubescens: caput transversum, breve, thoracis latitudine; vertex sat latus; frons impressa: oculi rufi, mediocres, non extantes: antennæ ademptæ: thorax longi-ovatus: prothorax transversus, mesothorace angustior: mesothoracis scutum longitudine latius; parapsidum suturæ sat bene determinatæ; scutellum magnum, subquadratum, postice latius: metathorax declivis, obconicus, mediocris: petiolus brevissimus: abdomen longi-ovatum, læve, supra planum, subtus carinatum, apice acuminatum, thorace vix longius: pedes simplices, subæquales, fuscii; coxæ nigræ; genua fulva: alæ sublimpidæ, squamulæ picæ; nervi fulvi; nervus ulnaris humerali longior, radialis humerali brevior, cubitali longior; stigma parvum. (Corp. long. lin. 1; alar. lin. 1 $\frac{3}{4}$ .)

#### Genus TETRASTICHUS, Haliday.

A genus formed of *Cirrospilus Lycidas* (Mon. Chal. i. 295.) and other species.

*Tetrastichus Polybæa*, Mas et Fem. *Ater, antennæ nigræ, pedes nigro-fuscii flavo-cincti, alæ limpidæ.*

Corpus sublineare, convexum, atrum, nitens, læve, fere glabrum: caput transversum, brevissimum, thorace paullo latius; vertex latus; frons impressa, abrupte declivis: oculi mediocres, non extantes: antennæ filiformes, pilosæ, nigræ, graciles, thorace longiores: thorax ovatus: prothorax brevissimus, supra non conspicuus: mesothoracis scutum latum; parapsidum suturæ remotæ, bene determinatæ, postice approximata; scutellum obconicum, mediocre, bisulcatum: metathorax declivis, obconicus: petiolus brevissimus: abdomen sublineare, depressum, thorace angustius, non longius: pedes graciles, subæquales, nigræ; tibiæ fuscæ; tarsi flavi, apice fuscii; protibiæ flavæ: alæ limpidæ, latæ, ciliatæ; squamulæ picæ; nervi fuscii; nervus humeralis ulnari multo brevior, radialis nullus, cubitalis sat longus, stigma minimum.

*Fem.* Caput thoracis latitudine; abdomen longi-ovatum, subtus carinatum, apice acuminatum, thorace longius. (Corp. long. lin.  $\frac{1}{2}$ — $\frac{2}{3}$ ; alar. lin.  $\frac{3}{4}$ —1.)

*Tetrastichus Scadius*, Fem. *Viridis, antennæ picæ, pedes flavi, femora viridia, alæ limpidæ.*

Corpus crassum, convexum, obscure viride, subtilissime squameum, parum nitens, parce pubescens: caput transversum, breve, thoracis latitudine; vertex sat latus; frons abrupte declivis: oculi rufi, mediocres, non extantes: antennæ picæ, clavatæ, pubescentes, thorace paullo breviores; clava triarticulata, ovata, acuminata, articulo præcedente latior et plus duplo longior: thorax ovatus: prothorax transversus, mediocris: mesothoracis scutum latum; parapsidum suturæ bene determinatæ; scutellum subconicum, bisulcatum: metathorax brevis, obconicus, declivis: petiolus brevissimus: abdomen longi-ovatum, nitens, supra convexum, subtus carinatum, apice acuminatum, thorace paullo longius et angustius; segmenta transversa, subæqua-



lia : pedes flavi ; coxæ virides ; trochanteres picei ; femora viridia, apice flava ; tarsi apice fusci : alæ limpidæ ; squamulæ piceæ ; nervi fulvi ; nervus ulnaris humerali multo longior, radialis nullus, cubitalis sat longus ; stigma minimum. (Corp. long. lin.  $\frac{3}{4}$  ; alar. lin.  $1\frac{1}{3}$ .)

XX.—*Short notice of a Botanical Trip to the Highlands of Scotland.* By Professor J. H. BALFOUR, M.D.

THIS trip was made in August last, along with my friend Mr. Babington and several of my pupils. We first visited the Clova district, and collected most of the rare alpine plants which are known to exist in that part of the Grampian range. *Sonchus alpinus* was found in a new locality in Glen Dole. The cliff on which *Astragalus alpinus* used to be found abundantly was examined with care, but only two or three specimens of the plant were seen.

From Clova we proceeded by Glen Callatea to Braemar, and made several botanical excursions in the neighbourhood of Castleton.

In our ascent of Ben Aven, one of the lofty mountains in the Braemar district, we examined a hill called Little Craigin-dal, which deserves notice on account of the number of good alpine plants which it furnished. The hill has a rounded contour, is readily accessible, and is composed of loose dry granitic and micaceous rocks. We were delighted to find upon it *Astragalus alpinus* in great abundance, both in flower and fruit. In some places the turf was actually composed of this plant. *Carex rupestris* was also growing beside it in large quantity. The other plants seen on this hill were, *Thalictrum alpinum*, *Viola palustris*, *Silene acaulis*, *Dryas octopetala*, *Potentilla alpestris*, *Rubus chamæmorus*, *Alchemilla vulgaris*,  $\beta$ . *subsericea*, *Epilobium alpinum* and *alsinefolium*, *Sedum Rhodiola*, *Saxifraga oppositifolia*, *aizoides* and *stellaris*, *Cornus suecica*, *Hieracium alpinum* and *murorum*,  $\beta$ . *pulmonarium*,  $\gamma$ . *Lawsoni*, *Saussurea alpina*, *Gnaphalium supinum*, *Vaccinium uliginosum*, *Arctostaphylos Uva-ursi*, *Azalea procumbens*, *Pyrola media* and *secunda*, *Veronica Chamædrys*, var. *hirsuta*, and *V. serpyllifolia*,  $\beta$ . *humifusa*, *Trientalis europæa*, *Armeria maritima*,  $\beta$ . *alpina*, *Oxyria reniformis*, *Salix herbacea* and *myrsinites*,  $\beta$ . *arbutifolia*, *Betula nana*, *Listera cordata*, *Tofieldia palustris*, *Juncus trifidus* and *triglumis*, *Luzula spicata*, *Carex rigida*, *capillaris* and *pauciflora*, *Aira alpina*, *Lycopodium alpinum*. The hill at first sight appeared to be very unpromising in a botanical point of view, not presenting any of those wet, disintegrating, micaceous cliffs, on which the best alpine plants in Scotland are found ; and I have therefore de-

tailed fully all the plants which were observed, with the view of calling the attention of botanists to many hills of a similar nature which occur in the Braemar district, and which I fear have been overlooked. Much still remains to be done in that part of Scotland, and I have no doubt that many of the plants hitherto considered as confined to the Clova range will, on careful examination, be detected on the Braemar hills. On reaching the summit of Ben Aven we gathered *Luzula arcuata* in considerable quantity.

In all the alpine districts which we visited, we met with numerous varieties of *Hieracium alpinum*, *Halleri* and *Lawsoni*. These require to be carefully studied, and I trust that ere long Mr. Babington will give us the result of his examination.

On leaving Braemar Mr. Babington and I proceeded to Dingwall, with the view of botanizing on some of the Ross-shire mountains. On Ben Wyvis we saw luxuriant specimens of *Arctostaphylos alpina*, growing in a damp situation more than 1000 feet below the summit. In the other districts of Scotland in which I have picked this plant, I have generally found it on the dry stony summits of the mountains. The other plants found on Ben Wyvis are not of such importance as to deserve notice. The mountain is not rich in alpine species, a character which it appears to possess in common with most of the other hills in Ross-shire.

We returned to Glasgow by the Caledonian Canal and Inverary, and picked *Potamogeton plantagineus* in several localities near Oban, and a variety of *Hieracium prenanthoides*, without a ray on the shores of Loch Long near Arrochar.

XXI.—Excerpta Zoologica: *On Metamorphoses among Intestinal Worms.* Communicated by W. FRANCIS, Ph. D., A.L.S.\*

M. MIESCHER found *Filaria piscium* especially frequent in the following fish exposed for sale in the Paris market: in *Trigla Gurnardus*, *Lyra*, *Cuculus*, and *lineata*, in *Trachinus Draco* and *Gadus Merlangus*. The *Filaria* were partly free in the ventral cavity; some lie beneath the peritoneal coverings of the different intestines, between the layers of the mesentery beneath the peritoneum of the ventral walls,

\* The present notice, which was alluded to in the last Number of this Journal, p. 48, is taken from Dr. Th. von Siebold's valuable report on the investigations in Helminthology during 1840, and published in Wiegmann's 'Archiv,' parts 4 and 5 for 1841. It not only furnishes the results of Miescher's interesting discoveries, but also draws attention to similar investigations by Leblond and Dr. Siebold. Miescher's paper is published in the Reports of the Proceedings of the Naturalists' Society in Bâle.

in the muscles of the latter mostly singly, sometimes several lying together in nests, and inclosed in a common pseudo-membranous cyst. I (adds Dr. Siebold) am somewhat surprised at the latter part of this statement, as I have never met with more than one individual of *Fil. piscium* inclosed in a cyst in *Gadus Callarias*. (Wiegmann's 'Archiv,' vol. i. p. 306, 1838.) Miescher's description of the worm agrees with the one I have there given, with the exception that Miescher does not notice the peculiar band-like organ, which, according to my own researches, extends through the entire cavity of the body of the *Filaria*; on the other hand, Miescher succeeded, in the further course of his inquiries, in detecting the sexual parts, which at first appeared to be entirely missing. He found the female sexual organs arranged in the usual manner, but so minute and delicate that they were easily overlooked. The two oviducts even in the largest specimens did not contain any trace of eggs, but their contents seemed to consist merely of a limpid fluid mixed with a few very minute granules. The sheath reached the muscular membrane at the end of the first third of the worm, but no external aperture could be perceived. These *Filaria* seem to be subject to a changing of skin, as Miescher not only met with a number of shrivelled empty sacs, but frequently found *Filaria* still situated in these sacs and crawling about with them; such a sac surrounded accurately the body of the *Filaria*, but projected somewhat beyond the anterior and hind part of the worm, and contained in its cavity a clear fluid, sometimes rendered opaque by granules.

In company with these *Filaria*, Miescher always found, in considerable number, peculiar chrysaloid bodies, but stiff and without motion, lying free in the ventral cavity, or buried in the muscles of the ventral walls; sometimes they lay in one and the same fold, and were inclosed by similar pseudo-membranous cysts. These chrysaloid bodies consist of two parts, of a globular or ovate body (resembling in form a Florence oil-flask), and of a cylindrical tail proceeding from it. The head is about  $\frac{2}{3}$  to  $\frac{3}{4}$  lin. in diameter and 1 to  $\frac{5}{4}$  in length, and is drawn out at its free end into a short truncate umbilicus. The tail is from 4 to 6 lines long, separated by a distinct constriction from the head, rounded at its extremity, and generally curved in the form of a crozier. I conceive these chrysaloid bodies to be perfectly identical with those described and figured by Leblond (Ann. des Sciences Nat., 1836, p. 290. pl. 16. fig. 2, 3.), from *Muræna Conger*. With regard to the changes which these bodies gradually undergo, Miescher observed that the tail not only decreased in length but entirely shrivelled up, so that at last only the head remained; in the mean time this expanded into double or thrice its volume, and appeared at last as a simple elongate rounded sac. This sac, whether it still possessed a caudal extremity or not, always consisted of an external thicker brownish-coloured covering, beneath which was a second always more delicate, transparent covering, inclosing a cavity corresponding to the external form of the sac; this cavity was quite filled by a new worm, the form of which was according to that of the cavity; so long, for instance, as the chrysaloid body still consisted of head and tail, the more or less pro-



longed neck of the worm extended into the cavity of the tail. At the end of the neck there is an incurvation which might be regarded as the mouth. I perceive in the drawing of Leblond a distinct aperture at the same place. Of the great sucking head which Leblond asserts his having seen on the body of this worm, to which he has applied the name of *Amphistoma ropaloides*, there is no mention in Miescher's description. Miescher further observed, on the redevelopment of the tail, that the neck of the worm withdrew itself within the expanded head and gradually disappeared entirely; in the simple oval cysts he then found an oval, somewhat flattened trematodoid worm, at the front margin of which the incurvation suspected to be the mouth was more distinct. This worm consisted of a transparent homogeneous substance, with round large and small granules scattered in it, without the slightest trace of any distinct internal organs: its vermoid motions, even though sluggish, did not allow of the least doubt being entertained as to the independent animality of this worm. Miescher did not hesitate to suspect that the chrysaloid bodies were derived from the *Filaria*, although he did not observe directly the metamorphosis of a *Filaria* into a clavate body. Miescher adduces the following reasons in support of his supposition: the rudimentary organs of generation of the *Filaria* indicate that these animals have not yet reached their full development; the clavate bodies occurred with the *Filaria* in the very same place; Miescher saw whole nests of clavate bodies and *Filaria* inclosed by a common cyst, in which large and small *Filaria*, with and without tails, occurred. In the three different genera of fish on which these inquiries were made, in *Trachinus*, *Gadus* and *Trigla*, the *Filaria*, and also the clavate bodies, presented complete specific differences.

The trematodoid worm appeared now to develop anew, while the substance of the *Filaria*, with the exception of the epidermis, dissolved into nutriment for the new creature. Miescher found the posterior extremity of the *Filaria* to be the point of development of the new worm. A *Tetrarrhynchus* gradually formed in the hinder portion of the body of the trematodoid worm, while the first worm still continued to live and did not quit its envelope. The *Tetrarrhynchus*, which was in no way in organic connexion with the trematodoid worm, lay bent spirally together in its cavity, and showed by its retraction and exertion of the four snouts, and by the rotation of its body, signs of its independent existence. Leblond likewise observed in the tailed bodies a similar *Tetrarrhynchus*, which he considered to be the *Tet. appendiculatus*, Rud. Miescher makes no mention of the appendage which Leblond observed on this worm. Miescher found in a *Trigla Gurnardus*, in the month of March, together with living *Filaria* and clavate sacs, tailless sacs, most of which were empty and only contained a mucous granular substance. On further examination he detected in the ventral cavity some *Tetrarrhynchi* which had just escaped; but was greatly surprised, on opening the pericardial cavity, to find this swarming with *Tetrarrhynchi*, and the heart full of them, which was the more remarkable, as Miescher had never met with *Filaria* or clavate bodies in this cavity. The *Tetrarrhynchi* of this place were characterized by a short appendage to the extremity of the body,

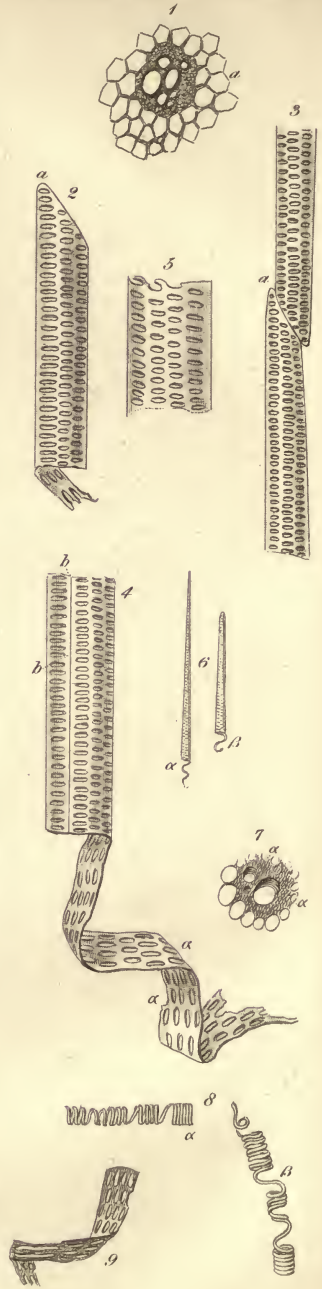




*Poa Balfourii*, Parn.

var. *rigida*.

Parnell del.



Structure of Ferns.

Griffith del.

J.D.C. Sowerby fecit



somewhat smaller than the rest of the body, and inserted as it were within it. Miescher was able to observe on these worms the ease with which, by means of their hooked proboscis, they pierce into and bury themselves in the different intestines of the fish without the least injury to them; he was therefore justified in concluding that the *Tetrarrhynchi* met with in the pericardial cavity had got into it from the ventral cavity. Miescher suspects that the *Tetrarrhynchi* were on their way to quit the fish through the membranaceous hind wall of the gill-cavity, behind which they had already collected in considerable number. Miescher further suspects that these *Tetrarrhynchi*, having got into the sea-water, search for other animals as an abode; this seemed to him very probable, as he subsequently often met with similar *Tetrarrhynchi* at Nice, in the mantles of *Loligo sagittata*, which were filled with water. I likewise found at Pola quite similar sexless *Tetrarrhynchi*, provided with an appendage inserted into the body between the ventral folds of *Sepia officinalis*, as if they had bored their way from without in order to find a new habitat. Miescher lastly questions whether the sexless *Tetrarrhynchi* might not subsequently change into *Bothriocephali* of the group furnished with hooks, as the *Bothriocephali* belonging to this group perfectly resemble in head and neck a *Tetrarrhynchus*. In favour of the probability of this metamorphosis, Miescher adduces the following observation: a *Notidanus griseus*, just killed at Nice, contained in the cavity of the spiral intestine a great number of *Bothriocephalus corollatus*, Rud.: in the articulations of this tape-worm the male and female genitalia were distinctly developed; beneath the membranes of the same intestine there was found, inclosed in a thick-walled cyst of the size of a pea, a worm, to the *Tetrarrhynchus* head of which two *Tenia* joints, without developed genitalia, were affixed: without doubt this undeveloped worm was connected with the *Bothriocephalus corollatus* of the intestinal cavity.

Creplin\* found, like Miescher, similar bodies provided with a tail: on the peritoneum of *Esox Belone*, he states his having seen a pore at its thick end, agreeing in this respect with Leblond, but he did not any more than myself notice a worm, but only a white granular mass in these sacs. Creplin's observation, that *Esox Belone* contains in the cavity of its body a remarkable parasite, resembling *Tetr. attenuatus*, two inches in length, is however interesting.

XXII.—*Description of a new Species of Poa.* By RICHARD PARNELL, M.D., F.R.S.E., &c.†

[With a Plate.]

THE *Poa* about to be described was gathered by Dr. Balfour, Professor of Botany in the University of Glasgow, on a mountain called Ben Voirlich, near the head of Loch Lomond, during

\* Encyclopädie von Ersch und Gruber, p. 294.

† The description and drawings are taken from a work on Scottish Grasses about to be published by Dr. Parnell.—EDIT.

an excursion with his pupils in July last. Specimens of it were also collected by him in August last, on the mountains of Clova in Forfarshire. The plant grows on micaceous soil, at an elevation varying from 2000 to 2500 feet above the level of the sea. It has been named in honour of its discoverer, and the following are the characters by which it is distinguished:—

POA BALFOURI, Parnell. St. John's Meadow-grass.

*Specific Characters.*—Florets slightly webbed. Ligule prominent, obtuse. Upper leaf nearly as long as its sheath. Outer palea five-ribbed. Stem compressed.

*Description.*—It grows from three to fifteen inches high: the root is perennial, creeping. *Stem* erect, compressed, furnished with a few minute spiculæ, with their points directed upwards, producing a slight roughness to the touch; bearing three or four leaves, with scarcely smooth sheaths; the upper sheath a very little longer than its leaf, crowned with a prominent obtuse ligule (Pl. V. fig. 4.); second sheath shorter than its leaf, covering the upper joint. *Joints* three, situated on the lowest third of the stem. *Leaves* confined to the lower part, leaving nearly two-thirds of the stem naked; all the leaves of about equal length, short, lanceolate, roughest on the upper surface and edges, smooth below. *Inflorescence*, a simple or compound panicle. *Panicle* erect, from one to three inches long, spreading when luxuriant; branches slender, rough, the lower ones mostly in pairs. *Spikelets* erect, ovate, of three awnless florets, the summit of the lowermost floret on a level with the apex of the large glume of the calyx; the three or four uppermost spikelets arising from the rachis, the lower ones on lateral branches. *Calyx* of two unequal acute glumes (fig. 1.), three-ribbed, the dorsal rib minutely toothed on the upper third, margins membranous. *Florets* of two paleæ (fig. 2.). The *outer palea* of lowermost floret equal in length to the large glume of the calyx, five-ribbed; the rib on each side of the dorsal rib not hairy, and rather indistinct (unless the palea be held between the lens and light); lower half of the dorsal and marginal ribs hairy; base of the two lowermost florets furnished with three or four long, silky, convoluted hairs, which seem but slightly attached to the calyx. *Inner palea* about equal in length to the outer palea, with two green marginal ribs minutely fringed. *Pedicel* of second floret slightly hairy. *Filaments* three. *Anthers* notched at each extremity. *Ovary* obovate. *Styles* two, distinct. *Stipules* feathery. *Scales* acute, notched (Pl. V. fig. 5.).

Dr. Balfour collected two varieties of the grass, one, *var. rigida*, short and stout, from 3 to 5 inches high, with a short

simple panicle of few spikelets; and the other, *var. extensa*, tall and slender, from 8 to 12 inches in height, with a simple panicle of few spikelets.

This grass is closely allied to *Poa nemoralis*, but differs from it in the *ligule* of the upper sheath being prominent; *upper leaf* scarcely as long as its sheath; all the *joints* situated on the lower third of the stem, and covered by the sheaths; *stem* slightly roughish: whereas in *P. nemoralis* the *ligule* is very short; *upper leaf* as long, often longer than its sheath; *upper joint* situated not below the middle of the stem, and not covered by the second sheath; *stem* smooth.

From *Poa montana*\* it differs in the *florets* being webbed; *upper joint* situated on the lower third of the stem; *lower floret* equal in length to the large glume of the calyx: whereas in *P. montana* the *florets* are not in the slightest degree webbed; *upper joint* situated about half-way up the stem; *lower floret* shorter than the large glume; *panicle* longer, more slender, of fewer spikelets on longer foot-stalks; *leaves* more taper-pointed.

From *Poa polynoda*†, Parn., it differs in the *florets* being webbed; *joints* not exceeding three in number, situated on the lower third of the stem; *upper joint* covered by the second sheath: whereas in *P. polynoda* the *florets* are not webbed; *joints* six or seven in number; *upper joint* situated above the middle of the stem, not covered by the second sheath.

From *Poa cæsia* it differs in the *florets* being webbed; *lower floret* equal in length to the large glume of the calyx: whereas in *P. cæsia* the *florets* are not webbed, and the *lower floret* is longer than the large glume of the calyx; the *spikelets* are larger, and the glumes of the calyx nearly equal.

From *Poa compressa* it differs in the *outer palea* being five-ribbed; *spikelets* of three *florets*; *joints* three, confined to the lower third of the stem: whereas in *P. compressa* the *outer palea* is three-ribbed; *spikelets* of five to seven *florets*; *joints* usually five, the upper one situated about the middle of the stem.

From *Poa pratensis* it differs in the *florets* being but slightly webbed; *stem* very much compressed and slightly roughish to the touch; *upper leaf* a very little shorter than its sheath; *spikelets* of three *florets*; whereas in *P. pratensis* the *florets* are copiously webbed, suspending the calyx by their silky hairs; *stem* smooth and round (except in the *var. planiculmis*, in which the stem is slightly compressed); *upper leaf* much shorter than its sheath; *spikelets* usually of five *florets*.

\* This species was found on Ben Lawers by Dr. Greville.

† This species is described in Dr. Parnell's work on Scottish Grasses.



The Plate represents *Poa Balfouri*, Parnell, with its variety *rigida*.

## PLATE V.

- Fig. 1. Glumes of calyx, } magnified.  
 — 2. Paleæ of a floret, }  
 — 3. Spikelet, }  
 — 4. Ligule with leaf and part of sheath, } natural size.  
 — 5. Stamens, styles, ovary and scales, }

XXIII.—*Information respecting Scientific Travellers.*

MR. FORBES.

A letter from Mr. Spratt, published in Woolmer's Exeter Gazette, will interest our readers, as giving some particulars relative to our much-esteemed friend Mr. Forbes :—

“ I am happy in being able to announce my arrival at the ship, after an absence of nearly four months, most of which was spent in making a tour through ancient Lycia. Mr. Forbes and self parted from our fellow-traveller, the Rev. Mr. Daniell, at Rhodes, who proceeded on to Athens, by way of Smyrna. We had a tedious passage, in a small country-boat, from Rhodes to Syra, of nine days. Poor Forbes, the naturalist, was taken ill on the way, which I soon perceived was the country fever, and he daily got worse until our arrival at Syra, being without medicine or medical advice. His condition was very miserable, and mine, from mental suffering on his account, was nearly as bad. We at length arrived at Syra, in which port I found one of our little tenders, and, through the Consul's exertions, obtained leave from the quarantine department to spend our time in quarantine on board of her. I set sail immediately for our ship, the Beacon, at this place—Paros; our assistant-surgeon, Mr. Harvey, has joined us to take care of poor Forbes, who is now in an improving condition, but has not taken food for thirteen days. I am myself, thank God, in most excellent health, and am much pleased with our tour. This is certainly the most picturesque country I ever saw, and my companions,—who are better judges, from having travelled over the continent,—say that it is not equalled anywhere in Europe. Its highest mountains are 10,000 feet high—the country fertile in parts, and capable of being made a paradise if sufficiently populous. It may be thus described to you for a general idea of its geographical features. Three large maritime valleys forming its south, east and west districts, the largest of which is Xanthus; and in its central and northern divisions extensive and fertile plains and valleys, which are from 400 to 500 feet above the sea. These are all delightfully watered with numerous streams and rivulets, and studded with small villages and towns. Its climate is that of England, though less humid, and its inhabitants Turks, who treat strangers with the greatest civilities and kindness. We have lived in their homes, and travelled under their guidance, and found ourselves at all times kindly and honestly dealt with. During the depth of winter these uplands are

shut up by snow, when the greater part of the inhabitants retire to the low valleys. On the 24th of May the snow capped the mountains above 700 feet, but was fast melting on that day. I visited one, in height a few hundred feet less—Mount Cragus : large patches of snow were on its sides, and we plucked tulips from the parts uncovered, also crocuses. We ascended from the valley of the Xanthus in the morning, when all appeared advancing summer—the corn was ripe and the heat intense ; but at noon we descended into a climate where the vegetation showed a dawning spring. These changes are very curious, and one of the sources of interest to the traveller. Our labours in Lycia have been crowned with success ; we have discovered several ancient cities by examining others which were before known ; have identified their names from inscriptions found amongst their ruins, and shall thus correct many errors of our predecessors, Mr. Fellows, &c., who opened the interests of this unknown part of Asia Minor to the world by two journeys through it. He won the laurels of his fame by first discovering, and by his most praiseworthy perseverance and exertions in endeavours to procure for his country its riches. All the results of our digging during the last winter are now on their way to England by the Monarch and Medea. The ships' companies had tough work in the removal of them. When we passed through the ruins on our return we found them hard at it with bullock-carts and hand-trucks, with flat-bottomed boats conveying the heavy blocks down to the sea. The officers and men suffered very much from mosquitoes and fever. Termessus was our greatest discovery, which we found about eight miles N.W. of Adela, and Cibyra, the next, both of which are identified by inscriptions cut in them. The ruins of the former are so extensive that we had not time to examine it minutely.”

We are happy to have received much later intelligence from a gentleman just arrived in England, who states that on his passing through Syra he heard that Mr. Forbes had quite recovered. We learn also from the Prospectus of the Summer Course at King's College, London, that he has been appointed to succeed Mr. Don in the Botanical Professorship.

#### *The Antarctic Expedition.*

The Alarm, Capt. T. L. Stewart, left Guernsey last year for the Falkland Islands, and departed from thence at the end of May last for Buenos Ayres. A gentleman of this island (Guernsey) having received a letter by her, giving some account of Capt. Ross and the vessels under him, engaged on a scientific voyage of discovery towards the Antarctic Pole, has favoured us with the following extract :—

“ Captain Ross and the Antarctic expedition are now here. The Erebus and Terror came in contact, on endeavouring to escape an iceberg, in the seas of the Southern Pole. The expedition will positively be here for five or six months to repair the vessels and to make observations.

“ Captain Ross has been so kind, at my request, to ascertain the rate of evaporation in these islands ; and Hooker, the botanist, is also so good as to draw up a report on the Grasses, the prevailing Gra-

*mineæ* being considered as unknown in Europe. The splendid tussock grass is the gold and glory of these islands. It will, I hope, yet make the fortune of Orkney and Irish landowners of peat bogs. Every animal here feeds upon it with avidity, and fattens in a short time. It may be planted and cut like the guinea grass of the West Indies. The blades are about six feet long, and from 200 to 300 shoots spring from one plant. I have proved, by several experiments, that one man can cut 100 bundles in a day; and that a horse will greedily devour five of these in the same time. Indeed, so fond of it are both horses and cows, that they will eat the dry tussock thatch from the roofs of the houses in preference to good grass. About four inches of the root eats like the mountain-cabbage. It loves a rank wet peat bog, with the sea-spray over it. Indeed, when the sea beats with the greatest violence, and the sea-spray is carried furthest, then the tussock grass thrives the best on the soil it loves. All the smaller islands here, though some of them are as large as Guernsey, are covered with tussock, which is nutritious all the year.

“The whole of the gentlemen on the expedition are delighted with the Falkland Islands, and express themselves as being more pleased with them than even with New Zealand. Some think them in every way better for colonization, even with the drawback of wanting timber-trees there. When the observations made during their voyage are published, you will be surprised at their favourable account of the climate.

“In addition to all these scientific observations, the surveying department is exploring and examining different harbours, sites for different objects in a new settlement, &c.

“The botanist and I started from Port William, where I had been eight days, at seven o'clock in this winter morning, and on foot; arrived at Government House by four o'clock in the afternoon, examining the country we travelled over, where there is a good deal of mossy bog. No one had done this before in one day during the winter, yet the distance as the crow flies is not far.

“I have tamed a Guanaco from Patagonia. He lies down before the fire, with his head on my knee, like a dog, though he is now as tall as a donkey. I hope to get more in the Falkland Islands. They browse on the poorest land, and their flesh is like venison. Their wool is thick, but I fear not so valuable as that of the Alpaca. The monkey from the Cape de Verds has hitherto kept his health, and is quite lively. I hope soon to give a favourable account of my adding to our domestic breed of animals the valuable fur seal.

“In going from Fort Sussex to Mount Osborne I passed several herds of wild cattle. The day was most beautiful, and so clear that I saw from Cape Dolphin to Cape Carysford, all over Berkley Sound. Lively Island appeared at our feet.”—*From the Guernsey Star.*

LETTER FROM MR. FRASER, ZOOLOGIST TO THE NIGER EXPEDITION.

*To Richard Taylor, Esq.*

MY DEAR SIR,—I arrived here on the 15th of May, after a cruise of six weeks in the Bights, in H.M.S. *Iris*, *Termagant* and *Persian*.



Notwithstanding the rainy season has set in, I have collected upwards of 100 skins, besides specimens in spirits. Amongst my mammalia I may mention a specimen of Mr. Waterhouse's *Colobus satanus*, which I intend sending entire for Mr. Owen's examination; a specimen of *Antilope Ogilbyi*, Waterh.; six species of *Sciurus*, and a Flying Squirrel, which I trust will prove a new form: also an animal called by the colonists the "Ground Pig," which appears nearly allied to Mr. Waterhouse's *Cricetomys*, which I think will also prove new; a species of *Sorex* and a *Manis*, the latter of which I had alive for some days. I wish to stay here for at least twelve months should my health permit. I have requested Mr. Ogilby to describe some of my specimens which I have enumerated.

LOUIS FRASER.

P.S.—Here lie the remains of that most enthusiastic traveller Lander, without a mark or memorandum to distinguish his grave from those of his coloured neighbours. Upon this I will make no remark; having stated the fact, I shall leave it to your own reflections.

Fernando Po, Clarence, June 19, 1842.

#### BIBLIOGRAPHICAL NOTICES.

*Iconografia della Fauna Italica.* By C. L. Bonaparte, Prince of Canino. Rome, 1832-1842. London, Gould.

It is satisfactory to find that Italy, so long pre-eminent in literature and art, is at the present time displaying considerable energy in the cultivation of natural history. The museums of Turin and Florence have attained a very high degree of excellence, and respectable public collections also exist in Rome, Padua, Parma, Bologna, and other large towns. Nor do the naturalists of that country confine themselves to the formation of museums alone. Much has been done of late in Italy for the advancement of zoological and botanical science by the publication of original memoirs in the Transactions of the Academies of Turin, Florence and Bologna, as well as by the production of independent works. Unfortunately these publications are but too little known in this country, from the present very imperfect system of communication between the English and Italian booksellers.

Among the zoological works which have recently issued from the presses of Italy, there is none which has a higher claim on our attention than the 'Fauna Italica' of the Prince of Canino. For the last ten years this work has absorbed a large portion of the time and energies of its indefatigable and truly philosophic author, and as the publication is now complete, it is deserving of some notice in this journal.

The object of the present work is to illustrate the Vertebrate Animals of Italy, by giving accurate coloured plates and descriptions of all the new or imperfectly known species. Of the Reptiles of Italy it contains an entire monograph, but of the other classes of Verte-

brata it necessarily includes a selection only, though its illustrious author holds out a hope, if his life be spared, of hereafter completing the entire Fauna of Italy. In the meantime he has given in the introduction to this work an admirably lucid summary of our present state of knowledge of the Italian Vertebrata, which, if translated into the English language, would have considerable interest for British zoologists. From this essay we extract the following tabular result :

	Total of known species.	European species.	Italian species.	Figured in the present work.
Mammalia. . . . .	1260	180	90	45
Aves . . . . .	6000	540	390	35
Reptilia . . . . .	1300	92	60	60
Pisces . . . . .	7000	763	470	181

Among the animals illustrated in this work, many are new species, whose existence is now for the first time announced to the world. Some of them had indeed been known to previous naturalists, but, from the superficial methods of observation formerly in use, had been referred to analogous species of the North of Europe. It remained for the acute and discriminating eye of the Prince of Canino to detect the characters of these species, and to raise them to their true rank, and his work becomes in consequence an important contribution, not to the Italian only, but to the European Fauna.

It is indeed an interesting fact to find that Italy, separated as it is from the rest of Europe by a barrier of mountains and of seas, and enjoying a climate which excites the envy of the Teutonic race, possesses a fauna which is in a considerable degree peculiar to itself, or is shared only with its sister peninsulas of Spain and Greece. The present work will consequently possess an interest for the scholar as well as the zoologist, as tending to clear up many doubts respecting the specific identity of the animals alluded to by the poets and naturalists of ancient Italy.

In conclusion we will only add, that the plates of this work, as regards both drawing and colouring, are highly creditable to the Roman artists. The lithographic plates of birds in the earlier numbers are indeed printed rather too black, but the later ones are much improved, and are scarcely, if at all, inferior to the best ornithological works which have been produced in Britain.

*Algæ maris Mediterranei et Adriatici, observationes in diagnosis specierum et dispositionem generum.* Auctore J. G. Agardh. Paris, 1842.

By the kindness of the author we have received this important work, to which we take the earliest opportunity of calling the attention of our readers. Its interest is not merely confined to the geographical details or the elucidation of species and genera, but it contains many new and instructive systematic views, the result of the labours so successfully prosecuted by the author for some years, relative to the structure and germination of Algæ, which bid fair to take off the opprobrium long attached to all attempts at the systematic arrangement of these beautiful but puzzling productions, and which perhaps have been

instrumental in calling forth one of the first botanists of the day to their further illustration. It is a curious but happy coincidence, that two botanists, Decaisne and Agardh, deeply imbued with philosophic views, though occasionally differing on important points, should almost at the same time have published an account of the Algæ of two neighbouring seas approaching so near to each other in point of distance, though differing so much in many essential points, as the Red Sea and the Mediterranean.

The following passage from Agardh's preface gives a very interesting general view of the nature of the marine vegetation of the Mediterranean.

The vegetation of the Mediterranean compared with that of neighbouring seas presents a somewhat peculiar aspect. Species which inhabit the Red Sea scarcely occur in the Mediterranean, with the exception of certain cosmopolites which are almost universally distributed; the genera which are most characteristic of the former and most numerous in species, *Sargassum* and *Caulerpa*, are represented in the Mediterranean by very few, and those distinct species. Nor is the difference much less between the vegetation of the Mediterranean and Atlantic; the genus *Fucus*, which abounds in the Atlantic, is altogether wanting in the Mediterranean, or represented by mere floating specimens, which assume however a peculiar form in the Adriatic; many species of *Florideæ* (*Chondrus crispus* and *Ch. mamillosus*, *Rhodomènia laciniata*, *Rh. palmetta*, *Rh. ciliata*, *Delesseria sanguinea*, *D. sinuosa*, *D. alata*, &c.) of the tribes *Sphærococcoideæ* and *Delesseriæ*, which abound in more open seas, do not adorn the rocks of the Mediterranean; *Callithamnia* and *Ceramia* become scarce. On the contrary, the genera *Bryopsis*, *Valonia*, *Griffithsia* and *Poly-siphonia* are more numerous in the Mediterranean, and the vegetation of rocks exposed to the sun (embracing very many *Zoospermeæ*, *Laurenciæ*, &c., which are more generally cosmopolites) boasts of perhaps an equal number in either sea. The degree of exposure to light, and the greater or less motion of the waves, are important moments in the distribution of species.

In the larger and more tranquil and sunny bays, especially those which are shallow and sandy, *Zoospermeæ* principally occur, which are generally adorned with a brighter green in consequence of the greater intensity of the light. *Rivulariæ*, *Lyngbyæ* and many *Confervæ* flourish on the stones scattered about high-water mark; *Bryopsis myura*, *Anadyomene*, *Dasycladus* and many *Laurenciæ* grow on the larger rocks. On stones which are more submerged and consequently less exposed to light, are found *Cystoseira barbata*, *C. crinita*, *C. selaginoides*, &c., *Sargassa*, *Codium Bursa*, *Padina pavonia*, *Liagoræ*, &c.

In deep and very tranquil bays, which are less exposed to light, we may expect *Siphoneæ* and *Dictyotæ*; most of the species of *Bryopsis*, *Valonia intricata*, *Codium tomentosum*, *Asperococcus bullosus*, *Stilophoræ*, *Striaria*, *Cutleria*, *Zonariæ*, *Halyseris* and *Dictyota* adorn the stones and rocks with many species. The *Florideæ* love the open sea, choosing however rocks concealed from light and not exposed



to very strong currents: *Catenella*, *Polysiphonia obscura*, *Chondrus*, *Griffithsia* and *Gelidium ustulatum* inhabit spots almost emersed or sprinkled only with the spray; *Rhytiphleæa tinctoria*, in company with a variety of *Cystoseira abrotanifolia*, is found in ditches; *Nemalion*, many forms of *Gelidium corneum*, *Hypnæa musciformis*, *Gigartina acicularis*, &c. prefer such parts of high-water level as are exposed to waves; *Cystoseira amentacea* covers in profusion the more submerged rocks; most of the *Callithamnia*, *Griffithsia*, *Rhodomenia palmetta*, *Peyssonellia*, *Chondrus norvegicus*, and forms of *Gelidium corneum* inhabit the higher but more hidden rocks; *Phyllophora nervosa* and *Ph. Heredia*, with *Ph. coronopifolius*, adorn those which are concealed but more deeply covered. *Sphær.Lactuca* and *Chondria uvaria*, with *Va-lonia utricularis*, are often found in little hollows amongst sponges.

Agardh considers the Algæ as constituting a distinct class, which he divides into *Zoospermeæ*, *Florideæ* and *Fucoideæ*, which answer nearly to *Chlorospermei*, *Rhodospermei* and *Melanospermei* of Harvey. To these must be added *Diatomaceæ*, which however are not included in the present enumeration; nor are the Corallines and *Halimedeæ*, of which Decaisne proposes shortly to give a monograph, than which there are few greater desiderata in cryptogamic botany.

Decaisne's main divisions in his 'Plantes Arab.' published in the second volume of the 'Archives du Muséum d'Histoire Naturelle,' and in the numbers for May and June of the present year of 'Annales des Sciences Naturelles,' correspond closely with those of Agardh, though he makes one more division, *Synsporeæ*, to include *Zygnema* and its allies, which are classed by Agardh with the *Zoospermeæ*. His *Zoosporeæ*, *Aplosporeæ* and *Choristosporeæ* accord closely with Agardh's *Zoospermeæ*, *Fucoideæ* and *Florideæ*. Some genera, however, included by Agardh in his first division, as *Vaucheria*, *Codium* and *Spongodium*, are classed by Decaisne in his *Aplosporeæ*.

It is scarcely possible, without entering into the subject at great length, to give a sketch of their respective views and systems, especially as, notwithstanding the great similarity in the general result, there are many points of controversy between the authors which at present can scarcely be regarded as settled on firm grounds, and anomalies of structure unsatisfactorily explained or unnoticed\*. We must therefore content ourselves with very strongly recommending all who take an interest in Algology to study the memoirs themselves, which will afford ample matter for reflection†. *Palmelleæ* and

\* In *Sphæroplea crispa*, which is perhaps better referred to the genus *Lyngbya*, there being no other essential difference than the ultimate globular form of the concentrated masses of the green matter with which the joints are filled, a very curious phænomenon occurs. The masses, which appear to be as truly a form of fructification as the conyocysta of *Aplosporeæ*, being surrounded by their own especial hyaline coat, as is also the case in *Lyngbya speciosa* and *Lyngbya Carmichaeliana*, after a certain time break up again into Zoosperms endowed with the most lively motion. Other equally anomalous facts occur which can scarcely be at present referred with certainty to given types.

† Decaisne, who has very deeply studied the subject, has referred with great ingenuity the different forms of fructification to distinct types. He

*Ulvaceæ* are by both referred to *Zoospermeæ*; but it is to be observed, that in *Tetraspora lubrica* the four spores originate from a single globose body, precisely as in *Delesseria* and other genera with *Tetraspores*, and the quaternary arrangement in *Porphyra* appears to be of a very similar nature. We have, at least, in *Porphyra vulgaris* witnessed the division of cells into four distinct spores, each furnished with its proper envelope. *Palmella rupestris* presents also an analogous structure. We are inclined then to think, when the matter has been further studied, that they may be safely removed from their present very anomalous position. *Chaetophora*, again, if Decaisne's principles be fully carried out, must be removed to his *Aplosporeæ*, for the simple spores are as fully developed in the only species in which they have been at present observed as in any genus whatever.

One of the most useful points as regards species is the settling the true position of *Zonaria squamaria*, which is raised to the rank of a genus under the name of *Peyssonellia*, and it appears clearly to be allied to *Sphaerococcus*. The genus *Ralfsia* (= *Zonaria deusta*), which appears not to have been known either to Decaisne or Agardh, as clearly belongs to the Aplosporic group.

In conclusion we beg leave to direct attention to a very interesting work by Meneghini\* on the Algæ of Italy and Dalmatia, of which we have received the first fasciculus from the author, and we understand that another has appeared. It will consist of about ten fasciculi.

## PROCEEDINGS OF LEARNED SOCIETIES.

### ZOOLOGICAL SOCIETY.

Dec. 14, 1841.—Richard Owen, Esq., Vice-President, in the Chair.

Mr. Waterhouse laid before the Meeting his descriptions of numerous species of Coleopterous insects from the southern parts of South America, which had been placed in his hands for that purpose by H. Cuming, Esq. and C. Darwin, Esq. Those from Mr. Cuming formed part of a collection made by Mr. Thomas Bridges, who expressed a wish that the specimens should be laid before the Zoological Society. Unfortunately, the exact localities of the insects are not mentioned in Mr. Bridges's notes, but there is reason to believe

seems inclined to deny two modes of fructification altogether, and it must be confessed that his views, especially in *Choristosporeæ* (= *Florideæ*), are maintained with great ingenuity, though such generally received opinions as that of the diocious character of these Algæ cannot very easily be set aside. The typical form of fructification he considers to be the quadripartite granules, whether more or less superficial or arranged in podlike processes, and the so-called capsules he considers as mere modifications of these granules. This is one of the main points of difference between Decaisne and Agardh, and somewhat analogous points of difference exist in the other orders. His explanation of the structure of *Ulvaceæ* appears to us less clear than other points.

\* *Alge Italiane e Dalmatiche*, illustrate Dal Prof. G. Meneghini. Padova, Marzo 1842.

they were collected in the neighbourhood of Petorca. The species described belong to the genera *Nyctelia* and *Listroderes*, or are nearly allied to those two groups.

### Section HETEROMERA.

#### Family NYCTELIIDÆ.

#### Genus NYCTELIA.

Species from the collection of Thomas Bridges, Esq.

*NYCTELIA LÆVIS.* *Nyct. atra, nitida*; capite anticè punctis sparsis notato; thorace mediocritè convexo, latiore plusquàm longo, parte anticà angustiore, ad latera modicè rotundato, margine anteriore, pilis brevibus flavescentibus fimbriato, angulis et anticis et posticis productis et subacutis, dorso punctis parvulis dispersis: elytris lævibus convexis, brevibus, ovatis, apice producto et subacuto; carinà laterali crenulatà; segmentis abdominalibus rugis irregularibus longitudinalitèr impressis.

Long. corp.  $11\frac{1}{2}$  lin.; lat.  $6\frac{3}{4}$ ; lat. thoracis,  $4\frac{2}{3}$ ; long. ib.  $2\frac{3}{4}$ .

Black and glossy; general form ovate; thorax and elytra convex above, and presenting no distinct sculpturing. Head with scattered punctures in front, smooth behind. Thorax with very fine scattered punctures, and these most numerous on the fore part: parallel with, and at a short distance from the lateral margins of the thorax is an indistinct line on each side, formed by the somewhat abrupt termination of the convex discoidal portion at this part; the space between this line and the outer margin is nearly plane, and presents a few indistinct irregular rugæ, having a tendency to a transverse disposition. The thorax is broader than long, the width to the length bearing very nearly the proportion of 8 to 5; the middle of the thorax and hindermost part are about equal in width, but from the middle to the front the width gradually decreases; in front it is emarginated, and the anterior margin is furnished with a fringe of short, dense, yellowish hairs; the posterior margin presents an undulating line, encroaching on the body of the thorax on each side about midway between the mesial line and the posterior angle, which is produced. The elytra are very convex, and nearly of an ovate form; they are widest in the middle, and the apical portion is produced; the lateral keel (which forms the outer boundary of each elytron, viewing the insect from above) is not very prominent, and is indistinctly crenulated: this ridge does not extend to the apex of the elytron, but terminates about two and a half lines from that point: between the apex and the terminal point of the keel is an oblique ridge: the sutural portion of the elytra is distinctly indented near the scutellum, and less distinctly so at other parts. The mentum is coarsely punctured: the prosternum and mesosternum are coarsely punctured in the middle, and the punctures are confluent: the metasternum has small and somewhat irregular longitudinal rugæ in the middle, and similar rugæ are observable on the first, second, and anterior half of the third abdominal segments. The legs are black, but the tip of the femora and base of the tibiæ are pithy.

Very many specimens of this species were sent to this country by



Mr. Bridges, and as I have reason to believe they will be distributed in most of the public and private entomological collections, I shall regard it as a type for comparison in describing some other species of the same genus.

*NYCTELIA LÆVIS*, var. *RUFIPES*. Many specimens of a *Nyctelia* agreeing with the *N. lævis*, but differing in having the legs and antennæ of a pitchy red colour, were contained in Mr. Bridges's collection. Of these red-legged specimens, as well as of those having the legs concolourous with the body, there are males and females; but the red-legged specimens are generally rather narrower, and often have a slight trace of transverse depressions on the outer side of the elytra; the difference of form and sculpturing, however, is not constantly combined with the red colouring of the legs and antennæ, and as in some other species of *Nyctelia* and *Epipedonota* I have found a similar difference in the colouring of the legs, &c., I cannot regard that character as specific.

*NYCTELIA TRANSVERSO-SULCATA*. *Nyct. atra, nitida; capite anticè sparsim punctato: elytris vix duplò latioribus quàm longis, anticè potiusquàm posticè angustioribus, angulis productis, subacutis: elytris mediocritè convexis, brevibus, ovatis, apice producto, sulcis haud ad medium attingentibus, profundis et levitè undulatis, transversim insculptis; segmentis abdominalibus ferè lævibus.*

Long. corp. 9 lin.; lat.  $5\frac{1}{4}$ .

This species is smaller than the *N. lævis*, and the thorax and elytra are less convex. The head has a few scattered punctures in front, and numerous very fine punctures on the hinder part, near the eyes; the remaining portions are smooth. The thorax is impunctate, but little convex above, and has two indistinct foveæ on each side near the posterior angles, and joining the hinder margin. The elytra are ovate and slightly convex; the apical portion is produced, and has the outer margin slightly reflected: the lateral keel of the elytra is very prominent, and distinctly crenulated: extending inwards from this keel, to about the middle of the elytron, are a series of transverse and slightly irregular grooves, about fourteen in number, on each elytron; the length of these grooves (the interstices of which are convex) varies so, that they all terminate nearly at the same distance from the suture. On the space between these transverse *sulci* and the suture are two longitudinal striæ, which are somewhat indistinct, and interrupted in parts, excepting on the apical portion of the elytron, where the innermost of the two striæ is well marked, and the suture of the elytra is at this part somewhat elevated. Numerous oblique furrows are observable on the produced apical portion of the elytra. The portion of the elytra which lies below the keel presents no distinct sculpturing. The abdominal segment presents scarcely any trace of longitudinal rugæ. The legs are black, but have a slightly pitchy hue.

Species of *Nyctelia* from the collection formed by C. Darwin, Esq., during the voyage of H.M.S. Beagle.

*NYCTELIA PLICATA*. *Nyct. ovata, nigra, nitida; capite anteriore crebrè punctato, posteriore ferè lævi; thorace transverso, elytris*

*angustiore*; *angulis posticis productis, obtusis, suprà ad medium pauld convexo, et crebrè punctato*; *elytris latis, subovatis, convexis, sulcis profundis transversalibus, a margine externo ferè ad suturam ductis, plagà suturali profundè indentatà.*

Long. corp. (♂) 13 lin.; lat.  $7\frac{1}{2}$ ; vel, long.  $11\frac{1}{2}$  lin., lat.  $6\frac{1}{2}$  lin.

Long. corp. (♀)  $12\frac{3}{8}$  lin., lat.  $7\frac{1}{2}$  lin.

*Hab.* Port Desire.

This species is considerably larger than *N. levis*; the thorax is proportionately broader and shorter, and the produced apical portion of the elytra is dilated and depressed. The head is thickly punctured in front, and there are numerous punctures at the sides above and behind the eyes. The thorax is about twice as broad as long; the broadest part is behind, but till anterior to the middle it scarcely decreases in width; from the middle to the fore-part the transverse diameter is gradually lessened, so that the lateral margins form a gentle curve; the anterior portion is emarginated, and the posterior margin is rather strongly sinuated; the anterior angles are acute, and the posterior angles are rounded. The upper surface of the thorax is convex in the middle, but towards the sides it is slightly concave; it is thickly punctured, and the punctures are many of them confluent; on the disc the punctures are much less numerous. The elytra are about one-fourth broader than the thorax (rather less in the male sex), and about one-fourth longer than broad; they are very convex, indented at the suture, and furnished with a series of nearly transverse indentations, about eighteen or twenty in number, which commence at the lateral keel and terminate about one-eighth of an inch short of the suture; the space between these transverse folds and the suture is apparently smooth; but with a moderately strong lens some very minute tubercles may be observed scattered on this part, as well as on the interspaces of the transverse indentations, which are about equal in width to the grooves: the apical portion of the elytra is considerably produced, and the produced part is broad and somewhat depressed, and has the upper surface rugose. The mentum is coarsely punctured, and the under side of the head is thickly punctured: the prosternum is coarsely punctured in the middle, and has some irregular rugæ at the sides; at the lateral margin is a series of small transverse rugæ: the mesosternum and metasternum have irregular rugæ in the middle, and the two first and half of the third abdominal segments have small irregular longitudinal rugæ; the remaining two abdominal segments are finely punctured.

*NYCTELIA SOLIERI.* *Nyct. ovata, nigra, nitida*; *capite anticè punctato, posticè levi*; *thorace transverso, elytris angustiore*; *angulis posticis productis, suprà apud medium pauld convexo, et levi*; *elytris anticè apud plagam suturalem levitè impressis, et sulcis transversis paulo irregularibus a margine laterali ferè ad suturam ductis.*

Long. corp.  $11\frac{3}{4}$  lin.; lat.  $6\frac{3}{4}$  lin.

*Hab.* Patagonia.

This species resembles the *N. plicata*, but differs in having the thorax smooth; the elytra are rather narrower, and the apical pro-

duced part is shorter and broader; they are scarcely indented at the suture, excepting in a slight degree towards the scutellum; the transverse folds are less regular, often dividing into two branches, and approach more near to the suture. A transverse section of the elytra of *N. plicata* would present a convex upper surface near the suture, but at the part where the grooves commence the line would be straight (though sloping downwards to the lateral keel), or even slightly concave; whilst in *N. Solieri* a similar section would present an even convex curve. Scattered punctures are observable on the fore-part of the head, and a shallow transverse depression is situated between the eyes; the thorax is nearly twice as broad as long, convex in the middle, but slightly concave towards the lateral margins: with a moderately strong lens some minute punctures are visible, rather thinly scattered over the surface. The elytra are ovate, the length to the width bearing about the proportion of 7 to 9.

NYCTELIA DARWINII. *Nyct. breviter ovata, convexa, nigra, nitida; capite subpunctato; thorace paulò ad partem anteriorem quàm posticam angustiore, lævi, convexo; elytris subrotundatis, valdè convexis, lævibus, marginibus lateralibus crenulatis.*

Long. corp.  $11\frac{2}{3}$  lin.; lat. 8 lin.; vel, long. 11 lin.; lat.  $7\frac{1}{4}$  lin.

*Hab.* Port Desire.

This species is remarkable for its broad and very convex form and deficiency of sculpturing, having the upper surface of the thorax and elytra smooth and glossy. The head is finely punctured: the thorax is twice as broad as long, and convex; a groove runs parallel with and close to the lateral margins, and a similar groove is observable on the anterior margin, though here it is less strongly marked. Elytra rather more than one-third broader than the thorax, and the length and breadth are very nearly equal, if we exclude the produced apical portion, which is broad, depressed, and nearly of a semicircular form. The lateral keel is distinctly crenulated, and separated by an adpressed line. The underside of the thoracic segments are rugose in the middle, and the first and second abdominal segments have irregular longitudinal rugæ; the third segment presents a faint trace of similar rugæ at the base; the other segments are smooth.

The spines at the apex of the posterior tibiæ are longer than usual in the genus.

*Nyctelia Darwinii*, var. ? minor (long. corp.  $8\frac{2}{3}$ ; lat.  $6\frac{1}{3}$ ); elytris rotundatis apice paulò producto et angustiore.

*Hab.* Port Desire.

NYCTELIA FITZROYI, Curtis, MSS. *Nyct. subrotunda, convexa, nigra, nitida; capite utrinque punctis paucis adperso; thorace lævi, convexo, anticè latiore, angulis posticis acutis; elytris rotundatis, ad apicem productis, convexis, lævibus, margine externo crenulato; antennis pedibusque piceo-rubris.*

Long. corp.  $10\frac{1}{2}$  lin.; lat. 8 lin.

*Hab.* Port Desire.

This species was first discovered by Capt. King, and will be here-



after described in detail by Mr. Curtis, whose MS. name I have adopted. Two specimens were found by Mr. Darwin at Port Desire; it approaches very near in size and general characters to *N. Darwinii*, but differs in having red legs and antennæ, in being of a broader form, in having the legs less rough, the lateral keel of the elytra less prominent, and not so distinctly crenulated, and the spurs or spines at the apex of the posterior tibiæ are much smaller. The length of the elytra is rather less than the width, if the produced apical portion be omitted; and if included in the measurement, the length very slightly exceeds the width; they are very convex and smooth, and so is the thorax, which is twice as broad as long, and considerably narrower before than behind. The head is sparingly punctured.

*NYCTELIA GRANULATA*, Curtis, MSS. *Nyct. atra, nitida, subrotundata; capite transversim impresso, anticè punctato; thorace subquadrato, ad latera crenulato, suprâ convexo, lævi; elytris rotundatis, apice paulò productis, suprâ conveis, ad suturam depressis, rugis validis et irregularibus obsitis, his in dorso plerumque longitudinalibus et prope latera obliquè dispositis.*

Long. corp.  $8\frac{1}{4}$  lin.; lat. 6 lin.

*Hab.* Cape Negro.

This, together with several nearly allied and very remarkable species of *Nyctelia*, occurs in Capt. King's collection, and will be hereafter characterized in detail by Mr. Curtis. The specimen from which the above short description is taken forms part of Mr. Darwin's collection, and was found at Cape Negro. The legs are very rough, being thickly covered with tubercles, and they are shorter than in most of the species of *Nyctelia*. The whole upper surface of the elytra is covered with rugæ, and these are very strongly marked, and though very irregular, they have a general longitudinal direction on the depressed space on the middle of the elytra. This sutural depression, which is about two lines in width, is bounded on each side by a broad and slightly elevated ridge; between this ridge and the outer margin the rugæ have a tendency to form oblique lines. A few fine punctures are observable on the fore-part of the thorax, and on the sides are two grooves placed closely together, and parallel with and near the lateral margin; the narrow ridge between the two grooves, as well as the marginal ridge, is crenulated.

*NYCTELIA PUNCTICOLLIS*. *Nyct. ovata, atra, nitida; thorace distinctè et crebrè punctato; elytris tuberculis minutis, et ad latera rugis transversis irregularitèr impressis, his non forte distinctis.*

Long. corp.  $9\frac{3}{4}$  lin.; lat. 6 lin.

*Hab.* Bahia Blanca.

This species is rather smaller than the *N. lævis*, and has the thorax and elytra less convex. The head is rather thickly and coarsely punctured, excepting on the vertex. The thorax is thickly and coarsely punctured, and the punctures are for the most part confluent; a distinctly impressed line runs parallel with and close to the margins; the lateral margins are obscurely crenulated. The elytra are of a broad ovate form, and the apical produced portion is convex

and rounded at the apex. The lateral keel of the elytra is distinctly crenulated, and transverse shallow furrows run inwards from this margin, leaving interspaces rather broader than the furrows, which, for the most part, are about a line, or rather less, in length. On the interspaces between the furrows, and the whole upper surface of the elytra, are very minute scattered tubercles; these are very indistinct towards the suture, near which are one or two very faint striæ. The labrum is coarsely punctured, and the underside of the head is also punctured. The under surface of the prothorax is covered with small tubercles, from each of which springs a hair; between the legs, the under side of the prothorax and mesothorax is coarsely punctured. The first, second and third of the abdominal segments are covered with distinct longitudinal rugæ, and the apical segments are punctured beneath.

Several specimens of this species were collected at Bahia Blanca by Mr. Darwin, who says they are 'tolerably abundant on sand-hillocks.' A *Nyctelia* in Mr. Darwin's collection, from Rio Negro, resembles the present species, excepting that it has pithy red legs and antennæ.

*NYCTELIA SUBSULCATA.* *Nyct. ovata, atra; thorace transverso distinctè punctato; elytris rugis tuberculisque minutissimis; sulcis transversis aliquanto irregularibus ad latera insculptis.*

Long. thoracis elytrorumque,  $9\frac{1}{2}$  lin.; lat.  $5\frac{2}{3}$  lin.

*Hab.* Mendoza.

This species is very closely allied to the *N. puncticollis*, and it is with considerable hesitation that I venture to describe it as distinct, more especially as Mr. Darwin's collection contains but one specimen, and that has lost its head and legs; this specimen, however, differs considerably in form from any of the numerous examples of *N. puncticollis* which I have before me. The thorax is narrower and less thickly punctured; the elytra are more elongated, and the lateral transverse grooves are more distinct and regular.

The thorax is transverse, and the length is equal to rather more than half the width; the middle and hinder parts are very nearly equal in width, and the anterior portion is contracted; the surface is distinctly punctured, and there are two irregular foveæ on each side of the middle, rather nearer to the mesial line than the outer margin. The elytra are one-fourth longer than broad; the apical portion is moderately produced and somewhat pointed: the whole upper surface of the elytra is covered with very minute rugæ, and there are moreover some minute tubercles; on the outer half of each elytron is a series of transverse furrows, with convex interspaces equal in width to the furrows.

*NYCTELIA SAUNDERSII.* *Nyct. atra, oblongo-ovata, nitida; thorace punctato; elytris sulcis transversis pauld irregularibus a margine laterali usque ad medium ductis.*

Long. corp.  $7\frac{1}{2}$  lin.; lat. 4 lin.

*Hab.* Bahia Blanca.

Head distinctly punctured in front. Thorax rather coarsely punc-

tured, excepting on the disc, which is almost impunctate; emarginated in front, the emarginated portion in the form of a segment of a circle; the lateral margin slightly rounded. The hinder part of the thorax and the middle are equal in width; the fore-part is slightly contracted. The elytra are ovate, and but little convex; they are depressed at the suture, most distinctly so near the scutellum. The lateral keel is very prominent, and extending from this keel to the middle of the elytron are distinct transverse furrows, the interspaces of which are convex, and about equal in width to the grooves. The apical portion of the elytra is moderately produced. The three basal segments of the abdomen, as well as the metasternum, are covered with slightly irregular longitudinal rugæ: the terminal segment is punctured. The prosternum and mesosternum are coarsely punctured, and the punctures are confluent.

This is a small species compared with *N. levis* (being about the size of *N. nodosa*); its form is more elongated and much less convex. The lateral margins of the thorax form an even curve from the front to the back.

The specimens from which the above description is drawn up were found by Mr. Darwin in the month of September, on the sandy plains of Bahia Blanca.

*NYCTELIA RUGOSA.* *Nyct. nigra, opaca, ovata; thorace distinctè punctato; elytris valdè rugosis, sulcis duobus, suturam prope, longitudinalibus et interruptis, impressis.*

Long. corp.  $7\frac{3}{4}$ ; lat.  $4\frac{2}{3}$ .

*Hab.* San Blas (near Rio Negro) and Bahia Blanca.

This, which is a small species compared with *N. levis*, approaches that species in general form, but the thorax and elytra are less convex. The head is coarsely punctured in front. The thorax is coarsely punctured, and the punctures are numerous, excepting on the disc: a groove runs parallel with and close to the margins, but at the posterior margin it is interrupted in the middle. The elytra are convex, and of a short ovate form, and the apical portion is but little produced; their width is about one-fifth less than the length: the whole upper surface is covered with coarse and very irregular rugæ. Four somewhat interrupted and irregular striæ run parallel with and near the suture, and there are two abbreviated oblique striæ near the scutellum. Besides the ordinary rugæ of the elytra, there are more marked rugæ, which, though very irregular, have a tendency to a transverse disposition, and these cover the outer half of each elytron. The prothorax is punctured beneath and rugose between the legs, as well as the mesosternum and metasternum. The three basal segments of the abdomen are covered with fine but distinct rugæ, and though these rugæ, for the most part, have a longitudinal direction, they are much more irregular than in most species of the genus. The two terminal segments are punctured, but in the penultimate segment the punctures are very few in number, and confined to the sides. The spines at the apex of the anterior tibiæ are more slender and proportionately longer than in *N. levis*.



Besides the two specimens, one from Bahia Blanca and the other rather further south (San Blas), Mr. Darwin's collection contains a specimen from Tierra del Fuego which is smaller (length  $6\frac{2}{3}$  lin., width  $3\frac{3}{4}$  lines) and proportionately narrower; but these differences are combined with a greater length of tarsus, and are precisely such differences as exist between the sexes of other species; in fact, it is no doubt the male of the insect from which the above description is taken.

*NYCTELIA WESTWOODII.* *Nyct. breviter ovata, nitida, atra; capite subpunctato; thorace transverso, posticè paulò latiore quam anticè, levitèr convexo, lævi, margine laterali imperspicuè crenulato; elytris ovatis, profundè striatis, interstitiis convexis, striis utrinque ad suturam duabus longitudinalibus, striis reliquis obliquis.*

Long. corp.  $7\frac{1}{2}$  lin.; lat.  $4\frac{3}{4}$  lin.

*Hab.* Port Desire.

Head with a few punctures in front. Thorax convex, about twice as broad as long, with the middle and hinder parts about equal in width, and the fore-part contracted; the anterior part emarginated, the emarginated portion in the form of a segment of a circle; the hinder margin but slightly waved; a distinct groove runs close to the anterior and lateral margins, which latter are crenulated. Elytra short and rounded; the length and width equal, if the produced apical portion be omitted in the measurement; the apex is moderately produced: the whole surface of the elytra is covered with deep striæ, leaving convex interspaces which are scarcely broader than the grooves; on each side of, and parallel with the suture, are two of these striæ; the remaining grooves are oblique, and for the most part converge towards the apical portion of the elytra: on the sides of the elytra, and more especially towards the apex, the grooves have a tendency to a transverse disposition. The mentum is very coarsely punctured, and there are some distinct punctures on the sides of the head beneath. The prothorax presents a few large scattered punctures beneath, some short irregular (but for the most part transverse) rugæ at the lateral margin, and some longitudinal rugæ near the base of the legs; between the legs the prosternum has some confluent punctures; the mesosternum and metasternum have irregular rugæ, and the three first abdominal segments have minute longitudinal furrows; the penultimate segment is smooth, and the apical one is finely punctured, but the punctures are by no means numerous. The legs and antennæ are rather shorter than usual in the genus.

*NYCTELIA STEPHENSII.* *Nyct. atra, nitida, lævis; thorace subquadrate; elytris rotundato-ovatis, convexis, carinè laterali prominenti et crenulatâ; elytrorum apicibus productis latis et subcomplanatis.*

Long. corp. 7 lin.; lat.  $4\frac{1}{3}$  lin.

*Hab.* St. Cruz.

Head with scattered punctures in front. Thorax transverse, the width being rather less than double the length; the upper surface is but little convex; the anterior and posterior margins are nearly

straight, but the anterior angles are produced and the posterior angles are slightly produced. The width of the fore and hind parts of the thorax is nearly equal, it being but slightly narrower in front, and the sides deviate but little from a straight line; a faint dorsal channel is observable, and a groove runs parallel with and close to the lateral and anterior margins. With the assistance of a strong lens, minute punctures may be observed scattered over the upper surface of the thorax, and some minute tubercles on the under. The elytra are convex, and of a short rounded form, the width and length being very nearly equal, if we do not include the produced apical portion, which is more dilated than in most of the genus, and is nearly flat. A groove runs close to and parallel with the lateral keel, both above and below, and this keel is distinctly crenulated. The upper surface of the elytra presents numerous indistinct and very shallow foveæ. The abdominal segments are almost smooth. The legs are proportionately rather longer than in *N. lævis*.

Mr. Darwin found this species at St. Cruz in the month of April.

*NYCTELIA NEWPORTII.* *Nyct. elongato-ovata, nigra, nitida; capite transversè impresso; thorace lato plus quàm longo, lateribus rotundatis; anticè et posticè latitudine compari; supernè minimè convexo, impunctato, ad latera rugis parvulis obliquis; elytris ovatis, lævibus, plagâ suturali valdè impressis, marginibus lateralibus crenulatis.*

*Hab.* Patagonia.

Long. corp. 10 lin.; lat. 6 lin.

This species is rather smaller than *N. lævis*, and differs moreover in being of a more elongated form, and most especially in the form of the thorax, which is narrower and nearly equal in width, in front and behind: the apical portion of the elytra is much less produced, and the produced portion is broader. The head is sparingly punctured at the sides, and has a curved impression, the chord of which is rather in front of the insertion of the antennæ. The thorax nearly one-third broader than long (taking the length from the anterior and posterior angles); it is broadest in the middle, and a trifle narrower in front than behind; the lateral margins form an even curve; the anterior part is emarginated, the emarginated portion being in the form of a segment of a circle, and a little less than a semicircle: the anterior angles acute, and the posterior angles form very nearly right angles: the hinder margin of the thorax is nearly straight, but the line descends slightly towards the angles. The surface of the thorax is very little convex, and almost impunctate, there being but a few scattered very minute punctures; on the sides, running inwards and upwards, are a series of minute grooves, like scratches, and on the hinder margin a faint trace of very short longitudinal grooves is visible. The elytra are ovate, convex, smooth, and glossy; the region of the suture is broadly and rather deeply depressed; the lateral keel is prominent and distinctly crenulated, and joining this keel are a series of shortish transverse furrows. The under surface of the body and thoracic segments is remarkable for the almost

total want of sculpturing, if we except some longitudinal furrows on the under side of the prothorax at the sides.

The exact habitat of the specimen from which the above description is taken is not known, but in Mr. Darwin's collection is a specimen which I am inclined to regard as specifically identical, and which is from St. Julian. It has the elytra proportionately rather broader and the thorax narrower, and the short longitudinal furrows on the hinder margin of the thorax are distinct; the sutural portion of the elytra is less depressed.

*NYCTELIA GUERINII.* *Nyct. atra, nitida, ovata; capite transversim impresso; thorace subquadrato in medio pauld dilatato, anticè emarginato, posticè ferè recto; ad marginem lateralem sulcis minutis valdè obliquis insculpto; elytris ovatis, convexis, ad apicem pauld productis, ad latera rugis transversis in seriebus tribus dispositis.*

Long. corp.  $9\frac{1}{2}$  lin.; lat.  $5\frac{3}{4}$  lin.

*Hab.* St. Cruz.

Rather smaller than *N. levis*. Head with small punctures very thinly scattered over the upper surface, and with a transverse impression rather in front of the line of the eyes. Thorax subquadrate, the breadth not quite equal to twice the length; the emarginated portion in front in the form of a segment of a circle; the hinder margin nearly straight; the posterior angles scarcely produced, and forming nearly right angles; the anterior angles acute. The thorax is contracted in front, broadest in the middle, and the lateral margin from the middle to the posterior angles forms nearly a straight line: on the hinder part of the upper surface are some extremely minute punctures, and at the sides are some small oblique grooves. The elytra are ovate and moderately convex, and the apical portion is but little produced; the region of the suture is very slightly indented: the sides of the elytra are covered with transverse grooves having narrow convex interspaces; these grooves extend inwards to about the middle of each elytron, and are arranged in three series, being divided by two longitudinal lines; the innermost series is indistinct: the lateral keel is distinctly crenulated. The mentum is distinctly punctured; the prosternum, as well as the other thoracic segments, and the abdominal segments, have the usual sculpturing, but it is less strong than usual.

It is with some hesitation that I name this insect, since it approaches very near to the *N. Newportii*; it differs, however, in having the thorax smaller and proportionately narrower, the elytra less convex, and furnished at the sides with three rows of transverse impressions instead of one; the region of the suture is less depressed.

*NYCTELIA SULCICOLLIS.* *Nyct. ovata, atra; thorace transverso, ad latera rotundato, anticè angustiore, sulcis minutis longitudinalitèr impresso; elytris crebrè punctatis (punctis confluentibus), tuberculisque minutis instructis: capite, thorace elytrorumque lateribus pilis vestitis, pedibusque etiam pilis instructis.*

Long. corp.  $8\frac{1}{4}$  lin.; lat.  $5\frac{1}{2}$  lin.

*Hab.* St. Cruz.



Much smaller than *N. levis*, and of a shorter and more rounded form. The upper surface of the head is very thickly punctured throughout, and the punctures run into each other so as to form irregular rugæ. The thorax is twice as broad as long, and has a deep and almost semicircular emargination in front; the anterior angles are acute, and the posterior angles are obtuse, and not produced as in many species of the genus, the hinder margin of the thorax presenting a nearly straight, or but very slightly waved line: the broadest part of the thorax is near the posterior angles, the narrowest part is in front, and the lateral margins are rounded in such a manner that the thorax might almost be described as semicircular, and having the fore-part emarginated. The whole upper surface of the thorax is covered with small but distinct grooves, leaving convex ridges between them about equal in width to the grooves; these furrows are longitudinal in their direction, or very nearly so, excepting in the fore-part, where they diverge from the mesial line and run up to the anterior margin, and at the sides of the thorax, where the grooves are irregular, but have a tendency to a transverse disposition. The under side of the thorax presents similar longitudinal grooves, excepting in the middle, where it is rugosely punctured; scattered hairs cover this under surface of the thorax; and towards the lateral margin the hairs, which are moderately long, are much more numerous and form a projecting fringe, which is visible when the insect is viewed from above. The elytra are of a short ovate form, about one-fourth broader than the thorax, and scarcely one-fifth longer than broad; the apical portion is but little produced: the upper surface is convex, and is thickly covered with small confluent punctures, amongst which minute tubercles are scattered; towards the lateral keel, which is very little prominent, the tubercles are distinct. The sculpturing of the portion of the elytra beneath the keel resembles that above it, but here the tubercles give origin to small hairs\*. The meso- and metasternum present irregular rugæ. On the first and basal half of the second abdominal segments are distinct longitudinal rugæ, and a slight trace of similar rugæ is observed at the base of the third segment; on other parts of these segments are some minute scattered punctures. The terminal segment is rather thickly though finely punctured. The legs are clothed with longish ash-coloured hairs.

*Nyctelia nodosa*, Latr. *Zophosis nodosa*, Germar ?

Five specimens of this species are contained in the collection of Mr. Darwin, and these are from three different localities, viz. Maldonado (La Plata), Bahia Blanca, and Mendoza.

**NYCTELIA ANGUSTATA.** *Nyct. atra, elongata, nitida; capite distinctè punctato et transversim impresso; antennis piceis; thorace subquadrato, lateribus ferè rectis, anticè emarginato, suprà punctis minutissimis; elytris subelongatis, et cum thorace quoad latitudinem ferè coequalibus, costis aliquantò irregularibus subelevatis interstitiis rugulosis, ad latera plicis transversalibus.*

\* Probably similar hairs originally sprang from the tubercles on the upper surface, but have been worn off.

Long. corp.  $7\frac{1}{4}$  lin.; lat.  $3\frac{2}{3}$  lin.

Hab. Patagonia?

The specimen from which the above characters are taken is a male, and by accident its label, containing the habitat, is lost; it is most probably from Patagonia. In general appearance the *N. angustata* greatly resembles the *N. nodosa*, but it differs in being of a narrower form, and in having the terminal joints (the fifth to the tenth inclusive) broader; the anterior tibiæ are also broader and rather shorter, and the thorax is longer in proportion to the width.

The head is distinctly and very thickly punctured in front. The thorax approaches to a quadrate form, but is slightly narrower in front than behind; the lateral margins form a very slight curve, and in fact are nearly straight; in front it is emarginated, and the emarginated portion is in the form of a segment of a circle; the hinder margin is but little waved; the anterior angles are acute, and the posterior angles are slightly produced and rounded at the point; a faint impressed line borders the anterior and lateral margins: the upper surface is but little convex and finely punctured, but on the disc the punctures are scarcely traceable: the length of the thorax is about equal to three-fifths of the width, whereas in *N. nodosa* the length is about equal to half the width. The elytra are very little broader than the thorax, being scarcely dilated in the middle, and are about one-third longer than broad; they have interrupted and somewhat irregular longitudinal grooves or striæ, and the interspaces are convex; the third and fifth most distinctly so: the striæ and interspaces on the lateral half of each elytron have distinct irregular rugæ, the largest of which are for the most part transverse in direction: the legs are long; the claws are of a pitchy colour. The fifth, sixth, seventh and eighth joints of the antennæ are somewhat compressed, broader than long, and produced in front so as to present nearly a triangular form; the ninth and tenth are still broad, but of a somewhat rounded form.

#### GENUS EPIPEDONOTA.

EPIPEDONOTA RUGOSA. *Epip. atra, opaca: capite rugoso; thorace lato plusquam longo, posticè angustiore, depresso supernè rugis valdè irregularibus, illis apud marginem exteriorem plerùmque longitudinalibus, illis apud discum ferè transversis, et utrinque costâ majore sublongitudinali definitis; elytris subovatis undatim rugis plerùmque transversis, et utrinque costâ apud discum valdè elevatâ, deindè alterâ minus elevatâ inter illam et carinam lateralem.*

Long. corp.  $8\frac{1}{2}$  lin.; lat.  $3\frac{3}{4}$  lin.; vel, long.  $11\frac{1}{3}$ ; lat.  $5\frac{3}{4}$ .

Hab. Petorca?

The whole upper surface of this insect is covered with well-marked irregular rugæ; these are for the most part longitudinal in their direction on the clypeus, and there is a transverse indentation marking the posterior boundary of this part: a little behind the line of the eyes is a somewhat irregular transverse ridge, and in the middle, between this ridge and the transverse groove just mentioned, is a short longitudinal ridge. The labrum is rugosely punctured. The thorax is very nearly twice as broad as long; its anterior and posterior

margins are nearly straight, excepting near the lateral angles, which are produced. Besides the ordinary rugæ on the thorax, there are two large longitudinal and slightly curved ridges, situated one on each side, nearly midway between the mesial line and the outer margin; and on each elytron is a strongly elevated costa or ridge, extending from the base very nearly to the apex, and running nearly parallel with the lateral keel of the elytron, on the mesial line of which they are placed. The spaces between these costæ is somewhat concave, and so is the interstice of the costa and the lateral keel of the elytron, which is crenulated or irregularly indented. The mentum is very coarsely punctured, and the punctures are confluent. The under side of the head is punctured, and there are numerous coarse punctures on the prosternum between the legs. The basal segments of the abdomen have small longitudinal sulci beneath.

Besides the great difference in size and form indicated by the dimensions, there occurs sometimes a difference in the sculpturing of the thorax and elytra, which I could scarcely have believed to exist in the same species had I not had an opportunity of examining many specimens. In a specimen before me, the rugæ on the head, thorax and elytra are much less distinct than in the individuals from which the above description is taken; and this is combined with a convexity of the elytra (which are almost always concave between the two dorsal costæ and also between these costæ and the lateral keel), giving a very different aspect to the specimen under consideration.

In having the thorax distinctly contracted behind, and in the more truly moniliform structure of the antennæ, the present insect approaches more nearly to *Callyntra* than to *Epipedonota*, but the terminal joint of the antennæ is decidedly smaller than the rest. I have before me specimens of the *Callyntra multicostata* and *Call. vicina* (which I scarcely think a distinct species), and do not find so marked a difference in the size of the terminal joint of the antennæ as compared with the penultimate joint, as that represented by M. Solier's figure—indeed the penultimate joint and terminal appear to me to be equal in size, or *most* nearly so.

EPIPEDONOTA AFFINIS. *Epip. atra, nitida*: capite anticè punctis sparsis, et posticè rugis transversis undulatis, notato; thorace latiore quàm longo, ad medium depresso, rugis vel plicis ferè longitudinalibus, ad latera transversis notato; clytris thorace latioribus, propè suturam ferè lævibus, singulorum dimidio externo sulcis transversis, his costâ longitudinali, in duas series divisis; prosterno sulcis distinctis longitudinalibus; segmentis abdominalibus levitè longitudinali-sulcatis.

Long. corp.  $9\frac{1}{2}$  lin.; lat.  $5\frac{1}{3}$  lin.

Hab. Petorca?

This species is of a shorter and broader form than *Epip. ebenina*, the furrows on the thorax are smaller and more numerous, and the elytra present but one distinct costa besides the lateral keel, the ridge corresponding to that nearest the suture in *E. ebenina*, being here obliterated, or very nearly so.



The head presents some scattered punctures in front, and, generally, there are some waved transverse impressions towards the hinder part, leaving narrow ridges between them. The thorax is twice as broad as long, has the sides distinctly rounded, the fore-part emarginated in the form of a segment of a circle; the anterior angles are acute, and there is a small indentation in the outer margin close to the angle; the posterior margin is nearly straight in the middle, but the angles are produced: the upper part of the thorax presents a slightly concave surface, and is covered with small sulci; those in the middle are oblique, converging to or towards the hinder part of the mesial line; about midway between this line and the outer margin they become longitudinal in their direction, and a space bordering the lateral margin is covered with oblique but nearly transverse narrow grooves and ridges. The width of the elytra, compared with that of the thorax, is nearly as seven to five, and the elytra are about one-fourth longer than broad, or rather less; the dorsal surface is plane and almost destitute of sculpturing; on the sides are two series of transverse furrows, which are separated by a strong costal ridge; the innermost of these two series of transverse grooves is obliterated towards the base and apex of the elytron, but in the middle they are strongly marked, as are also the transverse grooves between the costal ridge and the lateral keel: on the apical half of each elytron a faint trace of the costa, corresponding to the innermost one in *E. ebenina*, is observable.

Numerous specimens of this new species were contained in Mr. Bridges's collection.

*Epipedonota ebenina*, Solier. *Nyctelia ebenina*, Auct.

Four specimens of this species were brought by Mr. Darwin from Mendoza; two of these are females, and present a character I have not before observed in the species, viz. some zigzag white lines at the apex of the elytra; these lines are observable in the grooves between the costæ: in one specimen there are three of the white lines on each elytron, corresponding with the number of interspaces of the costæ; they are interrupted, and form dots as they recede from the apex of the elytron. In the other specimen there are but two of these lines visible.

*Epipedonota erythropus*, Solier. *Nyctelia erythropus*, Auct.

Mr. Darwin also found this species (if it be really distinct from *ebenina*) at Mendoza.

EPIPEDONOTA BONARIENSIS. *Epip. atra, nitida; thorace suprâ irregulariter et longitudinaliter multiplicato, ad latera crenato; elytris utrinque costis duabus elevatis, et sulcis transversalibus ordine triplici.*

Long. corp.  $11\frac{1}{2}$  lin.; lat.  $5\frac{3}{4}$  lin.; vel, long.  $9\frac{2}{3}$  lin.; lat. 5 lin.  
*Hab.* Monte Video and Bahia Blanca.

The species nearly resembles the *E. ebenina*, but differs in being larger and proportionately broader; as in *E. ebenina*, each elytron has two longitudinal elevated costæ besides the lateral keel; but the interspaces of all the costæ are indented with transverse furrows, whereas in *E. ebenina* only the two outermost interspaces have these

furrows, and here they are much less strongly marked. The lateral keel in *E. ebenina* presents a nearly even line, but in *E. Bonariensis* the keel is distinctly indented; the sulci on the thorax are less strongly marked and more numerous.

Seven specimens of this species occur in Mr. Darwin's collection.

*EPIPEDONOTA LATA.* *Epip. atra, nitida, lata; capite punctis dispersis anticè, apud medium sulco transverso, et posticè sulcis paucis obliquis; thorace sulcis, his obliquis, illis apud medium longitudinalibus, illis margini proximis transversis, insculpto; elytris convexis costis latis pauld elevatis posticè subobliteratis, spatio inter costam secundam et carinam externam, sulcis profundis transversis notato.*

Long. corp.  $9\frac{3}{4}$  lin.; lat. 6 lin.; vel, long.  $8\frac{2}{3}$  lin.; lat. 5 lin.

*Hab.* Port Desire.

This species is larger and proportionally much broader than *E. ebenina*. The thorax, in proportion to the size of the insect, is much broader than in any other species of *Epipedonota* here described, the width being nearly equal to two-thirds of the length of the elytra; whereas in *E. affinis*, which I have described as a shorter and broader species than *E. ebenina*, the width of the thorax is scarcely more than equal to half the length of the elytra.

The head is punctured in front and has some waved transverse grooves and ridges between the eyes. The thorax is about twice as broad as long, emarginated in front nearly in the form of a segment of a circle; the lateral margins are rounded; it is widest a little behind the middle and narrowest in front; the anterior and posterior angles are acute; the upper surface is nearly flat, but the lateral margins are slightly reflected; the anterior mesial portion is a little convex, and the posterior mesial portion is sometimes slightly concave; the whole surface is covered with narrow grooves and ridges; those on the dorsal part of the thorax are longitudinal but slightly irregular, towards the sides they are oblique, diverging slightly behind, and a broadish space at the sides is covered with sub-transverse grooves, these being directed inwards and slightly upwards from the lateral margin. The width of the elytra, as compared with the length, is as 4 to 5; their upper surface is convex, excepting at the base, where they are somewhat depressed: on each elytron are three longitudinal narrow grooves, these are distinct and wavy at the base of the elytra; the first groove, or that nearest the suture, is obliterated on the hinder half of the elytron; the second is continued nearly to the apex, but from the base it becomes gradually less distinct; the third extends to the apex, and forms as it were the outer boundary to the convex portion of the elytra for the space between the last-mentioned line and the lateral keel, which is nearly equal in width to one-third of that of the elytron, is nearly flat, or even slightly concave in the males; on this space is a series of deep transverse indentations, leaving convex interstices of a width corresponding to that of the grooves. The two interspaces between the first, second and third striæ of each elytron are very broad and slightly convex; and on the second or outermost of these interspaces are a few oblique furrows, which are not very distinct, and for the most part rather widely separated. Be-

sides the longitudinal striæ mentioned, there are some others, but these are short and confined to the base of the elytra; in the males about five or six longitudinal grooves may be seen at the base of each elytron, and all of these grooves are more or less wavy. The sides of the prosternum present distinct longitudinal sulci, and narrow longitudinal sulci are observable on the abdominal segments.

Three specimens of this new species were brought from Port Desire by Mr. Darwin.

Genus *CALLYNTRA*, Solier.

*Callyntra vicina*, Solier. One specimen of this species was brought from Valparaiso by Mr. Darwin.

Genus *CEROSTENA*, Solier.

*CEROSTENA PUNCTULATA*. *Cer. atra, elongato-ovata*; capite crebrè punctato et transversim impresso; thorace transverso, anticè profundè emarginato, suprâ ferè plano, punctato; marginibus laterali-  
*bus reflexis, disco foveis duabus impresso; elytris oblongo-ovatis, paulò convexis, suprâ punctulatis, singulis costis duabus dorsali-  
bus subobliteratis; carinâ laterali paulò prominente.*

Long. corp.  $8\frac{3}{4}$  lin.; lat.  $4\frac{3}{4}$  lin.

*Hab.* St. Cruz.

In general appearance the present species resembles the *Blaps obtusa*, but the thorax is much shorter and the body more depressed. On the hinder part and sides of the elytra is an ashy pubescence, and I think it probable that small hairs have originally been scattered over the whole upper part of the elytra and have been rubbed off the most exposed parts. On the under side of the head and body small hairs are also perceptible in the less exposed parts. The prosternum is very rugose beneath on the fore-part, and has distinct longitudinal furrows at the sides, as has also the mesothorax; the abdominal segments are thickly punctured, and there are longitudinal rugæ on the basal segments. The legs and tarsi are moderately well clothed with small yellowish hairs.

Unfortunately the antennæ are not perfect in the only specimen which Mr. Darwin brought home of this species; in the characters afforded by other parts, however, it agrees with M. Solier's genus *Cerostena*: the absence of sulci on the upper surface of the thorax would serve to distinguish it from the species of that genus hitherto described.

*Psectrascelis pilipes*, Solier. *Nyctelia pilipes*, Guerin. Numerous specimens of this species were brought from Coquimbo by Mr. Darwin.

*Entomoderes Erebi*, Solier. Mr. Darwin's collection contains one specimen of this curious insect, and this was found at Mendoza.

GEOLOGICAL SOCIETY.

Dec. 15, 1841.—A paper was read, "On the occurrence of the Bristol Bone-Bed in the Lower Lias near Tewkesbury," by Hugh Edwin Strickland, Esq., F.G.S.

After alluding to the occurrence of the bone-bed at various places between Westbury and Watchett, also at Golden Cliff and St. Hilary



in Glamorganshire, and at Axmouth, Mr. Strickland proceeds to describe its characters at three newly discovered localities, many miles to the north of the points previously known, namely, Coomb Hill, between Tewkesbury and Gloucester, Wainlode Cliff, and Bushley.

1: *Coomb Hill, four miles south of Tewkesbury*\*.—In lowering the road through the lias escarpment during the summer of 1841 a considerable surface of the bone-bed was exposed, and its contents were rescued from destruction by Mr. Dudfield of Tewkesbury. The following section is given by Mr. Strickland:—

	Ft.	in.
1. Yellow clay . . . . .	2	0
2. Lias limestone . . . . .	0	3
3. Yellow clay . . . . .	5	0
4. Nodules of lias limestone . . . . .	0	6
5. Brown clay . . . . .	14	0
6. Impure pyritic limestone with Pectens and small bivalves . . . . .	0	6
7. Black laminated clay . . . . .	8	0
8. Hard, grey pyritic limestone . . . . .	0	2
9. Black laminated clay . . . . .	1	0
10. Greyish sandstone . . . . .	0	2
11. Black laminated clay . . . . .	1	6
12. <i>Bone-bed</i> . . . . .	0	1
13. Black laminated clay . . . . .	3	6
14. Compact, angular, greenish marl. . . . .	25	0
15. Red marl . . . . .	3	0
Dip about 12° east.	64	8

The bone-bed, No. 12, rarely exceeds one inch in thickness, and frequently thins out to less than a quarter of an inch. It consists in some places chiefly of scales, teeth and bones of fishes, and small coprolites cemented by iron pyrites, but in others the organic remains are rare, and are replaced by a whitish micaceous sandstone. The osseous fragments, Mr. Strickland states, have the appearance of having been washed into the hollows of a rippled surface of clay, and of having been subjected to slight mechanical action. The existence of gentle currents is further proved, he says, by the presence of small rounded pebbles of white quartz, a substance of very rare occurrence in the liassic series. The only shell found in the bed at Coomb Hill is a smooth bivalve, but too imperfect to be generically determined.

2. *Wainlode Cliff, three miles west-south-west from Coomb Hill*.—The section exposed at this locality has been laid open by the action of the Severn, and consists of the following beds:—

\* Mr. Murchison has noticed the section formerly exposed in this escarpment, but at the time he examined the district, Mr. Strickland says, the banks were obscured by debris, and the bone-bed did not attract his attention. See Mr. Murchison's Account of the Geology of Cheltenham, p. 24, plate, fig. 1, and Silurian System, pp. 20, 29, pl. 29, fig. 1.

	Ft.	in.
1. Black laminated clay, inclosing, near the top, a band of lias limestone with <i>Ostreae</i> . . . . .	22	0
2. Slaty calcareous sandstone, with a peculiar small species of <i>Pecten</i> . . . . .	0	4
3. Black laminated clay . . . . .	9	0
4. <i>Bone-bed</i> , passing into white sandstone. . . . .	0	3
5. Black laminated clay . . . . .	2	0
6. Light green angular marl . . . . .	23	0
7. Red marls, with zones of a greenish colour ..	42	0
Dip very slight to the south.	98	7

The bone-bed is far less rich in organic remains, accumulations of fragments of bones and coprolites occurring at rare intervals; and its prevailing character is that of a fissile, white, micaceous sandstone, sometimes acquiring a flinty hardness. The upper surface of the bed is ripple-marked, and in some cases presents impressions considered by Mr. Strickland to have been probably made by the claws of crustacea. A small bivalve is also the only shell found in the bed. The stratum No. 2, the author says, is evidently a continuation of No. 6. of the Coomb Hill section.

3. *Bushley, two miles and a half west of Tewkesbury.*—The intersection of the lias escarpment by the Ledbury road near Bushley afforded Mr. Strickland the following section:—

	Ft.	in.
1. Black laminated clay, about . . . . .	10	0
2. Lias limestone . . . . .	0	4
3. Black laminated clay . . . . .	6	0
4. Compact slaty bed with numerous small bivalves, and the <i>Pecten</i> of Wainlode and Coomb Hill . . . . .	0	3
5. Black laminated clay . . . . .	9	0
6. <i>White micaceous sandstone</i> , with impressions of two species of bivalve shells . . . . .	1	0
7. Black laminated clay . . . . .	2	6
8. Greenish marl, about. . . . .	20	0
9. Red marl. . . . .	—	—
Dip about 8° east.	49	1

The sandstone bed, No. 6, agreeing precisely with that at Wainlode Cliff, Mr. Strickland does not hesitate to consider it the representative of the bone-bed, though organic remains are wanting; and he points out the identity of the stratum No. 4. with the beds Nos. 2. and 6. of the preceding sections. The author also refers to the railway section near Droitwich, and identifies with the bone-bed the two-feet band of white micaceous sandstone six feet above the top of the green marl, as it contains the same indeterminable small bivalve. He has also examined sections of the lias escarpment at Norton near Kempsey, and Cracombe Hill near Evesham, and has

invariably detected, a few feet above the base of the lias clay, a thin band of white sandstone containing the same shell.

The bone-bed at Axmouth, Watchett, Aust, Westbury, and other southern localities, occupies precisely the same geological position, or a few feet above the top of the greenish marls which terminate the New Red system, though much more rich in organic remains; and Mr. Strickland draws attention to this remarkable instance of a very thin stratum ranging over a distance of about 112 miles.

The great abundance of fossils in some parts of this stratum the author considers an indication that a much longer period probably elapsed during its deposition, either on account of the clearness of the water or of a gentle current which prevented the precipitation of muddy particles, than while an equal thickness of the less fossiliferous clays above or below it was accumulated.

The list of organic remains given in the paper includes scales of *Gyrolepis tenuistriatus?* and *Amblyurus*; teeth of *Saurichthys apicalis*, *Acrodus minimus*, *Hybodus minor*, *Pycnodus?*; others bearing an analogy to those of *Sargus*; portion of a tooth with two finely serrated edges, and considered as probably belonging to a saurian allied to the genus *Palæosaurus*; a tooth of *Hybodus De la Bechei* (*H. medius*, Ag.), a ray of *Nemacanthus monilifer*; small vertebra of a fish; bones of an Ichthyosaurus; coprolites; and the casts of the bivalve before mentioned.

Mr. Strickland next alludes to Sir Philip Egerton's paper on the Ichthyolites of the bone-bed, and he states that the bed cannot be of the age of the muschelkalk, as it overlies the red and green marls, which he considers to have been satisfactorily shown to be equivalent to the Keuper sandstein of Germany; and that the occurrence of muschelkalk fishes associated with lias Ichthyolites only justifies the inference that certain species survived from the period of the muschelkalk to that of the bone-bed. There are yet stronger grounds, Mr. Strickland states, for placing the bone-bed in the liassic series in the remarkable change a few feet below it, from black laminated clay to compact "angular" marl, greenish in the upper part and red below; and he adds, the transition is so sudden that it may be defined within the eighth of an inch; moreover no marl occurs above the line nor black laminated clay below it; and although, in the case of the bone bed, an arenaceous deposit similar to the Keuper sandstein is repeated, accompanied by some triassic organic remains, yet, the author adds, this does not invalidate the evidence of the commencement of a new order of things, or of an interesting passage into the liassic series from the triassic system.

Lastly, Mr. Strickland notices the occurrence of precisely analogous bone-beds in the Upper Ludlow rock, described by Mr. Murchison in the 'Silurian System' (p. 198), and in Caldby Island, near the junction of the carboniferous limestone with the old red sandstone; and he offers some remarks on the bone-beds being found in all the three cases near the passage from one great geological system of rocks to another.



January 5, 1842.—“A Notice on the Fossil Bones found on the surface of a raised Beach at the Hoe near Plymouth,” by Edward Moore, M.D., F.L.S., was first read.

At the Meeting of the British Association at Plymouth, Dr. Moore read a paper on the same subject as that which forms part of the present communication\*. In this notice he first alludes to the discovery of the beach by the Rev. R. Hennah in 1827†, and to Mr. De la Beche's account of numerous anciently raised beaches in Devon and Cornwall‡; he then briefly describes the characters of the beach, its position in a hollow in the limestone rock, 100 feet wide, 70 feet deep, and, at its base, 35 feet above the present high water mark. He also notices a projecting ledge of limestone stretching several hundred feet southward from this spot, and which sustained a mass of sand, with rolled pebbles and blocks, some of them two or three feet in circumference, and forming a hill twenty to twenty-five feet high, containing patches of loose sand with fragments of *Patella* and *Buccinum*. It was, says the author, easily traced by several patches along the rocks, and proved, by its structure and contents, to be a continuation of the same beach. Dr. Moore likewise briefly describes another deposit 100 yards westward of the beach, and at a greater elevation, being 88 feet above high water, 50 feet in extent, and 10 in thickness, covered irregularly by soil.

The animal remains more particularly enumerated by Dr. Moore consist of a molar and part of the jaw of a young elephant; a femur of a rhinoceros; maxillary bones of a bear, with the malar and palatine processes, and two teeth in each; an entire right lower ramus with teeth and tusks, the latter much worn; four separate tusks; several fragments of long bones; fragments of jaws of the horse containing teeth, numerous loose teeth, portions of long bones, and two caudal vertebræ; likewise portions of a deer's jaw containing teeth. The quantity of the bones which has been found is stated to be equal to several bushels. The vertebræ of a whale, much rounded, were also discovered, with undeterminable portions of ribs. The animals to which the above remains belonged, are considered by Dr. Moore to have coexisted with those which inhabited the caves of Devonshire.

The author then enters upon a defence of the opinions contained in his paper read at Plymouth, respecting the mode of accumulation of the bones. He states that these osseous remains cannot have been derived from the emptying of some cave, because the mass of superincumbent matter which has been removed from above the beach proves that the bones must have been deposited where they were found at a very ancient period, and long before they could have been affected by human agency. There are also no known caves

\* Athenæum, No. 721, and the volume of Reports of the British Association for 1841, Trans. of the Sections, p. 62 (published 1842).

† See also “A Succinct Account of the Lime Rocks of Plymouth,” by the Rev. R. Hennah, 1822, p. 58.

‡ Manual of Geology, 3rd Edition, p. 173, 1833; also Report on the Geology of Cornwall and Devon, p. 423, 1839.

containing bones sufficiently near. On the contrary, says Dr. Moore, if the sea was at one time at the level indicated by the beach, the Hoe must have been an island accessible by animals at low water, and there appears no obstacle to the supposition that the bears might have selected the beach to devour their prey; and the stranded whale may have added to the banquet. Whether the bones were drifted or not, their occurrence on the top of the beach, and not in it, prevents, the author says, any identity of time in their origin; but that the beach previously existed, and was of marine origin, is proved by the resemblance of the deposit to a modern beach, and its containing sea-shells of the existing period, although few in number.

That the deposit is not the result of glacial action, the author observes, is probable from the want of any indication of such action in the neighbouring district; and though he does not presume to assert that this may not be a cause of drift generally, and even of the upper deposit in the same locality, yet he contends that the dissimilarity in the composition of the lower deposit sustains him in the supposition of its being of different origin, and really a deposit from the sea. Lastly, Dr. Moore, in reference to the present position of the beach far above any point attained by the sea during the greatest storms, states that the deposit must have been elevated by natural causes; and that, however uncertain the exact period of such an event, it seems to have occurred at a time probably more recent than the epoch when the extinct animals disappeared.

Appended to the paper, is a notice of a specimen of perforated limestone taken from the Hoe Lake quarries, eighty-five feet above the present level of high water, and Dr. Moore maintains his belief that the perforations were formed by Pholades, and not by snails.

“Notice on the occurrence of Plants in the Plastic Clay of the Hampshire Coast,” by the Rev. P. B. Brodie, F.G.S., was then read.

The cliffs to the east and west of Bournemouth are composed of horizontal strata belonging to the plastic clay formation. East of the town they consist of white and yellow sands, the former containing fragments of wood. Further along the shore the cliffs are higher, and beds of clay full of vegetable remains appear under the sands. About half a mile beyond, a stratum of fine white sand, three or four feet thick, situated near the middle of the cliffs, contains impressions of ferns; and a layer of sand and clay is full of small leaves. The subjacent strata of clay are separated by thin layers of vegetable matter. Somewhat further, beds of white and yellow sand and sandy clay abound with beautiful leaves, and the surface of the strata is in some places covered with a thin layer of iron-sand containing impressions of ferns. In most cases, the various coloured sands are divided by beds of clay, and their fossil contents are distributed in layers at rather distant intervals. Mr. Brodie did not discover any shells. Several of the fossil plants are stated by the author to belong to the *Lauraceæ* and *Amentaceæ*; but he

says that these, as well as others which he arranges among the *Characeæ* and Cryptogams, and some of which he has not determined the characters, are all generically distinct from any British plant, and belong to those of a warmer climate. When the sandstone is freshly broken the epidermis of the fossil frequently peels off, leaving the impression of only the fibres. These remains often form masses of some thickness; and, from their state of preservation, must, the author states, have been deposited tranquilly beneath the waters.

## MISCELLANEOUS.

## PLUMATELLA REPENS.

Having this day, in the vicinity of Cheshunt, in a pond whose waters are perennial, met with several fine specimens of the above zoophyte, and these being in a living state, I had an excellent opportunity of comparing its polype with that of *Alcyonidium stagnorum*, which I procured in a pond on Acton Green, Middlesex, some time since and then examined, and I find that the polypi agree in all respects in the two species, the tentacula being arranged upon a crescentic disc in both, and their number corresponding, there being usually about fifty, seldom more than sixty, or less than forty in each polype. The ova too are of the same form in both species.

*Plumatella repens* and *Alcyonella stagnorum* ought therefore without doubt to be regarded as generically identical, for the difference in the mode of branching can scarcely be regarded as affording a character of generic importance: whether they are so specifically or not, has yet to be ascertained, I believe, but I am strongly inclined to think that they are not.

Whenever I have found *Alcyonidium stagnorum*, I have always noticed that it has been attached to pieces of stick, the stems of vegetables, or to some substance which would not necessarily perish and decay in a few weeks, and that some of the specimens were of such a size, being as large as the closed hand, as to lead to the supposition that many months must have elapsed before they could have attained such a development; whereas all the specimens of *Plumatella repens* which I have met with were attached to the decayed leaves of *Typha latifolia*, which in a few short weeks would, as a matter of necessity, be utterly decomposed, involving the zoophyte upon it in its own destruction. In some of my specimens the polypidom has crept over the leaves for several inches, and in all of them without either raising itself from the surface of attachment or exhibiting aggregations of cells, as it might be supposed that it would do were it merely a condition of *Alcyonidium stagnorum*.

September 8th, 1842.

A. H. HASSALL.

## NOTES ON THE USES OF SOME MADAGASCAR PLANTS TO THE NATIVES.

On looking, in the process of arrangement, through some plants from Madagascar, forwarded to the Herbarium of the Army Medical



Museum, Fort Pitt, Chatham, my attention was directed to some slips of paper attached to a very few specimens, on which were written (evidently by the collector at the time they were undergoing preservation, and whose name is unknown,) the uses of the plants to the natives. Thinking that they may probably furnish some little information, I have subjoined a list of the species with the accompanying remarks :—

*Achyranthes globulifera*, Boj.—The infusion of this plant is used in Madagascar for the cure of syphilis.

*Syzgium terebinthaceum*.—The leaves of this plant are used in Madagascar to give scent to aromatic baths. [Examined under the microscope, both surfaces of the leaves are found to be covered with very minute glandular hairs, having at their apex (which is doubtless the secreting part) a knob of brownish matter, which is most likely to yield the secretion, giving to the plant its aromatic odour.—D. C.]

*Blumea alata*.—Likewise used for a similar purpose as the *Syzgium terebinthaceum*.

*Anthemis dentata*, Boj.—Grows in the province of Emirna : the infusion of the whole plant is used in Madagascar as a sudorific.

*Gnidia daphnoides*, L.—The bark of this plant is manufactured into ropes : met with in the province of Emirna.

*Gentiana lutea*?—Grows on the mountain of Tananarivor, Madagascar. Used by the natives as a bitter, and given in fever and stomachic complaints.

*Dombeya spectabilis*, Boj.—Its bark is made into ropes.

*Amaranthus debilis*.—Used in Madagascar for the cure of syphilitic diseases.

*Dais Madagascariensis*, L.—The bark of this plant is manufactured into paper.

*Croton argyreum*.—Mentioned here on account of its interesting hairs or scales. The under surface of the leaves of this plant present, when viewed with a magnifying power of fifty linear and upwards, a very beautiful appearance. The whole cuticle is closely studded with numerous very small stellate hairs (or scales), in the centre of which a small elevated circular orifice (?) is seen, probably in connexion with the stomata, and from which, as a centre, the radii proceed, giving the hair or scale a conical appearance. They may indeed be aptly compared, both as to form and apparent structure, to the inverted pappus or seed-down of a compound plant. The numerous brownish spots seen on the under surface of the leaf, are hairs of the same character and structure as those just described, but possessing this difference, viz. that the elevated orifice is of a deep chestnut colour, which tint becomes gradually diffused towards the circumference of the hair, tinging in a slight degree the radii.—DANIEL COOPER, Assistant Surgeon to the Forces, Fort Pitt, Chatham.

August 22, 1842.

#### ON THE NUCLEI OF THE BLOOD-CORPUSCLES OF THE VERTEBRATA.

When the corpuscles of the oviparous Vertebrata are mixed with water, or with dilute or strong acetic acid, the nuclei are instantly

exposed in the clearest manner, appearing thick, oval, or spherical, and much smaller than their envelopes. Several other vegetable acids and sulphurous acid may be used with the same effect; and the nuclei may also be readily shown by gently moistening with the breath some dry blood on a slip of glass. But when the blood-corpuscles of man and other mammals, not excepting the oval discs of the *Camelidæ* (See Med. Chir. Trans. vol. xxiii., and Lancet, vol. ii. p. 101, 1840-41) are treated by any of the means just specified, and precisely under the same circumstances, no similar nuclei will be observed, unless in very young embryos; for the blood-corpuscles of these enclose a temporary and obvious nucleus which corresponds to the persistent nucleus of the corpuscle of the oviparous Vertebrata. As stated by the author in the Appendix to Gerber's 'Anatomy,' pp. 13 and 30, this does not prove that the corpuscles of mammals have no central matter, although he is induced to infer that these corpuscles have no nucleus like that contained in the corpuscles of the lower vertebrate animals.

The author then gives two figures to show the effect of several reagents, and especially of repeated washing with water till all the colouring matter is removed, on the corpuscles of Mammalia and of the lower Vertebrata. He shows, as he had formerly stated (Phil. Mag. for Feb. 1840, S. 3. vol. xvi. p. 106, 107), that the corpuscles of man, for example, are merely reduced about one-third or one-fourth in size, after completely removing their colouring matter by repeated additions of large quantities of water, when they appear very faint, flat and pellucid, presenting nothing like a nucleus, even when treated with acids and other reagents; nor do these washed blood-discs agree in any respect with the particles which had been commonly described as the nuclei of the blood-corpuscles. Now when all the colouring matter is removed in like manner from the corpuscles of any of the lower Vertebrata, the goose for example, the envelopes and nuclei remain, and are easily distinguishable as distinct parts, both appearing circular, and the nuclei with its component molecules or nucleoli. When exposed by acid the same nuclei present an oval form. Dilute muriatic acid scarcely affects the form of the envelope, but shows the nucleus with an appearance of granular matter around it. The same acid makes the corpuscles of a mammal appear puckered or shrunk, notched at the edges or granulated; some presenting a distinct central spot, irregular at the margin like a granular nucleus; others remaining smooth but misshapen, generally with a dark or brilliant central spot, according to the focus in which they are viewed.—*Abridged from Mr. Gulliver's Contributions to Minute Anatomy, Lond. and Edinb. Phil. Mag. for August.*

#### ON THE STRUCTURE OF FIBRINE.

The author, referring to his description and plates in the English version of Gerber's 'Anatomy of the Fibres,' and the organic germs or nucleated nuclei in pale or colourless clots of fibrine, figures similar corpuscles, though of a ruddy colour, in the red parts often found towards the edges of such fibrinous clots. He is disposed to

regard all these germs as nearly allied to blood-corpuscles, especially as Dr. Barry has so pertinently asked how many tissues there are that the corpuscles of the blood may not form. It is remarkable, however, that both the ruddy and the pale organic germs of fibrinous clots are irregular in shape, and exhibit nuclei when treated with acetic acid, while precisely the same treatment does not show any nuclei in the free or floating blood-discs. If, therefore, the organic germs of fibrine be blood-corpuscles entangled in the clot, these corpuscles must have undergone changes both in form and in chemical characters. A figure is given in which the germs are exhibited in a mesh of delicate fibrils, together with many very minute circular molecules. The fibrils are also depicted in the fibrine obtained by washing from the blood of the oviparous Vertebrata, which fibrine is further characterized by containing many particles similar to, and probably identical with, the nuclei of the blood-corpuscles.—*Ibid.*

*Discovery of a Chambered Univalve Fossil in the Eocene Tertiary of James River, Virginia.* By M. Tuomey.

Thinking that it may possess sufficient interest, the following notice of the discovery of a *Nautilus* in the Eocene on James River, is communicated.

Mr. Lyell, during his visit to this portion of the tertiary of the United States, directed my attention to the broken link in our great cretaceous formation, presented by Virginia. At his suggestion, I determined to observe any fossils that may come under my notice, with a view to the elucidation of this interesting point. The liberality of Capt. H. H. Cocke, U. S. N., afforded me a good opportunity of examining the fossils of the well-known eocene locality at Evergreen, near City Point, James River. Capt. Cocke, at the instance of Edward Ruffin, Esq., editor of the 'Farmer's Register,' who is engaged in the investigation of the tertiary of Lower Virginia, caused a shaft to be sunk at the base of the escarpment at the locality just mentioned. In this shaft, and at a depth of about twenty feet below the level of tide-water, the fossil referred to was found. It was imbedded in the dark-coloured tenacious clay containing much greensand, common to some of the eocene strata of this region. The exterior of the shell is much decayed, but the pearly surface of the interior is well preserved, and by removing portions parallel to the aperture the concave septa and siphunculus can be seen. It was associated with eocene species of *Turritella*, *Crassatella*, *Pectunculus*, a small *Panopæa*, and a little lower in the same stratum was found a gigantic *Ostrea*, measuring in height eight and a half inches, breadth five and a half inches, and weighing five pounds. The upper valve of this *Ostrea* agrees with the description of *O. percrassa*, Conrad, but in the lower valve the cartilage fosset is deep. The muscular impression in each valve exhibits a cavity extending upwards into the substance of the shell about two inches. A person seeing but this huge individual, and the common form of *O. compressirostra*, Say, found in the same stratum, would pronounce them distinct species; but I am in possession of a suite of specimens showing the in-



intermediate forms between the two, and am convinced that this enormous fossil is but a full-grown *O. compressirostra*.—From *Silliman's American Journal for July 1842*.

## EGG OF THE BRAMBLING FINCH.

*To the Editors of the Annals of Natural History.*

GENTLEMEN,—A gentleman of this city has presented me with the egg of a Brambling Finch, laid in his aviary towards the end of last month. There was only one egg laid, which, when taken, appeared to have been sat upon about ten days, and contained a young bird.

The egg is a little larger than that of the goldfinch: the ground colour is a gray-blue like that of the whinchat, but round the shoulder of the egg there is a belt of thickly scattered cloudings and minute spots of a "lie de vin" or light dull puce colour; these are also scattered (but very much more sparingly) over the other parts of the egg, and in some instances they are collected into larger spots of a rust colour, much like those of the chaffinch, except that the spots on the Brambling's egg are smaller, and less exclusively of a rust colour, being clouded with lie de vin about the edges.

The most curious thing about the egg is the smallness of the size, but this may be in consequence of its being laid in confinement.

The nest was of course made of the materials incidentally supplied, and chiefly dry grass on the outside and deer's hair on the inside.

The nest was thick at the bottom and the cavity somewhat shallow, the whole size intermediate between the nests of the chaffinch and greenfinch.

About ten days since I received a specimen of that rare bird the Baillon's Crake, killed near Yarmouth: it is a fine adult male.

I am, respectfully,

Norwich, August 23, 1842.

J. H. GURNEY.

## LOCUSTA MIGRATORIA.

*To the Editors of the Annals of Natural History.*

I beg to inform you, that on the 3rd instant, a specimen of the migratory locust (*Locusta migratoria*) was captured at Mickleover, near Derby, by a labouring man, who pursued it over several fields, being allured to the chase by its great size and immense leaps; and on the 13th a fine female was taken, near Burton-on-Trent, by a gentleman who was out shooting, and who disturbed it by getting over a hedge near to which it was reposing. This gentleman informs me, that, when first discovered, the insect sprung a distance of at least fourteen yards: he immediately followed it and secured it in his hat.

The first example above mentioned is now in the possession of my friend, R. I. Bell, Esq., of Mickleover; the other was given to me for the use of the Burton-on-Trent Natural History Society, in whose museum it will be placed. I have satisfactorily identified the species, and on dissecting it I discovered a large ovarium, containing from forty to fifty eggs, apparently ready to be deposited.

In the 'Sheffield Mercury' of the 10th inst., there is a descrip-

tion of this same species, from a specimen taken in the town of Sheffield; but the writer, flattering himself that it is the only individual which has been of late years caught in Britain, arrives *very logically* at the conclusion that it cannot be the migratory locust, but that it is some South American species, which has been imported in a cargo of wood or some other product of that country.

I am, Gentlemen, your most obedient servant,

EDWIN BROWN.

P.S.—I beg also to say, that of the entire number of Terns shot in our neighbourhood in May last, and which amounted to many scores, not one was *Sterna hirundo*; they were all, without exception, *S. arctica*.

Burton-on-Trent, 19th Sept., 1842.

#### LOCUSTA CHRISTII.

Last week, a fine specimen of the *Locusta Christii* was brought to Leeds in a waggon of lead, from the works at Pately Bridge, which fell into my hands. Mr. Curtis, in his 'British Entomology,' plate 608, mentions only two examples as having occurred, one in Ireland, and the other in a garden on the Clapham Road. I suspect three other specimens have been taken in the neighbourhood of Scarborough last week, from a paragraph in the 'Scarborough Herald' announcing their capture, but under a supposition that they were the *Locusta migratoria*.

HENRY DENNY.

Philos. Hall, Leeds, 15th Sept., 1842.

A specimen of the locust tribe, an uncommon visitor in this country, was found on Monday in the Town-well-fold. The insect is supposed to have been brought from Birches Barn in a load of clover. It is now caged by the boy who found it, and appears in excellent spirits. We have heard of other specimens of this insect having appeared lately in this country.—*Stafford Examiner*.

#### CAPTAIN BELCHER'S COLLECTIONS.

Our conchological readers will be gratified to learn that an extensive and valuable collection of shells has recently arrived in England, having been made by Capt. Belcher, C.B., during his protracted voyage of circumnavigation in H.M.S. Sulphur. A large proportion of these have been dredged, and some are from very deep water. Much attention has been paid to the localities and geographical range of the different species, also to the circumstances under which they were found, and to every point interesting in their œconomy. The depth of water in some cases had an apparent influence on their development, but very frequently the effects of this were not discernible. On the contrary, locality was found to control greatly the size and colouring of the shells. At the solicitation of Capt. Belcher, the Admiralty have appointed Mr. Hinds, an officer of the expedition, and who during nearly the whole of the voyage gave his aid towards the formation of the collection, to take charge of it and make it available to science. A number of zoological objects have

been preserved in spirits, and in some departments the illustrations are particularly interesting. Among the minerals brought home is a series which will serve to elucidate the hitherto scarcely known mountain range of Lower California.

*Works in the Press.*

Dr. Parnell is printing a work upon the Scottish Grasses, which will contain full descriptions of the species and varieties, and be illustrated by figures and dissections of all of them.

The Rev. J. E. Leefe is about to publish Fasciculi of specimens of British Willows. Mr. Borrer has kindly undertaken the superintendence of the nomenclature, and Mr. Leefe has been promised the assistance of many distinguished botanists. The first Fasciculus is expected shortly.

Mr. Babington has nearly completed the new Flora of Britain, upon which he has been so long engaged. It may be expected in the spring of next year.

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METEOROLOGICAL OBSERVATIONS FOR AUGUST 1842.

*Chiswick.*—August 1. Overcast: very fine. 2. Sultry. 3. Sultry: distant thunder. 4. Sultry: high temperature maintained day and night. 5. Cloudy and fine. 6. Cloudy: rain. 7—9. Clear, hot and dry. 10. Sultry: excessively hot and dry: heavy thunder-storm at night, with rain in torrents. 11. Cloudy: clear and fine. 12. Clear and fine throughout. 13. Overcast: clear and fine. 14. Sultry. 15. Cloudless and hot. 16. Hot and dry. 17. Dry easterly haze: very hot. 18. Excessively hot and sultry: lightning in the evening. 19, 20. Cloudy: fine. 21. Very fine. 22. Hot and dry, with easterly wind: lightning. 23. Cloudless, hot and dry. 24. Hot and dry: lightning, distant thunder, with wind and rain at night. 25. Overcast: heavy thunder-showers in the evening. 26. Hazy: sultry. 27. Cloudy and fine. 28. Rain: cloudy and fine. 29. Heavy thunder-showers early A.M.: violent thunder-storm commenced four P.M., with very heavy rain: clear at night. 30. Hazy. 31. Clear and fine.—Mean temperature of the month 4° above the average.

*Boston.*—Aug. 1—3. Cloudy. 4. Fine. 5. Cloudy. 6. Rain. 7—9. Fine. 10. Fine: rain, with thunder and lightning P.M.: thermometer 85° three o'clock. 11. Fine. 12. Cloudy. 13. Cloudy: thermometer 79° two o'clock P.M. 14. Cloudy: thermometer 80° two o'clock P.M. 15. Fine: thermometer 80° eleven o'clock A.M. 16. Foggy. 17. Cloudy. 18. Fine: thermometer 83° two o'clock P.M. 19. Cloudy. 20. Fine. 21, 22. Cloudy. 23. Fine: thermometer 82° two o'clock P.M. 24. Cloudy: rain with thunder and lightning at night 25—28. Cloudy. 29. Cloudy: rain A.M. 30. Fine: rain P.M. 31. Fine.

*Sandwich Manse, Orkney.*—Aug. 1, 2. Clear. 3. Cloudy: damp. 4. Rain: showers. 5. Showers. 6. Drops: clear. 7. Bright: showers. 8. Clear: rain. 9. Clear: cloudy. 10. Damp: thunder: rain. 11. Showers: rain. 12. Showers: cloudy. 13. Bright: rain. 14. Drizzle: cloudy. 15. Drizzle: rain. 16. Clear. 17, 18. Clear: cloudy. 19. Fog: thunder. 20. Cloudy. 21. Showers: clear. 22. Bright: clear. 23. Rain. 24. Clear. 25. Clear: cloudy. 26—28. Clear. 29. Clear: cloudy. 30. Rain: clear. 31. Clear.

*Applegarth Manse, Dumfries-shire.*—Aug. 1—3. Very fine. 4. Showers. 5. Showery. 6. Fine. 7. Slight showers. 8. Rain P.M. 9. Showers. 10. Heavy rain and thunder. 11. Fair and bracing. 12. Cloudy and drizzly. 13. Fair and fine. 14—16. Very fine. 17, 18. Very fine: very hot. 19. Showers. 20. Heavy showers. 21, 22. Fair and bracing. 23. Fine: one shower: thunder. 24. Wet A.M.: cleared up. 25—27. Fair and fine. 28. Fair and fine, but hazy. 29—31. Slight showers.





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XXIV.—*On the Life and Writings of J. P. E. Vaucher.*  
By ALPHONSE DECANDOLLE\*.

GENEVA, a few months since, witnessed the decease of the eldest of her naturalists, the author of the 'Histoire Naturelle des Conferves,' a work ranking as a classic, and cited universally and long since as a model of accurate observations.

We have lost this venerable old man, whom age had not robbed of his physical power, nor of the energy of his deep convictions. We love to recall the rare qualities which distinguished him; that nobleness of soul, which a frankness, sometimes bordering on rusticity, rendered prominent; that simplicity of manners so becoming to the man of learning and the pastor; that cordiality, devoid of vulgarity but abounding in sincerity; that constancy, that disinterestedness in the affections, which rendered M. Vaucher the best of relatives and the best of friends.

His presence amongst us operated as a moral protection and a continual encouragement to study. In our eyes he was the last representative of the school of Charles Bonnet, who cast so great a lustre over our town. He, together with De Saussure and his contemporaries, founded that Society of Natural History and Physics, whose unpretending character and amenity of discussion drew together the Genevese *savans*. At once professor of theology and botanist, he was a connecting link between two of the faculties of our Academy, and became an example of that union of religion with science which so advantageously distinguishes our clergy.

M. Vaucher had taught historical theology for a long time, but his natural tendency was rather towards the religion of the heart, and towards a profound study of the works of creation. The recital of so much strife caused by unintelligible questions, of so many wars and persecutions brought about by theological dogmas, was likely to produce this effect upon

\* From the Bibl. Universelle de Genève for July 1841.

an upright and enlightened man. He loved to look upon natural history as a branch of his own theology, and to find therein a variety of proofs in support of his inmost convictions, which were doubly powerful because uncontested and devoid of sectarian rivalry and rancour. His happiness consisted in observing in detail the wonders of nature, and in attributing, with more or less probability, a fixed design to every phænomenon of vegetable life. The theory of final causes was his guide, and the constant object of his reflections; and his last work, the 'Physiological History of the Plants of Europe\*', is the development of this mode of considering botanical science.

M. Vaucher was employed during several years in preparing this work. He published a small part of it in 1830†; but perceiving it to be formed upon too extended a plan, he remodelled and rearranged it with an almost youthful ardour. After long years of intellectual labour and enjoyment, the work was at last printed in four large volumes. On his death-bed he received them, blessed Heaven for the favour of this last satisfaction, and employed his feeble and declining strength in sending some copies to his friends and to that sovereign, his former pupil, from whom he had received flattering marks of kindness‡.

\* *Histoire Physiologique des Plantes d'Europe, ou Exposition des Phénomènes qu'elles présentent dans les diverses périodes de leur développement*: Paris, 1841, 4 vols. 8vo.—See 'Annals,' vol. ix. p. 50.

† See *Bibl. Univ.* 1830 (Sciences et Arts), vol. xlv. p. 379; and 1837, vol. ii. p. 134.

‡ The Prince of Carignano, now King of Sardinia, was brought up in M. Vaucher's institution, at a time when Piedmont was a part of the French empire, and when there was little probability that the house of Savoy, especially the princes of the younger branch, could ever ascend the throne. Then commenced a connexion ever devoted and disinterested on the part of the venerable tutor, ever affectionate on that of the king. I cannot resist the pleasure of quoting the dedication of M. Vaucher's work to Charles Albert; it enables us to comprehend the views by which the author was guided; it is moreover in a style altogether new.

"SIRE,—I now present to you, as a feeble mark of my profound respect and of my lively attachment, this work, the labour of a great portion of my life, and which you allowed me in past years to hope I might be permitted to inscribe to you.

"It is wholly consecrated to the glory of the Creator, whose works have always appeared to me the more admirable the nearer they are considered, and it is designed to produce in those who read it a part of those impressions which they have so often made me experience. It is the study and the meditation of these wonders, of which I as yet only know the outlines, which have embellished my last years, and which have inspired in me a desire, continually more ardent, of one day contemplating them at their source in the bosom of Sovereign Wisdom.

"Deign, Sire, to receive with that touching goodness, of which you have



By the expression, "Physiological History of Plants," M. Vaucher meant the detailed analysis of the phænomena of vegetable life; not of any one plant, regarded as similar in general respects to all others, but of a certain species in particular, or of a certain agglomeration of nearly allied species, forming the same section or the same genus. He passes by the general and ordinary questions of physiology,—absorption by the roots, the ascension of the sap, evaporation by the leaves, the modification of the juices by the atmosphere, the formation of the organs by the nutritive juices, the mode of penetration of the pollen, &c. &c. He prefers studying each plant in detail in the intimate relations of the different organs and the functions of these organs. He describes what we may call the habits of plants, by analogy with the habits of animals. In this manner of considering the subject, M. Vaucher thought he should be original, and should lay the essential foundations of an edifice as yet unerected. In fact, the publication of a considerable work with this particular aim is quite a new thing in science; nevertheless we must not forget, and M. Vaucher himself mentions this, that other naturalists, for example, Conrad Sprengel, Duhamel and Cassini, have published some partial observations of the same kind on fecundation, on the development of the ligneous species, and on the vital phænomena of certain families. All complete monographs, all treatises on cultivation, speak of the succession of phænomena presented by certain plants. The merit of M. Vaucher consists in his desire to extend this kind of observation to an infinity of vegetables which have not yet been sufficiently studied.

The following is the method followed by the author. He enumerates the families and the genera in the order of the works of M. DeCandolle, translates into French the botanic characters expressed in Latin in the 'Prodromus,' and, for the families not yet included in that work, consults the best authors on descriptive botany. Having stated the characters founded on the presence, the situation, and form of the organs, he details his own observations in a physiological point of view. These are sometimes facts relative to the disposition of the leaves in the buds, the varying direction of the peduncles or of the branches, and the development of bulbs and of suckers;

already given me so many proofs, this last offering of a heart which has always tenderly loved you, and has entertained the highest hopes of you.

"J. P. E. VAUCHER."

A few hours after the death of the author, an affectionate letter in the king's handwriting came from Turin announcing the receipt of the book, and also a portrait of the king sent by his orders.

sometimes too, and oftener, to the mode of the dispersion of the pollen, to the different and successive movements of the parts of the flower, and to the dissemination of the seeds. Information of this kind is very precious, when accurate, inasmuch as thereby the descriptions of authors are rendered more complete, some of whom have unfortunately neglected this kind of facts, whilst others, describing from dried plants, have not suspected certain phenomena of the life of plants. Without herbaria we should hardly have any idea of the 40,000 or 50,000 species which grow out of Europe, and which have never been cultivated; they could never have been referred to their genera and families, they could not have been compared in the most essential relations, since they live in distant countries or flower at different periods; but we must also add, without descriptions made from nature the very delicate organs would be ill understood, the different secretions, the mode of action of the pollen, the development of the ovules, the diversities of colour, of consistence, of perfume, which also have their value, would neither be remarked nor well comprehended. Besides, very many persons have not the patience and skill necessary for dissecting fragments of dried plants under a magnifying glass. I know experience proves that we attain nearly everything by this means, and that the advantage of immediately comparing the flowers and fruits which in nature succeed each other at long intervals, compensates for many difficulties; but we also know that dried plants are not very attractive, and that the study of living flowers possesses, on the contrary, a peculiar charm. True botanists understand and love both these means of observation, and use both as opportunity or occasion serves; they also will compare the work of M. Vaucher, made from living nature, with works of another kind, made in a great measure from herbaria. The one will frequently form the completion (*complément*) of the others. Science will not have been placed on new bases, but will have been enriched by new facts.

One point to which M. Vaucher often directs attention is the function which he attributes to the nectar in the fecundation of the flower. He calls this liquid *humeur miellée*, *honeyed moisture*, and notwithstanding the extreme diversity of origin, which he carefully describes, he considers as one and the same agent the liquids which proceed from the torus in many plants, from the base of the petals in some others, from the tissue of the stamens in rarer cases, or from that of the stigma a little before the fall of the pollen. "The principal," says he, "and indeed the only conclusion towards which all the facts explained in this work converge is this, that the honeyed

moisture is the agent of fecundation, without the concurrence of which fecundation could not take place. This humour ordinarily resides in the gland which supports the ovary, where it is often very visible; but sometimes it escapes our observation and we find it on the stigma, which it impregnates at the period of flowering, or on the torus, as in all the *Rosaceæ*; sometimes also it resides in the glands situated either at the base of the stamens, or on some parts of their surface, or in short in the stigma from whence it proceeds; in a word, there is no floral organ where it may not be met with and give signs of its existence\*.”

In this theory there are two assertions: one long ago admitted, namely, that the viscous liquid of the surface of the stigma is necessary to fecundation; the other new, the demonstration of which will be asked for, viz. that the nectar secreted in other parts of the flower, particularly on the torus, is an agent of the same kind as the viscosity of the stigma. Until the present time the nectar produced by the torus and by the glands has been considered as an excretion, that is to say, as a substance produced to disembarass the plant of the matters become useless in the series of vegetative functions. Those who saw in this product a liquid subservient in some manner to fecundation, did not go so far as M. Vaucher; they supposed at most, with Conrad Sprengel †, that the transportation of the pollen on to the stigma must be made by insects, and that the nectar, as well as the stains of lively colour of many corollas, served to attract into the flower these living agents of vegetable reproduction.

The use of the nectar in fecundation may be demonstrated in various ways. It has been sometimes attempted to suppress the secreting organs, but the conclusions thence deduced appear to me uncertain, and M. Vaucher probably thought so too, for he has not made trial of this kind of experiment. In fact, one of two things must happen; either fecundation takes place notwithstanding the mutilation, or it does not take place. In the first case, it may always be feared that it has been produced by the honeyed moisture from the general surface of the torus, or of the floral organs, which no mutilation could hinder, and of which there are many examples in the ordinary course of vegetable life. If, on the contrary, fecundation has not been effected, we may suspect that this is owing to the wounds being too deep, and to the extraction of the glands necessary rather to the life of the flower than to its fecundation. In natural history, observation leads us further than experiment. M. Vaucher, wishing to prove the physio-

\* Vol. iv. p. 521.

† Das entdeckte Geheimniss, &amp;c.



logical function of the nectar, has relied on detailed studies of the progress and series of the phænomena of the inflorescence. His conclusions are rather inductions than proofs. Let us quote some of the phænomena of which he speaks. According to him, it is from them collectively that a well-established conviction results.

“Of the four petals of *Corydalis tuberosa*, the two exterior petals, placed one above the other, exactly close the flower, to which they serve as a calyx; their superior margins are free and reflexed; the two interior ones, lateral and applied exactly one against the other, inclose the anthers in a pouch or quadrangular hood (*capuchon*) and do not separate, although a narrow slit is left between them by which the air penetrates. Fecundation takes place a considerable time before the development of the flower; the anthers lie upon the stigma, which is a vertical and fringed disc, entirely covered with the yellow fecundating dust; the nectary which grows from the torus is a greenish body, filled with a honeyed liquor which proceeds from a well-defined pore, and is diffused in the cavity of the superior petal; thence it insinuates itself by the slit which separates the two interior petals and penetrates to the anthers and the stigma, which it thoroughly moistens. This humour is not designed to attract flies, since it is contained in a closed sac.” The grains of pollen fall on the stigma and burst, in order that their elongated pollinic tubes may penetrate into the interior. It seems, indeed, that the abundant humour described in this particular case must bring about the phænomenon of the rupture of the pollen, if the facts are precisely such as the author has indicated. The advanced season has not enabled me to verify them.

In another chapter he says, that “the anthers of the *Helleborus foetidus* open outwardly and in such a way that their yellowish pollen falls into the melliferous tubes\*, filled at this epoch with the honeyed moisture, and gradually as they [the anthers] are matured from the circumference towards the centre, they raise themselves one above the other, and thus convey their pollen to the stigma, which can hardly be fecundated except by the emanations of the nectaries: the little nectariferous tubes are seen quite open, powdered with the granules which absorb the limpid humour.” Here, I confess that the induction appears rather indirect. If the grains of pollen fall to the bottom of the flower, on the torus, or into special cavities in certain plants, we can scarcely conclude that these same grains contribute to the fecundation. Does not an immense quantity of pollinic grains fall upon the earth around

\* The bilobed and tubular petals, so remarkable in the tribe of Hellebores.

trees? In what way do they contribute to the fecundation of the ovules? Scarcely does one in a million of these grains again pass from the ground by means of the wind or of insects upon the stigma of a plant of the same species. The pollen is so abundant, that the loss of a considerable proportion of the grains does not hinder the species from being reproduced. Thus the pollen which falls into the nectariferous tubes of *Helleborus fœtidus* is probably so much pollen lost, and the function of these secreting tubes has perhaps no connexion with the rupture of the grains which fall into the liquid. Besides, M. Vaucher adds, that it is not the same in *Helleborus viridis*, and that its nectariferous tubes always appear closed. In short, the author might have been asked how the grains of pollen, bursting in the nectar of the tubes, could be transferred thence to the stigma. The expression which he uses, "the stigmas can hardly be fecundated but by the emanations of the nectaries,"—does it indicate an action taking place at a distance, an *aura seminalis*, setting out from the nectariferous tubes where the grains of pollen are, and conducting something invisible to the stigmas? This would seem to be so, according to the words, but the idea of an *aura seminalis* is at the present day inadmissible. We must suppose that this passage relative to the Hellebore, with others containing analogous expressions, were written by M. Vaucher a long time before the modern discoveries of the pollinic tube and its penetration into the stigma. It is the inevitable defect of so extended a work not to be on a level with science on all points. An author cannot be continually varying his plan and expressions in order to follow the progress of discoveries. M. Vaucher quite admits, in several articles, the action of the pollinic tubes, but his book was under preparation during a period of fifteen to twenty years!

Let us proceed in seeking for proofs or presumptions in favour of the supposed action of the nectar.

"In the genus *Agrimonia* the stamens, to the number of fifteen, surround a small convex torus, which is velvety and nectariferous; the anthers have a very wide connective, and bear upon the margins two turgid cells, which open principally towards the summit; they are at first inclined on the bottom of the flower, but at the time of flowering they raise themselves up and spread; afterwards, when they have lost their pollen, their filaments fold themselves and form by their union a kind of grating, and we see the connective impregnate the pollen with the honeyed humour with which it is itself covered, and afterwards the honeyed humour spread itself over all the floral organs." I have in vain endeavoured to verify

this last part of the description. All that concerns the movements of the stamens of the *Agrimonia* appears very accurate, and, in the flowers which I have observed, pollen always fell on the stigmas in consequence of these movements, but I have not perceived any appearance of nectar. Perhaps M. Vaucher had discovered a moment when this liquid is produced; but in any case I doubt whether it can act upon the pollen and upon its transference.

M. Vaucher considered the genus *Lopezia* as one of those in which the action of the nectar in fecundation manifests itself with most elegance. He thus describes the phænomenon: "There is at the bending part of their two petals, at the place where the superior limb begins, a small spherical drop of honeyed moisture, and opposite to it the stamen, as well as the style, enveloped by a whitish and petiolated hood, which botanists consider as an abortive stamen. At the moment when the bilocular and extrorse anther opens its cells in order to scatter its bluish and bright pollen, the hood throws itself down on the inferior lip by a very marked flexure, and the pollen abundantly covers the two melliferous drops which absorb it; afterwards the withered anther is detached from the filament, and the style, till then shapeless and as it were abortive, lengthens insensibly and is terminated by a pretty globose, feathery and papillose stigma, which receives the contents (*émanations*) of the pollen transmitted by the honeyed moisture; for it is impossible to suppose that the anther could scatter its pollen immediately on a stigma not at the time in existence, and whose style was situated at the side opposite to the opening of the anthers; fecundation is therefore, in this case, evidently effected by means of the honeyed moisture, for there is not in the cluster any neighbouring flower whose anther could fecundate our stigma. Two little nectariferous drops may also be remarked at the base of the corolla, similar to those of the petals, and which equally conduce to the fecundation." In admitting that the series of phænomena takes place in *Lopezia* just as the author describes, we cannot help asking how the pollen, after falling into the honeyed moisture of the petals, sends *émanations* at a later period to the stigma. What are these *émanations*? What transportation can take place of the drop containing the pollen to the stigma? Here, it must be confessed, is a gap in the observation or in the description. Perhaps the sense of the passage will be explained by an attentive examination of nature, for our author was most honest, and did not write in order to propose enigmas for botanists.

[To be continued.]



XXV.—*On the Dotted Vessels of Ferns.* By J. W. GRIFFITH,  
M.D., F.L.S.

[With a Plate.]

DURING the examination of the petioles of some of the British Ferns, I have several times been led to doubt whether the dotted tubes found in them\* have really been referred to their proper situation in structural classifications, and if their real functions have been properly understood. They are usually considered as forms of woody tissue.

These tubes are situated in bundles at tolerably regular distances from the axis and from each other, surrounded by the cellular system of the petiole. In the younger petioles they are mixed with spiral vessels, but these are rarely found in the older ones. Their transverse section shows them to be cylindrical or elliptical, not angular nor solid (Pl. V. fig. 1. *a.*). They are usually of a yellowish brown colour, terminating in acute extremities, which become more obtuse as their age advances. *In situ* their terminations overlap one another (fig. 3. *a.*). Their surfaces are studded with small elliptical markings or dots, not extending far across the tube, but arranged in parallel lines; these dots are rarely exactly opposite each other, so that the axis of any dot in one row rarely coincides with that of any other in the next. They have no tubular nor rimmed margin. On some of the torn edges projecting solid fibres may be seen leaving spaces between them corresponding to the dotted parts, and sometimes on their edges may be seen the fragments of the lacerated membrane filling up the dots, thus proving that these tubes are composed of two coats, one of united fibres, the other delicate and membranous. In the older petioles the tubes are often continuous at their extremities, but in the younger they are not. When these tubes are examined in the dried state the delicate membrane filling up the dot disappears, leaving a perfect foramen. The dots are situated obliquely on the walls of the tubes, so that if the upper and under surfaces be brought into focus under the microscope immediately after one another, or the focus of the object-glass be made to correspond to the centre of the tube so as to have both surfaces indistinct but still perceptible at the same time, the dots cross one another, showing their arrangement to be spiral. When they are stretched they do not break but uncoil (Pl. V. fig. 4. *a.*), as if the tube were formed by a band of four or five spiral fibres united at the margins. Their terminal points are situated on one side so as to make the end appear cut off obliquely. Sometimes there

\* *Pteris aquilina* shows them remarkably well.

appears a black line extending along their surface and separating the rows of dots (fig. 4. b.). These tubes always contain air, except during their earliest periods. Tubes somewhat similar to these have been figured by Link\* from ferns (*Aspidium*, *Polypodium*, &c.†), but they differ from those I have described in having a beaded margin and the dots being opposite each other.

These tubes are not true ducts, inasmuch as they uncoil without breaking, and contain air; they cannot be considered as any form of woody tissue for the last-mentioned reason, as well as because the dots have a spiral arrangement. They are not scalariform vessels, as their markings do not extend across the tube, nor are they angular. They agree with spiral vessels in, 1. terminating in pointed extremities; 2. containing air; 3. being composed of a fibre or fibres and a membrane; 4. uncoiling elastically. So that although not actually spiral vessels, in consequence of the edges of the fibres not being free but adherent, they are, I think, undoubtedly formed from them, and perform precisely the same physiological functions. This brings us to the question of the transformation of spiral into dotted vessels, which has been so often and so unprofitably discussed, inasmuch as even at the present time the highest authorities differ. I believe that all dotted tubes are not formed in the same way; thus, the reticulated tubes of flowering plants are formed on totally different principles from those of these ferns. I will not tire my readers by discussing this question, as it has been so often done by the best anatomists and physiologists. I will merely direct attention to the fact of the spiral vessels being found numerous in young petioles or stems, and being more rarely found, at least not in the same abundance, in the older ones; also to a beautiful microscopic object lately laid before the public by Mr. Kippist‡, I allude to the spiral cells (sp. vessels) found upon the testa of the seeds of *Acanthodium*, *Ruellia*, &c. When the surface of these seeds is examined by a lens of low power, it appears covered with whitish appressed hairs. These when moistened separate from each other and resolve themselves into spiral vessels which shoot out in the most beautiful manner from the surface. When they are minutely examined by a high power the spiral fibre is distinctly seen: at that extremity farthest from the testa the fibre remains simple (fig. 3. §); where (as in

\* *Ausgewählte anatomisch-botanische Abbildungen*: Berlin, 1841.

† Not British species.

‡ *Transactions of the Linnæan Society*, vol. xix. p. 76.

§ The figures here alluded to are those accompanying Mr. Kippist's paper in the *Linnæan Transactions*.

fig. 2.) the tube has been stretched, the fibre breaks up into rings; and at that part nearest the testa where the pressure is considerable, the fibres at first are simply approximated; nearer still to the testa we have union of the fibres, and the reticulated duct produced.

August 9, 1842.

DESCRIPTION OF THE PLATE.

PLATE V.

- Fig. 1. Transverse section of a bundle of dotted tubes from *Pteris*; *a*, the circular or elliptical orifices.  
 Fig. 2. Dotted tube from the same; *a*, conical termination.  
 Fig. 3. The same; *a*, overlapping extremities.  
 Fig. 4. The same, showing how the extended tube uncoils without breaking; *b*, the black line spoken of above.  
 Fig. 5. and 9. Show how the thicker portion when torn presents a ragged edge: this preparation was dried, and the thinner membrane deficient.  
 Fig. 6. Early dotted tubes from *Aspidium Filix mas*.  
 Fig. 7. Transverse section of bundle of tubes from *Pteris*: when the internal surface of the tube is brought into focus the transverse bars may be seen.  
 Fig. 8. and 9. Fibres withdrawn from the membrane in *Aspidium Filix mas*.

XXVI.—*The Birds of Ireland.* By WM. THOMPSON, Esq.,  
 Vice-Pres. Nat. Hist. Society of Belfast.

[Continued from p. 59.]

No. 13. *Hirundinidæ* (continued).

COMMON SWIFT, *Cypselus murarius*, Temm. Although this bird is common in favourite localities, the species must be set down with reference to Ireland generally as but partially distributed. Along the western range of the island it is rather scarce, and in some extensive districts is never to be met with.

The swift is more regular as to the time of its appearance around Belfast than any of the genus *Hirundo*. It may generally be seen during the first week of May, and frequently on the 2nd day of that month.

In his 'Illustrations of British Ornithology,' Mr. Selby observes, "It has been remarked that these birds delight in sultry weather, with approaching thunder-storms, at such times flying in small parties, with peculiar violence; and as they pass near steeples, towers, or corners of buildings, uttering loud screams, which White, in his 'Natural History of Selborne,' supposes to be a sort of serenade to their respective families. This is fanciful and pretty; but I should rather be inclined to reason the opposite way, and to consider this action and cry as the consequences of irritability, excited by the



highly electrical state of the atmosphere at such times." With Mr. Selby I agree in considering the remark of White respecting the scream of the swift to be merely "fanciful and pretty," as I have heard these birds scream in the manner described so soon after their arrival as to afford sufficient proof that the cry did not proceed from the "males serenading their sitting hens," as at the time incubation had not commenced\*. But I cannot coincide in opinion with Mr. Selby that "this action and cry are the consequences of irritability excited by the highly electrical state of the atmosphere at such times." This idea differing from my own previous to the perusal of the admirable work in which it appeared, I, for two summers, gave some attention to the subject, to see how far my preconceived opinion was justified. In the years 1832 and 1833, from the 7th and 9th of May, the days on which the swifts first came under my observation about Belfast, until the 1st and 3rd of June (when I left home), they daily, in dull and gloomy as well as bright and cloudless weather, kept flying about in small parties, screaming loudly.

The following particular notices on this subject are abbreviated from my Journal:—

May 24th, 1832.—For the last eight or ten days the swift's scream has been daily heard; and when present this evening at the closing sessional meeting of the Historic Debating Society, the swifts obtruded themselves on my attention by flying, "in small parties," closely past the windows, screaming most furiously. Though amusing to the ornithologist, it must have been very annoying to the assembled company to be "serenaded" by their ill-timed scream, which not only jarred most discordantly with the "eloquent music" discoursed within, but for the time being entirely drowned the voices of the speakers, and indeed almost seemed to be intended as a mockery of what was passing there. During these ten days the weather has been rather dark and cloudy; the barometer remarkably stationary, and very high. With the exception of a few showers on one day, no rain has fallen.

May 27th and June 3rd, 1832.—Weather remarkably fine and warm; sky almost cloudless. The screaming of swifts heard above every other sound, about the localities frequented by them.

May 22nd, 1833.—After eight this evening, which was very warm and the sky cloudless, swifts were flying about in little parties of three and four, and noisy as usual: two of these parties would occasionally join, and continue together for a short time screaming vociferously. These evolutions have always seemed to me manifestations of pure enjoyment, and I have considered the swift's peculiar cry generally indicative of pleasure. When these parties were about to meet, and when just separating, their power of screaming was ex-

\* I have often remarked what doubtless led White to conjecture that the cry of the swift is the serenade of the males to "their sitting hens," as, at the season of incubation, these birds (but of which sex I cannot say) may often be observed flying about in the neighbourhood of their nests, and screaming only "when they come close to the walls or eaves."

erted to the utmost\*. Similar evolutions, in which a much greater number of these birds participated, were witnessed on the 24th inst.; the weather being similar to what it was on the 22nd, in regard to fineness and a cloudless sky. The barometer was very high and stationary on both evenings. The state of the barometer and weather has been mentioned, that some idea may be formed whether or not the atmosphere could have been "highly electrical" throughout the varied weather described, or indeed daily throughout that of any two months in this climate †.

Swifts prefer to nestle in lofty edifices, especially when in a state of dilapidation ‡; but in the north of Ireland, where these do not often occur, they content themselves with more humble dwellings. I have remarked that in many of our northern towns §, where swifts are as plentiful as in any country, that they select for their domicile the eaves of the oldest houses, or those from which the fast encroaching spirit of improvement has not yet banished the thatched roofs. On the 8th of July 1833, I observed many of these birds flying under the eaves and clinging to the walls of occupied two-story houses of this kind in the town of Antrim, and although they and the martins appeared an indiscriminate multitude when flying about the street, their places of nidification were quite distinct, the martins building on the south, and the swifts confining themselves to the north side: on a house just opposite the chief abode of the latter, I reckoned about twenty nests of the martin. When in the town of Ballymoney, on the same day, several swifts were observed to fly under the thatch of a house similar to that described, whilst against it appeared some inhabited nests of the martin. On the 24th of June 1834, the swift was remarked to have similar nestling-places in Lisburn and Banbridge. In all the above-mentioned localities these birds were flying about in groups and screaming violently, the weather being delightfully warm, and the sky not only "purely beautifully blue," but not a cloud visible. For a week after the former date the weather continued very warm and dry.

In Belfast, where houses such as those described are not to be met with, I have known the swift's nest to be placed under the window-

\* Mr. Macgillivray remarks, "that the loudest and most frequent cries are heard when birds are evidently in active and successful pursuit." At the times above alluded to they certainly were not feeding.

† Mr. Macgillivray, in his 'British Birds,' vol. iii. pp. 619 and 622, enters fully into the subject of the swift's screaming. His observations of 1837 very generally agree with mine, made a few years before. Dr. J. D. Marshall, in his memoir on the Statistics and Natural History of the island of Rathlin, where swifts are plentiful, states, that the result of his observations is opposed to the views of White and Selby. He believes the loud screaming of these birds to be particularly induced by fine weather and an abundance of food.

‡ When on Ram's Island, in Lough Neagh, in the month of June 1833, I remarked several of these birds flying in the vicinity of the ancient round tower, whose "rents of ruin" were most probably their temporary abiding place.

§ Swifts especially delight in large open spaces in towns.

sills of houses newly erected, to which the bird gained access by means of an aperture, about an inch in width, that the careless builder had neglected to close up. An ornithological friend has seen swifts fly under the eaves of the low thatched cottages in the village of Magheralin (county Down), where they doubtless nestle.

This species, like the martin, frequents the basaltic precipices of the north coast of Ireland, from their southern extremity at the Cave hill near Belfast, to their northern termination above the sand-hills of Magilligan; and, from their being ever present in these situations during their sojourn with us, they doubtless have their dwellings in their crevices\*.

In the fifth volume of the 'Mag. of Nat. Hist.,' p. 736, Mr. Couch remarks, "It is not long that swifts have frequented stations convenient for my observation. At first they were about two pairs, but they have now increased to four or five; and it is singular, that according to my observation, there is always an odd bird." A similar circumstance was, for the first time, remarked by me in the summer of 1829, when three swifts repaired to Wolfhill†, and took up their abode between the slates and window-frame of a loft not more than twenty feet in height. Here, where a shot was not permitted to be fired, and the odd bird could not have lost its partner by the fowling-

\* White of Selborne mentions swifts "breeding in the sides of a deep chalk-pit at Odiham." At the end of June 1835, I observed numbers of these birds about the high limestone cliffs which rise in picturesque beauty above the river Derwent, at Matlock in Derbyshire, where it was presumed that they nested.

† This locality, situated about three miles from Belfast, is elevated 500 feet above the sea, and is a favourite haunt of the *Hirundinidæ*. During the sojourn of the swift, this species, with the three others, may frequently be seen at one view, the swallow, martin and sand martin sweeping in company over the ponds, whilst the swift, though generally maintaining a superior altitude, occasionally breaks through their ranks; the whole of the species, on such occasions, and indeed at all times, exhibiting the most perfect amity. The swift builds here under the eaves of an out-house, the rafters of which display the nest of the swallow beneath them; under an adjoining roof the "cradle" of the martin appears, and not more than a furlong distant is the burrow of the sand martin. It is extremely interesting to the lover of nature thus to behold at a glance all the species of these attractive summer wanderers that regularly visit the British Islands; and where they do thus appear, there are generally some charming features of natural scenery.

When at Kilrea in July 1839, where the banks of the river Bann are picturesquely wooded, and the expansive stream of water is impeded in its progress from Lough Neagh to the ocean by low and scattered rocks which rise here and there above it, and in a moment change the smooth mirror of its surface into a scene of active and "lusty life," such as delighteth the angler's heart, I observed the four species, and swifts, not less than a hundred in number, keeping almost on the same level with the others.

In Malta, again, on the 17th of April 1841, the day very fine and warm, our four *Hirundinidæ* were in like manner observed flying low and in company wherever we walked about the island, and all the species in numbers similar to what they are in their most favoured haunts in the British Islands. This is a fortnight earlier than the swift generally appears in the north of Ireland.



piece, the circumstance was considered as "passing strange." During three months, the usual period of the swift's presence in this country, the three mature individuals only appeared. The following year also an odd number of these birds was observed at Wolfhill, there being either five or seven. It may be stated, that during these two summers the houses there had, in regard to fallen plaster and the growth of lichens, mosses, &c., rather more of a picturesque appearance than is consistent with the most perfect order, and that in the autumn of 1830 they were all repaired and *roughcast*, the swifts' eyrie being most carefully protected from the hands of the renovator; but, notwithstanding this, the species has never since tenanted the place.

Swifts generally keep at such an altitude, that the vicinity of water is not enlisted by their presence as it is by that of some of the *Hirundines*, yet they may occasionally be seen flying over Belfast Bay (particularly about the time of high-water), as well as skimming the surface of ponds and rivers. Once only have I witnessed these birds keeping regularly at a lower elevation than swallows. This was on the 3rd of July 1838, a beautiful sun-bright day, when numbers of them appeared flying over Strangford Lough, near Portaferry, at from twenty to forty yards above the surface of the sea, while, in the stratum of air immediately above, swallows were abundant.

Bewick remarks that swifts (vol. i. p. 267, ed. of 1821) "are said to avoid heat, and for this reason pass the middle of the day in their holes, [and that] in the morning and the evening they go out in quest of provision." Mr. Macgillivray too observes, that "in dry and sunny weather [the swift] generally rests in the middle of the day." This has, I conceive, been assumed from the circumstance that swifts are not seen about their breeding haunts throughout the day, like the swallow and martin. Instead, however, of lying concealed at such times, they are ranging far abroad. During our very warmest and brightest days I have commonly seen them sweeping in great numbers over the mountain heaths and around the summit of Divis\*, the highest mountain in our neighbourhood†, and near to which they have not any nestling-places. Towards evening they return from these comparatively distant flights, and are then seen about their accustomed haunts for some time previous to retiring for the night, having thus led persons to believe that the evening is one of their favourite times for stirring out. Swifts may likewise be occasionally seen on wing about their nests throughout the very warmest days‡.

\* 1575 feet above the sea.

† When here on the 15th of May 1836 (a remarkably fine day), to witness the eclipse of the sun, I saw fully as many swifts as had ever appeared when the season was farther advanced.

In like manner I remarked them on the 6th and 7th of May 1841, about the lofty mountain tops, and there only, in the island of Syra, one of the group of the Cyclades. Captain Cook, in his 'Sketches in Spain,' mentions a similar propensity of the alpine swift, in the following words: "I have heard they were not uncommon in Catalonia, but I never met with them, probably from their habit of going to feed at vast heights and distances in the daytime, which prevents their being seen." (Vol. ii. p. 276.)

‡ An intelligent shooter and taxidermist states that two swifts' nests which

In the 'Natural History of Selborne' (Letter 21), White remarks of the swift, that "in the longest days it does not withdraw to rest till a quarter before nine in the evening, being the latest of all day birds." In Belfast it may be seen about midsummer at nine, and not rarely for some time after that hour, before which the three species of *Hirundo* have generally retired.

The swift generally leaves Belfast about the 12th of August, but in 1840 I saw a number of them here on the 19th of that month, and in 1832 on the 20th; in 1833 I remarked about twenty in company, in its vicinity, so late as the 30th. These were pursuing their prey most leisurely, at about thirty yards from the ground, many swallows and martins occupying the space immediately beneath them; and each, the *Cypselus* and *Hirundo*, occasionally breaking through the others' ranks. The month of August was much colder than usual this year, but that circumstance could hardly have influenced the swift in remaining beyond its ordinary time of departure, as the first assemblage of swallows and martins, constituting a vast multitude, was congregated for migration at the same time and place, and on the same day they all departed. On the 4th of September 1835, swifts were observed by a scientific friend about Dunluce Castle, near the Giants' Causeway; and on the 11th of that month in the following year, three of these birds were seen by myself at Hillsborough (county Down), and many more of the *Hirundinidæ*, which appeared at some distance, were believed to be of this species. About the same place, many of the *Hir. rustica* were congregated preparatory to their departure. I have never witnessed any assembling together of swifts, towards the time of their migration, like that of the swallow and martin. During the period of their stay, they are, in favourite localities, generally to be seen in some quantity.

In the course of a tour made to the south and south-east of Europe, &c., in 1841, the swift was first met with at Malta on the 17th of April, when many appeared in company with the three common species of *Hirundo*—*H. rustica*, *H. urbica*, and *H. riparia*. None were seen during the passage of H.M.S. Beacon from Malta to the Morea, when numbers of *H. rustica* and *H. urbica* alighted on the vessel. On the 6th and 7th of May swifts were next met with, about the mountain tops in the island of Syra, when the weather was very fine and warm. Towards the end of the month they were seen at Smyrna, and were abundant at Constantinople. Early in June they were numerous about a rocky islet north-east of Port Nousa, in the island of Paros, and were breeding in the fissures of low marine cliffs. At the end of this month they were plentiful in Trieste; and in July at Venice (remarkably so here), Verona, Milan, &c. At

he *manually* examined in the summer of 1839 were placed on the wall-top of a two-story thatched house, and were like a sparrow's nest in a similar situation, but contained fewer feathers—in the one nest were two eggs which had been long incubated, and were therefore the complement, or full number, and in the other were three young birds. Swifts have for some years built at this house, inside of which the common swallow as regularly nestles.

Constantinople only were both the *Cypselus murarius* and *C. melba* seen.

White of Selborne, and Mr. Macgillivray (Brit. Birds), give very copious and highly interesting accounts of the swift, from personal observation.

ALPINE SWIFT, *Cypselus alpinus*, Temm.—By the ‘Dublin Penny Journal’ of March 1833, my attention was called to a *rara avis* said to have been killed at Rathfarnham, and preserved in the fine collection of native birds belonging to Thomas W. Warren, Esq. of Dublin.

On calling to see this bird, I found it to be the *Cypselus alpinus*, a species unrecorded as occurring in any part of Ireland; the specimen recognised as the alpine swift by Mr. Wm. Sinclaire, and communicated by him to Mr. Selby as an addition to the British fauna, having been obtained off Cape Clear, at the distance of some miles from land. Mr. Warren’s specimen is incorrectly stated in the ‘Journal’ to have been captured in the month of February, as, according to a note made by that gentleman when the circumstance occurred, the bird was sent to him from Rathfarnham, in the neighbourhood of Dublin, on the 14th of March, being then in a perfectly fresh state.

Four individuals of this species have since been met with in England, as particularly noticed in the ‘British Birds’ of Yarrell and Macgillivray.

The first place I met with the alpine swift was about ten miles to the north of Naples, on the 12th of August 1826, when a great number of them were observed associated together in flight, at a considerable altitude. The evolutions of this species in the air are similar to those of the common swift; but independently of their superior size, which at once distinguishes them from that bird, the white colour of a portion of the under plumage, from which they have received the name of ‘white-bellied swift,’ is very conspicuous, even when the bird is at a considerable elevation.

When on the Continent in 1841, this species was first seen by us on the 9th of April, when descending the Rhone from Lyons to Avignon. About half-way between these cities several appeared flying over the river, and a few were seen at all suitable places thence to Avignon. On the morning of the 28th of April, when entering the fine bay of Navarino, great numbers appeared careering high overhead, and in walking through the petty town of the same name later in the day, alpine swifts were flying very low over the streets and houses, although the weather was delightfully warm and fine. On my visiting the island of Sphacteria, the western boundary of the bay, on the 29th, these birds were very abundant. The attraction here was a range of noble precipitous cliffs which rise direct from the sea, at the western side of the island, and which were inhabited by them; just such a locality as would be tenanted by the common swift in the north of Ireland, where the basaltic precipices are resorted to. The day was as fine and warm as our northern summers ever boast, yet on walking along the top of the cliffs, these



birds swept about low and in numbers, occasionally within a few yards of my head. In general appearance and flight they are very similar to the common swift: they are very noisy, almost constantly uttering a loud twitter; besides which they occasionally give a *brief* scream, nowise resembling the long-drawn and shrill cry of the common species. Towards the end of May I saw a few alpine swifts at Constantinople, wheeling about the heights of Pera, and near the high tower of Galata, in which they probably nestle. In the month of June I met with this species at the island of Paros, and about the Acropolis at Athens. Throughout this tour the common swift was more frequently seen than the *C. alpinus*; and at one locality only did they both appear—this was at Constantinople, where the former species was abundant, and a few of the latter were observed. This seemed rather remarkable, as in no scene did I meet with the one species in which the other would not have appeared equally at home. The only difference in their habits which struck me was, that the alpine swift is more partial to cliffs than buildings, the common swift more partial to artificial structures than to rocks.

THE GOATSUCKER, *Caprimulgus Europæus*, Linn., is a regular summer visitant to favourite localities in all quarters of the island, and of rare but occasional appearance elsewhere.

In the neighbourhood of Belfast it very rarely appears. A venerable sporting friend, who has been shooting here regularly in the season for above sixty years, has not during that time met with a dozen of these birds, although there are several districts apparently well suited to them. In the wooded glen at the "Falls" one was seen by Mr. Wm. Sinclair and myself some years ago. It was perching lengthwise (as the species is well known to do), instead of across the branch of a fine beech tree, then displaying the tender and beautiful green of its young leaves. I am aware of four only having been killed, within twelve miles of Belfast, in the last fifteen years. Of these, the first was shot at Belvoir Park on the 28th of July 1827; the second, in the summer of 1835, in the district of Malone; the third, on the 25th of September in the same year, in Hillsborough Park; the fourth, on the 1st of June 1840, at Bangor Castle: the stomach of this last was filled with the remains of several individuals of *Geotrupes stercorarius*. In the Ards, county Down, the goatsucker has not unfrequently been observed, by George Mathews, Esq., at Springvale; and he informs me, that about Echlinville a few have been shot. It is a regular summer visitant to the Mourne mountains, more particularly in the vicinity of Tollymore Park\*. The gamekeeper there informed me, in 1836, that he had frequently found the nest of the goatsucker; and had never observed in any of them more than one egg. On the 28th of June 1838, he pointed out to me one of their nests: it was at the base of a young

\* In Templeton's 'Catalogue of Vertebrate Animals' (Mag. Nat. Hist. vol. i. new series), this bird is noticed as "rare about Belfast; but [not] uncommon at Mourne, county Down." The *not* before uncommon was omitted in the printing of the paper.

tree planted in the spring, and which formed one of a young plantation on the mountain side. The bird was consequently seen on the nest from some distance. She did not leave it until we approached within seven or eight paces, and then flew but a short distance before alighting:—there were two very young birds on the bare ground; and about the distance of a foot from where they then were, it was stated that the eggs had been incubated.

The goatsucker is noticed by J. V. Stewart, Esq., as common in the north of Donegal. It is stated to be a regular vernal migrant to the county of Wicklow,—the “Vale of Ovoca,” a name familiar to the lovers of the “Irish Melodies,” is said to be one of its favourite places of resort. Mr. R. Davis, jun., of Clonmel, says that this species is not uncommon, and annually breeds in some heath-clad mountains near that town. Captain Walker of Belmont, near Wexford, informs me that the “fern-owl” is rather common there. Mr. G. J. Allman, of Bandon, states that it is occasionally shot in that neighbourhood, but is not known to him as regularly frequenting any locality. A young plantation of limited extent, on the high banks above the river Blackwater, near Youghal, was pointed out to me in July 1834 by Mr. R. Ball as annually resorted to by these birds. In three specimens sent him from the locality, the ghost-moth (*Hepialus Humuli*) only was found; one stomach contained the remains of nine of these insects. When visiting the Lakes of Killarney, in company with Mr. R. Ball, in July 1834, we had the gratification of seeing three goatsuckers hawking about, and very near to each other, as we were passing from the upper to the lower lake, and near the highly picturesque mountain called the Eagle’s Nest: in the twilight, the white markings on the tail of one of them—said to denote the male bird—were quite conspicuous. On the following evening we saw another between Innisfallen and Ross Island.

Dr. J. L. Drummond informs me, that when H.M.S. San Juan (of which he was surgeon) was anchored near Gibraltar, a few goatsuckers flew on board, in the spring of the year. During the passage of H.M.S. Beacon, at the end of April 1841, as particularly noticed in ‘Annals,’ vol. viii. p. 128, several goatsuckers were seen, and some shot. On the evening of the 1st of June two were killed, and others seen, in the barren and now uninhabited island of Delos, by some of my companions, the officers of H.M.S. Magpie.

White, in his ‘History of Selborne,’ gives an extremely interesting account of the goatsucker; Sir Wm. Jardine very fully notes its various modes of flight; and in Macgillivray’s ‘British Birds’ an ample description is given by the author, to which are added valuable contributions from Mr. Harley and Mr. Weir; the observations of the former having been made near Leicester, and the latter at Bathgate, Linlithgowshire.

[To be continued.]

XXVII.—*Observations on the Common Toad, and on its long Abstinence from Food.* By JOHN BROWN, Esq.

IN repeating an experiment on the Common Toad as to its long abstinence from food when deprived of a free circulation of air, which was made three years ago (see vol. iii. p. 518, 'Mag. Nat. Hist.' N. S.), it will there be seen that the animal in that instance died three days after it was restored to light and air, from its being, as was supposed at the time, most injudiciously exposed to the sun during that time in a southern aspect for the purpose of its being seen by any one who from motives of curiosity might wish to do so.

After the death of this toad, the trial being thought not quite perfect, another was selected and placed in the same grave out of which the former one was taken, and after remaining in that situation for three years to the very day upon a bed of dry flinty gravel, and with full three feet in depth of gravel over it, and without any apparent means of obtaining food, the toad was removed from its dormitory alive, but its body and limbs were discovered to be wasted and shrunk in some measure. This removal took place on Friday the 2nd of the present month (September). It was then put into a hole made in the ground about six inches deep and shaded from the sun; in this state it lived seven days, but it died on the eighth day after it was taken out of the ground.

At the same time that the animal now under notice was buried alive, four other toads were put alive also under two flower-pots; two animals under each pot, with its mouth downwards, as in the former instance, to prevent the pressure of earth from crushing them.

These were also buried three feet below the surface, in a corner of a field in a dry soil. Here we met with a very different result; for after removing the earth and turning up the flower-pots, not a vestige could be seen of any part of the four animals that were put under them three years before; and although search was made, not in a careless manner, for any part of the bones, skin, &c., not a trace of any of them could be seen; every fragment of their skeletons had disappeared; and after searching the earth over which the pots covering the toads had been whelmed very cautiously, all that could be found in the soil belonging to the animal kingdom were the antennæ, legs, and the elytra of beetles.

The only solution of the difficulty that then presented itself as to the cause of removal of the carcasses of the toads, was that the larvæ of the beetles in question, or the insects in a more perfect state of existence, had effected their removal by devouring them.



This is a question affecting entomology, and very probably among the numerous readers of this work, or the more scientific contributors to it, we may be favoured in a future number with a better solution of the matter in question than the foregoing.

The animals under notice in both experiments, when first taken out of the ground, were quite exposed to the open air; in the first instance the toad was very improperly placed in the sun for the space of three days in a southern aspect, as was before observed, a situation never chosen by these reptiles during the warm season.

In future experiments of this kind, perhaps if atmospheric air were to be admitted to the animals under the above circumstances in small quantities, and gradually, instead of sudden exposure to that element, we might then probably have a different result from those we have hitherto experienced; or after such long confinement as three years, letting them have access to their native element, water, for a time, this might be a means of recovering the animals and prolonging their existence; but this can only be ascertained by future research.

Since writing the above I have perused an interesting article in vol. vi. p. 459. in the 'Mag. Nat. Hist.,' which is pertinent to the remark of letting the animals have access to water when taken out of the ground after long periods of imprisonment. It is there stated that a toad was discovered "in a solid piece of ironstone, which on exposure to air exhibited symptoms of animation, and being put into water lived about three weeks, growing to nearly double its size when first released from its confined cell, which was just large enough to contain its body."

It appears by the account above quoted, that this discovery was made by some miners at the Rough Hills colliery in Shropshire. Vide *Shrewsbury Chronicle* for December 21st, 1823.

Stanway, Sept. 13, 1842.

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XXVIII.—*On the varieties of Dryas octopetala*. By CHARLES C. BABINGTON, M.A., F.L.S., F.G.S., &c.\*

[With a Plate.]

It is now several years since my attention was drawn to certain differences which exist in the specimens of *Dryas octopetala* obtained from two Irish stations and those found in England and Scotland, and I have at length determined to

\* Read to the Botanical Society at Edinburgh, Feb. 10, 1842.

submit the following short account of them to the consideration of botanists. To my valued friend, Mr. J. T. Mackay, the credit is I believe due of having been the first to observe that a considerable difference existed between these plants, and it was by his kind permission that I had an opportunity of examining the growing plants in the College Botanical Garden at Dublin, and making from them the outlines which accompany this paper. The differences which are found in the form of their leaves and calyces and in their pubescence, would in most genera be considered as of specific importance; but in the present case, although remaining constant in cultivation, they do not appear to indicate species. Indeed I look upon this as an illustration of the well-known fact, that variations of the highest value as specific marks in one group only distinguish varieties in another. It may however ultimately prove that these plants are really species, although that is not the view of them which I have been led to take.

The characters to which I am now inviting attention are, the proportional length and form of the sepals, the form of the base of the calyx, the form of the leaves, and the pubescence of the petioles. Combining these, I find three very well-marked varieties; two of them confined, I believe, to Ireland, and the third common in England, Scotland, and on the continent of Europe. This latter being the best known form, I shall consider as the type of the species. In it we find the sepals to be three or four times as long as broad and acute, the base of the calyx being hemispherical; in  $\beta$ . the calyx is very nearly the same, being only less acute; but in  $\gamma$ . the sepals are scarcely twice as long as broad and very blunt, and the base of the calyx is truncated in a remarkable manner. In  $\alpha$ . and  $\gamma$ . the leaves are ovate-oblong, and deeply cut into large rounded lobes, and the under side of their petioles and midribs clothed with long hairs, amongst which are numerous minute, linear, pellucid, fringed scales (Pl. VII. fig. 1,  $\alpha$ .); in  $\beta$ . the leaves are oblong or ovate-oblong, and deeply cut into large slightly acute lobes, and their petioles and midribs hairy, but without any scales.

I would characterize the species and its varieties as follows:—

*Dryas octopetala* (Linn.). Leaves crenate-serrate, obtuse; flowers white.

$\alpha$ . Sepals three or four times as long as broad, acute, covered with red hairs; base of the calyx hemispherical; under side of the petiole bearing minute, linear, pellucid, hairy scales mixed with long hairs; leaves ovate-oblong, deeply cut into large rounded lobes; under side of the petiole and midrib green. (Pl. VII. fig. 1.)

I have seen specimens of this variety from Teesdale, Breadalbane, Clova and Sutherland; also from Munich, Mount Stockhorn and the Col de Voza in Switzerland, the Pyrenees and Calabria.

*β. pilosa.* Sepals three or four times as long as broad, slightly pointed, covered with nearly black hairs; base of the calyx hemispherical; petioles hairy, but without scales; leaves oblong or ovate-oblong, deeply cut into large slightly acute lobes; under side of the petiole and midrib dark red. (Pl. VII. fig. 2.)

I have only seen cultivated specimens of this variety obtained from the county of Clare in Ireland.

*γ. depressa.* Sepals twice as long as broad, blunt and rounded at the end, covered with red hairs; base of the calyx truncate, nearly flat; under side of the petiole as in var. *α*; leaves ovate, deeply cut into large rounded lobes; under side of the petiole and midrib green. (Pl. VII. fig. 3.)

I have gathered this plant on Ben Bulbin in the county of Sligo, Ireland, but have not seen specimens from any other place. Not having obtained recent flowers, I am unable to state the colour of the petals, but suspect that they have a considerable tinge of yellow.

Should the colour of the flowers of var. *γ*. prove to be different from that of the other plants, or the characters derived from the calyx remain constant (which I believe to be the case), I should feel myself justified in naming it as a species, and characterizing it as follows:—

*D. depressa.* Sepals twice as long as broad, blunt and rounded at the end; base of the calyx truncate and nearly flat; leaves crenate-serrate, obtuse. (Fig. 3.)

The character of *D. octopetala* would then stand as follows:—

*D. octopetala* (Linn.). Sepals three or four times as long as broad, more or less pointed; base of the calyx hemispherical; leaves crenate-serrate, obtuse. (Fig. 1. and 2.)

#### EXPLANATION OF THE PLATE\*.

PLATE VII. Fig. 1. *Dryas octopetala*, var. *α*.

*a.* One of the scales greatly magnified. Those represented upon the petioles in fig. 1. and fig. 3. are considerably larger than they are found in nature, in order to make them visible.

Fig. 2. Var. *β. pilosa*.

Fig. 3. Var. *γ. depressa* or *Dryas depressa* (nova species).

\* The figures being only intended for the illustration of the subjects treated of in this paper, all pubescence to which it has no reference is omitted.



XXIX.—*A Century of new Genera and Species of Orchidaceous Plants.* Characterized by Professor LINDLEY.

Decade 1.

1. *EULOPHIA filicaulis*; foliis . . . . ., scapo gracillimo paniculato, bracteolis pedicellis multo brevioribus, sepalis petalisque linearibus obtusis, labello oblongo apice trilobo basi in cornu brevi producto, laciniis lateralibus brevibus intermedia oblonga concava crispa intus lævi venis quibusdam paulo elevatis, anthera bicristata. *Mexico*, Karwinski in herb. reg. Monac.

A very slender graceful plant, with the flowering stem  $1\frac{1}{2}$  foot high.

2. *EULOPHIA dilatata*; foliis . . . . ., scapo stricto simplici, bracteis acuminatissimis ovario brevioribus, sepalis lanceolatis acutis, petalis paulo obtusioribus et latioribus, labello basi mutico biauriculato sursum dilatato obtuso: venis 5 basin versus lamellatis. *Mexico*, Karwinski in herb. reg. Monac.

Flowering scape more than 2 feet high. Sepals about three-quarters of an inch long.

3. *GOVENIA pauciflora*; foliis binis oblongis acutis scapo paulo brevioribus, racemo 7—8-floro, bracteis lanceolatis membranaceis pedicellis brevioribus, sepalis oblongis acutis, petalis labelloque intus lævi ovato-lanceolatis, antheræ mucrone recurvo. *Mexico, near Jesus del Oro*, Karwinski in herb. reg. Monac.

A very remarkable species, with short oblong acute leaves, and a few-flowered scape not much longer than themselves. The whole plant is little more than a foot high.

4. *ISOCHILUS cernuum*; caulibus cæspitosis filiformibus erectis, foliis teretibus obtusissimis, spatha terminali bivalvi, pedunculis elongatis, floribus cernuis, sepalis ovatis petalisque linearibus obtusis, labello concavo subtrilobo columnæ adnato apice carnoso acuto utrinque rotundato membranaceo, linea elevata in medio. *Mexico*, Karwinski.

The habit of this plant is that of *Isochilus globosum*, but its stems are nearly 6 inches high and stout in proportion, and the flowers are half an inch long: they seem to be yellow.

5. *SUTRINA* (Nov. gen. Vandearum). Perianthium cylindræum, clausum. Sepala coriacea, lateralia fere ad apicem usque connata, basi subsaccata. Petala membranacea, conformia. Labellum liberum, unguiculatum, supra basin medio elevatum, oblongum, concavum, indivisum. Columna basi teres, sursum dilatata, apice utrinque alis falcatis instructa; clinandrio antice bidentato. Anthera membranacea, semibilocularis, antice membrana lata circulari cristata. Pollinia 2, pyriformia, solida, caudiculæ lineari in glandulam longissimam setaceam incumbenti affixa.—Herba glabra epiphyta, pseudobulbosa, foliis solitariis coriaceis, spica multiflora pendula.

*SUTRINA bicolor*. Pseudobulbi parvi ovati. Folia 2—3 poll. longa, ovalia, subsessilia. Spica 3—4 poll. longa. Bracteæ breves squamæformes. Flores 7 lin. longi. Sepala oblonga apiculata apice recurva, verosimiliter viridia. Labellum apice rotundatum, crispum, luteum.

*Peru*, Matthews in herb. Hooker.

This very curious genus is probably related to *Macradenia*, but its habit and structure are in all respects very peculiar. The gland resembles a long bristle or cobbler's awl, and projects beyond the column, extending as far as its long falcate arms. The anther, which is globose where the pollen lies, is furnished in front with a broad circular crest.

6. *BOLBOPHYLLUM Napelli*; pseudobulbis conicis, folio oblongo obtuso, scapo 1-bifloro folii longitudine apice ipso sub flore bibracteato, bracteis setaceis inæqualibus, sepalis lateralibus dorsalibus galeatis ovatis acutis, petalis conformibus paulo minoribus, labello lineari obtuso unguiculato, columna basi utrinque in dentem acuminatum producta.

*Brazil*, Descourtilz, Miers.

A very singular species with a solitary flower, white with violet stripes, and about half an inch long. In form it much resembles the flower of *Aconitum Napellus*, which suggested to M. Descourtilz its specific name. The lip is white with green veins.

7. *BOLBOPHYLLUM tripetalum*; pseudobulbo tetragono, folio oblongo acuto racemo brevior, scapo 6—7-floro flexuoso erecto, bracteis ovatis scariosis ovario longioribus, sepalis linearibus acutis patulis, petalis minimis squamæformibus, labello ciliato unguiculato apice oblongo obtuso basi ima utrinque auriculato, columna 4-dentata.

*Brazil*, Descourtilz.

A good figure of this exists among M. Descourtilz's drawings. It is related to *B. saltatorium*, like which its lip appears to be delicately and elastically articulated with column. The sepals are pale yellow, three-quarters of an inch long. The lip is bright yellow with crimson spots. It is stated by its discoverer to be scentless and to cover whole trunks of trees.

8. *BOLBOPHYLLUM gladiatum*; pseudobulbo ovato tetragono, folio oblongo carinato spica longe pedunculata multo breviori, spica secunda multiflora, rachi subclavata, sepalis linearibus lateralibus connatis, petalis obovatis ciliatis limbatis, labello unguiculato cordato in processum angustum gladiatum villosum elongato, columna 4-dentata.

*Brazil*, Descourtilz.

A most singular plant, the appearance of whose flowers is thus described by M. Descourtilz:—"The upper sepal is very long, very narrow, channeled at its base, acute at the point, lemon-coloured, as well as the two lateral, which are joined by their edges into one, two-toothed at the point. From the position constantly assumed by the flower, these three sepals are placed right and left of the axis.

The petals are short, spathulate, touching at both base and point, leaving between them a heart-shaped space; they are white edged with purple, and fringed with purple hairs on their outer edge; in the middle is a large heart-shaped violet spot. The lip is hinged with the column, moveable, and consists of a channel with broad wings, white edged with purple, and of a very long process, shaped like a sword-blade hanging down, brownish and velvety with hairs."

9. *BOLBOPHYLLUM exaltatum*; pseudobulbo tetragono folio oblongo obtuso paulo brevior, scapo vaginato stricto longissimo (pedali et ultra), vaginis obtusis supremis laxioribus, spica multiflora, bracteis ovatis concavis acutis herbaceis, sepalis ovatis acuminatis, petalis oblongis ciliatis, labello obovato obtuso pubescente lamina elevata in medio, columnæ dentibus supremis cirrhosis, anthera mucronata.

*Guayana*, Schomburgk.

The leaf of this remarkable plant is not much more than an inch long, while the scape is more than a foot high. The flowers are purple, and half concealed by the large permanent bracts.

10. *BOLBOPHYLLUM bisetum*; pseudobulbis inverse pyriformibus, folio lanceolato basi angustato spica paulo longiore, scapi filiformis erecti vaginis 3 distantibus laxis acutis, spica densa brevi nutante, sepalis alte carinatis lateralibus connatis semiorbicularibus dorsali oblongo minore, petalis spathulatis unguiculatis, labello convexo linguiformi villosa basi cordato, columnæ dentibus setaceis, bracteis 2 filiformibus sub flore.

*Khasya*, Griffith.

A very singular little plant, with flowers as large as a small pea, and deeply keeled sepals. Under each flower is a pair of long filiform bracts.

XXX.—*Horæ Zoologicae*. By SIR W. JARDINE, Bart.,  
F.R.S.E. & F.L.S., &c.

No. V. *Description of some Birds collected during the last expedition to the Niger.*

WHEN in London during the month of July last, Mr. Waterhouse, being aware that I was anxious to receive information regarding the family of the *Nectariniadæ*, kindly placed at my disposal for examination a small collection of birds procured by Dr. Stanger during the last expedition to the Niger, and as all the productions of a country which has been so fatal to our countrymen in the prosecution of their philanthropic schemes must be of interest, and the collection moreover presents some specimens apparently undescribed, a short notice of them has been considered as having a claim to a place in our "Horæ."





NECTARINIA STANGERII.





NECTARINIA CHLOROPYGIA.





The entire collection contained only four species, three of which belong to the genus *Nectarinia* of Illiger; the fourth is the common green-banded cuckoo of Southern Africa.

*Chrysococcyx auratus*.—A single specimen only occurs, exhibiting an intermediate state of plumage. On the upper parts, although the metallic lustre of the feathers is present, nearly all the white markings of the adult bird are there of a pale orange-red: beneath, the chin, throat, and upper part of the breast are entirely of that colour, the centre of the feathers darker; while the remaining under parts are white, with the dark metallic barring of the adult, and slightly tinted with reddish.

*Nectarinia cyanocephala*, Shaw, 1812. (*C. chloronotus*, Swain.)—Three specimens of the male form part of the collection, not apparently differing from those obtained in other parts of Western Africa. In one the process of moulting has commenced, and shows that the dark steel-blue of the head and neck is exchanged after the breeding-season for the more sombre olive colour of the back, becoming paler on the throat and upper part of the breast.

*Nectarinia Stangerii*, Jard., 1842.—This bird, so far as we can ascertain, is an undescribed species; and we trust that those who are averse to the indiscriminate use of proper names as specific designations, will wave their dislike while we endeavour to place a record, alike upon an important expedition and the services of one on whom devolved the safe conduct of the party to its termination when almost worn out by disease\*. This interesting species belongs to those with dark plumage, soft and velvet-like to the feel, and having a coronal and gular patch of imbricated shining feathers. *N. amethystina* and *fuliginosa* may be considered as allied to it, and represent the artificial group. The Niger bird, of which there is a single specimen apparently in complete breeding state, has the upper parts, cheeks and sides of the neck of a yellowish umber-brown, with bright reflections when looked at between the light; the under parts are dark umber-brown, and when seen across in the same manner have the reflections purple; there are no coloured axillary tufts. The coronal patch extends from the bill to the line of the eyes, dark bluish

\* "From want of engineers we should have had to drop down the whole length of the river without steam, had not Dr. Stanger, the geologist, in the most spirited manner, after consulting Tredgold's work on Steam, and getting some little instruction from the convalescent engineer, undertaken to work the engine himself. The heat of the engine-room affected the engineer so much as to throw him back in his convalescence and prevent him from rendering any further assistance; but Dr. Stanger took the vessel safely below Eboe without anything going wrong with the machinery."—*Athenæum*, Jan. 29, 1842. *Letter of Capt. H. D. Trotter*.

green, varying in tint with the light, and terminating posteriorly in a narrow band of violet; the space between the eye and the rictus, with the chin, are intense black; from the base of each maxilla there is a short narrow stripe of bluish green, inside of which the throat and fore-part of the neck are bright yellowish green, terminated with a narrow band of steel-blue edged with scarlet. This is produced by the last row of brilliant steel-blue feathers, having the naked tips of the plumules produced of a bright scarlet, forming a narrow fringe on each, and appearing like a thread of that colour bounding the brilliant gular patch. Bill, legs and feet black. Length 5 inches; of the bill to the forehead,  $\frac{7}{10}$ ; of the wing to the end of the longest quill,  $2\frac{7}{10}$ .

*N. chloropygia*, Jard., 1842.—One specimen only occurred in the collection from Mr. Waterhouse, but we compared it with another in the possession of Dr. Stanger at Manchester, which corresponded with it. Its nearest connexion is with the *N. chalybeia*, for which it was at first mistaken; and while it presents considerable variations, it may still remain a question how far local circumstances may influence varieties, and also whether the birds from that part of the African coast continue constant in the markings, &c. which seem to separate our two birds. The distinctions are, a less size, and less proportional length of the wings and tail; the want nearly of the blue collar, that being indicated by a deeper green, slightly tinted with blue; by the under parts and flanks being pale oil-green, whereas they are broccoli-brown in the other; and by the upper tail-coverts being of the same brilliant green with the head and back, and not *rich violet-blue*, as in the bird from Southern Africa. We have not seen specimens of *N. chalybeia* from the western coasts of Africa to compare with those from the Cape of Good Hope, but it is not impossible that the bird which served for the description of the one so named in the 'Birds of Western Africa' may have been that now before us; and the "greenish tinge" on the narrow blue collar, and the "tail-coverts banded with greenish blue," almost lead us to believe that this has been the case.

In Le Vaillant's description of "Sucrier à plastron rouge" (*N. Afra*, Linn.), a bird inhabiting the forests of Auteniquoi is described as almost intermediate in colouring between *N. Afra* and *chalybeia*, the crimson band being less in breadth, and having all the red feathers transversely marked with lines of a rich golden green: by referring to the following description, it will be seen that this is in part the case with the species now before us.

In the bird from the Niger, the upper parts, wings and tail



excepted, are of a very rich emerald bronzed green; the wings and tail are brownish black, on the former the edges of the feathers being dull oil-green; the chin is deep velvet-black, shading into the neck and upper parts of the breast, which are similar in colour to the upper parts, and finish on the breast by a band of deep bluish green; this is succeeded by a crimson band nearly similar in extent to the same part in the *N. chalybeia*, and having the tips of the feathers on the upper part of it narrowly edged with golden green; while the belly, flanks, vent and under tail-coverts are of a pale oil-green; the ample axillary tufts are rather paler in tint than in its ally. The comparative dimensions of the Cape and Niger birds are—

	Cape.	Niger.
Entire length .....	$4\frac{6}{10}$	$4\frac{1}{10}$
Bill to forehead .....	$0\frac{7}{10}$	$0\frac{7}{10}$
Wing to longest quill .....	$2\frac{5}{10}$	$1\frac{9}{10}$
Tail from extremity of upper coverts ..	$1\frac{1}{10}$	$0\frac{7}{10}$
Tarsus .....	$0\frac{6}{10}$	$0\frac{5}{10}$

Since the preceding notes were sent to press, that party of the Niger expedition which remained with the view of again attempting the ascent of the river have returned to Britain, and we have been obliged by the attention of Mr. Fraser, the naturalist, for the examination of some *Nectariniadæ* procured during his sojourn at Fernando Po, among which are eight specimens of the male of our *N. chloropygia*. All of them agree exactly, and maintain the distinctions of colouring and proportions which are pointed out above as separating this bird from *N. chalybeia*.

Three specimens of the female accompany them, and they exhibit even greater differences. The plumage above is olive or yellowish oil-green (not broccoli-brown as in *N. chalybeia*) underneath; the chin is yellowish white; the breast of a deeper shade tinted with olive, and the centre of the belly is nearly gamboge-yellow, shading to a paler tint on the sides, flanks and under tail-coverts. The wings are umber-brown, having the feathers edged with yellowish oil-green; tail nearly black glossed with green, and having the two outer feathers tipped with grayish white. The entire length,  $4\frac{6}{10}$ ; bill to forehead,  $\frac{7}{10}$ ; wing to longest quill,  $1\frac{9}{10}$ . The short notes which Mr. Fraser's other duties enabled him to collect are also interesting as giving us insight into its habits:—"Very common in flocks of from twenty to fifty near the houses; the note short but sweet; perch on the long grass and branches of the small

shrubs." A female was procured breeding: the nest, made of grass, was pendent from the branches of a small bush; she alone was the architect, both carrying and weaving the materials; the male was not observed to assist in any way.

October 6, 1842.

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XXXI.—*Extracts from a Report on subjects connected with Afghanistan.* By Dr. GRIFFITH, F.L.S.\*

*General Nature of Afghan Vegetation.*

BEFORE entering on a few brief notices of those vegetable productions which are not cultivated, but which administer to the wants of the people, it may be as well to premise a few popular remarks on the general nature of the Afghan vegetation. No parallel can be drawn between the Afghan flora and that of India in any part; for even in the lower parts of the country, but very little elevated above the general level of our extreme N.W. provinces, the flora of Afghanistan is decidedly peculiar.

The transition commences, as may be said, along the Sutleje: on the Ferozepoor route it is gradual, on that of Shikarpore it is much more abrupt. At Peshawur, which is in north latitude  $34^{\circ}$ , and about 1200 feet above the sea, it is tolerably mature; still there is an intermingling of Indian species, and this continues, gradually becoming less, until one ascends to Gundamak.

In Kutch Gundava the Indian forms are less frequent; indeed it may be said that by the Ferozepoor route the Indian species encroach on the Afghan territory; in Kutch Gundava the Afghan species encroach on the Indian territory.

The Afghan transitional forms are various: *Boragineæ*, *Reseda*, *Chenopodiæ*, *Bertholletia*, *Farselia*, *Medicago*, *Butomus*, *Peganum Harmali*, *Nerium Oleander*, *Alhagi Marorum*? The Indian transitional forms consist of *Calotropis procera*, certain *Amaranthaceæ* and *Chenopodiæ*, certain *Saccharineous* and *Panicaceous* grasses, *Acacia*, *Arabica* and *pudica*, *Prosopis spicigera* and *Dalbergia Sissoo*.

To gain a just idea of the Afghan flora, we must compare it with that of the Levant, and perhaps with the greater part of the basin of the Mediterranean, with which it may be said to correspond in latitude. With the general flora of Persia it may be regarded as continuous.

Few things can be more striking or worthy of comprehensive investigation than this vast extent of the Mediterranean

\* From the Journal of the Asiatic Society of Bengal. No. 36. New Series.

or Australo-European botanical province. Dr. Falconer told me, that he had ascertained it to prevail a long way to the northward and eastward of Afghanistan; and I have materials for showing that it characterizes the country on the N. face of the Paropamisus, between Maimuna and Bamean; and from the mission of Meyendorff to Bokhara, to which my attention was directed by Sir A. Burnes, it is evident that it equally characterizes Bokhara, and the country between it and Orenburgh.

On this subject I shall enter into details in the purely botanical part of my report, which I shall have the honour of submitting with the arranged collection.

The striking features of the flora, as compared with India, are the scarcity, generally amounting to absolute want, of indigenous trees; a general poverty in variety of form; the general prevalence of forms characteristic of Southern Europe; the abundance of the large European families, such as cruciferous, umbelliferous, &c. plants, and of those forms of *Compositæ* known to botanists as *Cynarocephaliæ*, and of which thistles may be mentioned as familiar instances; the common occurrence of bulbous monocotyledonous plants, such as tulips, hyacinths, onions, &c.; the nature of its grasses, and the scarcity of *Orchideæ* and Ferns, which may be said to exist only in Eastern Afghanistan.

The number of aromatic plants, the prevalence of thorny species, and the very general occurrence of the flowering periods in the spring months, are also deserving of notice.

From almost all the forms being what are called European, it follows that no transition in form occurs consequent on variation of elevation, similar to that which has been so much noticed by all travellers in the Himalayas and other high Indian ranges. In this we are accustomed to associate height with the appearance of forms familiar to our earlier days. In Afghanistan it is not so, and it is remarkable enough that even the summer floras of its lowest parts, which have as high a mean summer temperature perhaps as any in the world, are still characterized by a majority of European forms. In high or in low, in hot or in cold situations throughout Afghanistan, forms characteristic of an European climate will be found to prevail. The traveller may pluck roses, pinks, hyacinths, sea-lavenders, kochias, eryngos, catchflies, flags, &c. at an elevation of 1000 feet, as well as of 10,000 feet. It would perhaps be difficult to find many generic forms characteristic of altitude.

Ordinary visitors would be likewise much struck with the circumstance, that a total change in the indigenous plants may



exist, while there is little or none in those cultivated. Thus at Cabul, where the winter is so severe, and where heavy snow lies for two or three months, and about which not an indigenous plant common to India perhaps is to be found, he will see Indian corn and rice cultivated with wheat and barley, rice perhaps forming the prevailing crop. We may see at Cabul the rice-fields bordered by poplars and willows, the aspen quivering over the nodding rice. This is easily accounted for: an approach to community of temperature may perhaps be found between the summer heat of Cabul and the winter and spring heats of the plains of India, which may explain the cultivation of wheat and barley. Between the summer heats of the two countries, there is likewise sufficient community to account for the cultivation of rice occurring in both in the summer.

*Brief notices on useful Plants occurring wild.*

The accompanying list will be found extremely meagre; but in the first place, the great bulk of the vegetation consists of the large European families, among which valuable products in the wild state are not extensively presented; and in the second, it is drawn up from memory chiefly, for even the casual overlooking of the herbarium, which is requisite to make it more complete, would delay one considerably in the forwarding of the report, and I may add, there is no probability of valuable information turning up to compensate for this.

Among monocotyledonous plants, that of the most use is, I think, the *maizurrye* of the Khyburs and Momunds. It is a small palm, and appears to be a *Chamærops*; perhaps the same as *C. humilis* of Southern Europe. Should it be distinct, I hope it may be allowed to bear the name of *C. Ritchiana*, after Dr. Ritchie, the only person who has explored the botanical productions of the Khybur Pass. This plant is extensively used in the manufacture of ropes or strings for the bottoms of charpaiees and of the sandals, so universally worn in the Momund and Khybur districts, and perhaps generally throughout lower Eastern Afghanistan.

Salep is to be found in the markets of Cabul, at a much lower price than in those of the N.W. of India. A species of *Orchis* is common in marshy places, high up among the Huzarah mountains, but I could not ascertain whether it was from this that Cabul was supplied. There is also an *Eulophia* in sand-islands of the Koonur river, from which salep may be derived.

Among the dicotyledonous plants, the umbelliferous family holds perhaps the highest rank, as affording valuable wild pro-

ducts. In Afghanistan, most of the fœtid, or aromatic fœtid gum resins, such as opoponax, assafœtida, ammoniacum, sagapenum, will probably be found. Of these the most important is the assafœtida, as it is largely exported, and consumed in the country as an adjunct to cookery. It was first announced as existing in the country, I believe, by Sir A. Burnes; it appears to be of general occurrence on the hilly tracts. Probably it is furnished by two species. At Metah, Capt. E. Conolly told me it was produced largely in the hot country of Seistan. He also informed me, that it was collected in conical pieces of paper, placed over a complete section of the plant, at the junction of stem and root.

As famous a plant as the assafœtida exists in the *Prangos pabularia*. In Afghanistan, however, it certainly does not merit the reputation which Mr. Moorcroft has recorded it possesses in some parts of Thibet. This plant is not uncommon on the Huzarah mountains, at an elevation of 9500 and 11,500 feet; but it is not used more, either as summer or winter fodder, than most of the plants possessed of any degree of succulence of the same districts. It is, as I have said, cut indiscriminately with thistles, docks, and a host of others, which would surprise an English farmer; this agrees generally with Dr. Falconer's experience.

The Maimunna, a Rhamnæous genus, is held in some esteem for its fruit, which for an uncultivated one is by no means unpleasant. It is common throughout the lower parts of Eastern Afghanistan; the fruit is a black berry of the size of a black currant, and of sweetish flavour. A much more esteemed fruit, which is sold commonly in the bazaars, is the *Goorgoora*, *Edgeworthia buxifolia*, Fal.: this plant was first found by Dr. Falconer about Peshawur, and by him was named after Mr. Edgeworth, a distinguished member of the Bengal Civil Service. Its natural characters are, as it were, intermediate between *Myrsinæ* and *Theophrasteæ*, tending likewise towards *Sapoteæ*. The fruit is roundish and succulent, about the size of a small marble; it is principally occupied by the seed, which is not eatable. I have not seen it fresh. It is considered heating by the Afghans, and this perhaps is the reason of its being common in the bazaars. The plant is generally a thorny shrub; it is common throughout the lower parts of the hills of Eastern Afghanistan.

The Sinjit, which is probably the *Elæagnus orientalis*, ought perhaps to have been enumerated among the cultivated fruit-trees; it is commonly planted along the banks of water-cuts, and is ornamental from its graceful crown and gray foliage.

The dried pulp of the berry is eaten, but it is much too sour for European taste.

The *Pistacia* occurs, Lieut. Sturt tells me, on the Hindoo Koosh, to a considerable extent; scattered plants of it are not uncommon throughout the mountainous parts of the country generally. It is a low tree; the seed constitutes the fruit, and is as much esteemed by the Afghans as almonds are by us.

Edible seeds, of a very pleasant flavour, slightly tinged with turpentine, are yielded by the *Chilghozeh*, a species of Pine; the seeds are, to all outward appearance, exactly like those of the Kunawur *Pinus Gerardiana*. They are eaten in considerable quantities, the supplies being derived from the Sofaid Koh.

Another wild fruit is yielded by the Umlook, a species of *Diospyros*; it also occurs in some gardens: it is not worthy of any notice.

One of the most celebrated plants in the country for its aromatic and stimulant properties is the Schnee, which may perhaps be a species of *Balsamodendron*. It occurs in the Kojuck range, and is to be met with, though not to such an extent, on most others.

Another famous plant is the Rhuwath, or Rhubarb, which, as it is also cultivated and in great request, ought to have been arranged with the vegetables. It is the only instance which evinces the knowledge of the Afghans of the value of etiolating or blanching certain plants. I have never seen it, not having been in Cabul in the spring. The wild plant, which I believe is the original of the cultivated one, is plentiful on the Kojuck range, and also on the Huzarah mountains up to an elevation of 11,500 feet. The leaves of this are used with others as winter fodder: the cultivated Rhubarb might easily be introduced into Simlah, Mussoorie and Darjeeling.

Several of the wild plants of Afghanistan are extensively used as fuel. Those in most common use about Cabul are species of *Artemisia* or wormwood, by some of our officers known as wild thyme; they are aromatic, camphorated, low shrubs, and some are eaten by camels. In the loftier districts great part of the vegetable fuel is furnished by the plants known generally by the name of Koollah-i-Huzarah, Huzarah's Cap. They form one of the most prominent features of the flora, occurring in dense, highly thorny, hemispherical tufts, as unpleasant to touch as the back of a hedgehog. Many species occur. To botanists they are known by the name of *Statice*.

Plants eaten by camels become, in such a barren country as



Afghanistan, invested with a good deal of importance. Generally such are not deficient; but one of the difficulties of the Bolan Pass is occasioned by their absence, and to a similar cause I attribute the great loss of camels on the return to India between Bookhak and Bala Bagh. Of these the most esteemed is the Ka-ri-Shootur, or Jaursa of the N.W., one of the most widely distributed plants occurring all over the N.W. of India, and all over Afghanistan, up to an elevation of 9500 feet. This plant is also known as affording the Turunjubeen, a sort of manna-like substance; the production of this appears to be local, and the only place I was told it was procured in Afghanistan was the Candahar district.

Perhaps the best other kinds of camel fodder are furnished by the *Chenopodeæ*, or Goose-foot tribe; these abound throughout the country, and are succulent and saline.

There is every probability of the true Tragacanth plants being found in the country, the section being one of the most common forms of *Leguminosæ*.

A species of *Daphne* not unlike *D. Cannabina*, the paper-plant of Nepal and Bootan, is not uncommon at elevations of 5000 to 6500 feet. The Afghans only make use of it in the construction of the matches for their match-locks.

Of the timber-trees of Eastern Afghanistan an extensive use is not made; the Baloot suffers most from being most accessible. The Zaitoon wood is remarkably heavy, sinking in water: it has a very close grain, and may be found to possess valuable properties. On the subject of forest-trees I have entered elsewhere.

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Since the above has been in type, we have received from our friend the Rev. M. J. Berkeley the following interesting extract from a letter of Dr. W. Griffith to Nees v. Esenbeck.

“Serampore, Oct. 11, 1841.

“I returned some months since from the country west of the Indus, whither I had accompanied the army during its campaign, and where I have been employed as naturalist a year after its departure. I have brought with me from 1700 to 1800 species of plants, besides a considerable collection of mammalia, birds, and fishes, of which the latter are now in course of being prepared for the Directors of the East India Company.

“The natural productions of Afghanistan are very different from those of British India, and approach much more nearly to those of the Levant, or more especially of those countries

which form the basin of the Mediterranean. With exception of the boundary line, which may be considered as identical with the course of the Indus, a mixture of forms occurs nowhere. *Gramineæ*, *Smilacinæ*, *Labiatae*, *Boragineæ*, *Synanthereæ*, *Leguminosæ*, *Cruciferae*, *Chenopodiaceæ*, are the prevailing families, as well in number of species as individuals. Beginning from the Monocotyledons I have numbered my collection to the *Labiatae* inclusive, and find so far 510 species, of which 250 are *Glumaceæ*, which is certainly a very high proportion. The great number of *Staticeæ*, most of which are very thorny, is another peculiarity of this flora.

"I intend on my return to England, which I expect will be certainly in two or three years, to publish not only these but the results of my other missions, and I should be glad if you would make known my intention on the continent.

"I feel confident that botanists will place me in a condition to work up, in accordance with the prospectus sent to you some months since, the materials which I have made such exertions to collect, and I hope that I shall bring to England matter for the work, not inferior even to that which, according to the latest information, has been amassed for the flora of Brazil. I shall with pleasure place at the disposal of those botanists who are engaged on monographs, or willing to undertake them, the whole of such parts of my collection as may be requisite; every notification however before my return must be necessarily imperfect, as the geographical relations of each species are known only to myself, and must be regarded as premature.

"I have just finished an essay on *Santalum*, *Osyris* and *Loranthus*. As regards *Santalum* there is much additional matter. *Osyris* is extremely remarkable: it has an embryo-sac analogous to that of *Santalum*, but the albumen and the embryo are formed exterior to it, and it enters not further into the composition of the seed. In *Loranthus* the embryo seems to me to be formed from the end of the pollen-tube, altogether without the intervention of an embryonic nucleus (Eychens).

"All my observations confirm the views of Schleiden, with the exception of the inversion of the embryo-sac by the pollen-tube, and *Loranthus* very especially favours his doctrine.

"I set out shortly for Malacca and remain there till my return to Europe. This is a new and rich field, and the climate is excellent."—*Linnæa*, vol. xvi. p. 286.

XXXII.—*Observations on the Rodentia.* By G. R. WATERHOUSE, Esq., Curator to the Zoological Society of London.

[Continued from vol. viii. p. 84.]

CONSIDERABLE time has elapsed since I commenced the publication of my classification of the *Rodentia*, the groundwork of which was derived chiefly from the characters furnished by the skulls; and during the somewhat long intervals which elapsed between the appearance of the separate parts of the paper, I am happy to find that several mammalogists have devoted their attention to the group, and more especially Prof. A. Wagner, who has published a classification of the order in the first part of Wiegmann's 'Archiv für Naturgeschichte' for 1841\*.

Prof. Wagner objects to my classification because all the families are not reduced to their proper limits, and because some have been discarded by me which require to be re-established; had I however completed my paper, and certain families had then been left uncharacterized, part of this objection would have had more force.

The first family (*Pedimana*), according to Prof. Wagner's classification, I should not have attempted to characterize, because the single animal upon which the family is founded I have always regarded as a member of a different order—I allude to the *Cheiromys Madagascariensis*.

The second family (*Sciurina*), the third (*Myoxina*), and the fourth and fifth families (*Macropoda* and *Chinchillina*) agree perfectly with four families characterized by myself. Again, as regards our views of the contents of the family *Murina*, I find no essential difference. Prof. Wagner places in this family a few genera with the characters of which I was not sufficiently acquainted, and for that reason I omitted to introduce them.

Beyond the several families above mentioned, and the *Bathyergidæ*, none have yet been characterized in my paper.

The remaining families, according to Prof. Wagner's classification, are, *Psammoryctina*, *Cunicularia*, *Castorina*, *Hystri-cina*, *Subungulata*, and *Duplicidentata*. The genera *Lepus* and *Lagomys*, which constitute the last-mentioned family, afford such strongly marked characters, that in my tabular view of the geographical distribution and classification of the Rodents†, I was induced not only to form a family under the name *Leporidæ*, for their reception, but to regard them as constituting a section of higher value.

\* See also Annals, vol. viii. p. 50.—ED.

† Published in the Proceedings of the Zoological Society for Nov. 1839.



The *Psammoryctina* of Prof. Wagner I have long regarded as a natural group, and the genera of which it is composed were originally thrown together in the table before alluded to. The principal characters which induced me to remove those genera from other groups in which they had previously been placed, are pointed out in the introductory observations to my paper on the Rodents published in the 'Magazine of Natural History' for February 1839.

In the table published in the 'Proceedings,' however, there are two genera which are placed in juxtaposition with the others composing Prof. Wagner's family *Psammoryctina*, and which that author does not include in the family; I allude to the genera *Dasyprocta* and *Cælogenys*; on these I shall have to make some observations hereafter, as well as upon the little section of the family last mentioned, to which I gave the name *Octodontidæ* in the 'Zoology of the Voyage of the Beagle.'

The tenth family of Prof. Wagner's classification, the *Hystricina*, I have with most other naturalists regarded as a natural group, and have restricted to the same limits in the table.

The remaining three families, according to the distribution of the Rodents under consideration, are, *Cunicularia*, *Castorina* and *Subungulata*; under these three heads Prof. Wagner has grouped together various genera, as it appears to me, in an unnatural manner.

Before however I proceed to the consideration of this portion of the subject, which is the chief object of these observations, I may perhaps be permitted to take a short review of my arrangement of the order.

At the head of the Rodents are placed the Squirrels (*Sciuridæ*), which have the largest cranial cavity, the smallest development of the facial bones, and the most perfect palate; the sphenoids are broad and well-developed, and the posterior openings for the transmission of nerves from the brain are proportionately small.

In the highest mammals (*Quadrumana*) it is that we find the most perfect bony orbit for the eye, and it is in the *Sciuridæ* among Rodents that we find the orbit also most perfect. In their frugivorous diet and arboreal habits they may also be compared to the *Quadrumana*. In their dentition, moreover, the present animals evince a superiority over their congeners.

The extremities of the Squirrels are fitted for climbing and running, and their clavicles are well-developed. They differ from nearly all other Rodents in wanting a character which is observable only in this order;—I allude to an ant-orbital opening for the transmission of a portion of the masseter muscle.

The small opening in the superior maxillary bone of the *Sciuridæ* forms only a passage for the infra-orbital nerve, which in most other Rodents passes through together with the portion of the masseter muscle before alluded to. In the Hystricine section of Rodents (the *Hystricidæ*, *Echimyidæ*, *Caviidæ*, &c. &c.) the ant-orbital opening is very large, whilst in the Murine group it is moderate or small, opens obliquely upwards, and is almost separated from the opening for the nerve, which passes through a narrow slit situated below the opening for the muscle, though joining it: here we have a condition which is intermediate between the structure observable in the *Sciuridæ* and the Hystricine section.

It is in the Murine group that we find a tendency to carnivorous habits, and it is in the groups of Rodents following the *Murina* that we find the most truly herbivorous species, accompanied often by an inferiority of powers in the extremities. In fact, we find the most ruminant-like Rodents in the Hystricine section, the most carnivorous species in the *Muridæ*, and the most monkey-like in the *Sciuridæ*. Thus, in the *Rodentia* we find analogues at it were, or representatives of other great divisions of mammals\*.

The *Leporidæ* afford the greatest contrast to the *Sciuridæ* observable: here the portion of the skull devoted to the protection of the brain is very small, and the facial portion large; the palate is most imperfect and leaves exposed the sphenoids, the bodies of which, instead of being large and expanded as in the Squirrels, are remarkably contracted, and the openings for the transmission of the nerves are large. In the large orbits, separated but by a narrow bony septum, the large and united optic openings, imperfect palate, and narrow bodies of the sphenoids, we are strongly reminded of the bird's skull.

In the *Caviidæ* and *Chinchillidæ* we find the nearest approach to the structure of skull and dentition observable in the *Leporidæ*; there is nevertheless much difference; this present family is in fact the most isolated among the Rodents.

As regards the families, defined in the 'Magazine of Na-

\* A similar system of representation is frequently observable in natural groups. It is so strongly marked in the *Marsupialia*, that it has given rise to the belief with some naturalists that that is not a natural group, but is made up of members of other orders. I regard it as an error of the same kind which has led to the separation of the Sloths from the *Edentata*, and the grouping of those animals with or near to the *Quadrumana*, and the separation from the last-mentioned group of the *Galeopithecæ* and the *Cheiromys*—placing the former with the *Cheiroptera*, and the latter with the Rodents.

tural History' and in the 'Annals,' it appears to me that there are some which are open to objection. I cannot feel a doubt but that the several genera associated under the heads *Sciuridæ* and *Muridæ* are naturally grouped. On the other hand, I think upon more mature consideration that the group *Arvicolidæ* requires revision. In the first place, I do not consider it as a group of equal value with the *Sciuridæ* or *Muridæ*\*. The genera *Ondatra*, *Arvicola* and *Lemmus* of authors are undoubtedly most closely allied; indeed the first and last of these so-called genera might perhaps, without impropriety, be regarded as subgenera or sections of the genus *Arvicola*. The animals composing these groups have all the essential characters of the *Muridæ*, but differ in having rootless molars and in the form of the lower jaw. They have, moreover, some peculiarities in the structure of the cranium, which have been pointed out.

Here all the characters alluded to are combined, with three true molars, the normal number in the *Muridæ*, and may be conveniently used to define the *Arvicolina* as a subfamily of that group. In my paper on the *Arvicolidæ* I had placed in that section, besides the three genera above mentioned, two others, *Ascomys* and *Castor*. These genera M. Gervais is of opinion should be arranged,—the former next the *Sciuridæ*, and the latter in that family. According to Prof. Wagner, the genus *Castor* is associated with *Myopotamus* under the family title *Castorina*, and the genus *Ascomys* forms part of his family *Cunicularia*,—a family which, in my opinion, is made up of various groups of Rodents: they all burrow in the ground, and being fitted for that habit, they have a certain superficial resemblance, as is also the case with the *Myopotamus* and the Beaver, both being aquatic animals†. With M. Gervais' views I am more inclined to agree: the two genera under consideration are undoubtedly members of the great Murine section, and certain points of resemblance in the form of the skull and lower jaw induced me to place them in the Arvicoline group. In the bony palate of *Ascomys* and *Arvi-*

\* See the 'Annals of Natural History' for October 1841, vol. viii. p. 83.

† Among the Rodents there are five truly aquatic species, (besides others which take to the water, more or less,) the Beaver, the *Ondatra*, the *Hydromys*, the *Myopotamus* and the *Hydrochæres*; the second belongs to the *Arvicolina*; the third is nearly allied to *Mus*; the fourth approaches closely to the genera *Echimys* and *Capromys*; the last is essentially a Cavy, whilst the first differs from either. In nearly every family of Rodents there are burrowing species, and many possess aquatic, climbing and burrowing species. Such facts are most common in various groups of animals.



*cola* there are some peculiarities which also had considerable weight in my determination to place those genera near to each other, inasmuch as the characters alluded to I have found in no other Rodents. On the other hand, the situation of the ant-orbital opening, and its small size, combined with the number of the teeth ( $\frac{4-4}{4-4}$ ) and their simple form, render it desirable to raise the *Ascomys* group to the rank of a subfamily. The genus *Castor* is likewise somewhat isolated; and may be regarded as a subfamily. Whether these two little sections be an offset, as it were, from the *Muridæ* or the *Sciuridæ*, is difficult at present to determine; they both want the post-orbital process to the temporal, which runs through the *Sciuridæ*; but the genus *Aplodontia* forms a connecting link to a certain extent, having rootless molars, wanting the post-orbital process, but at the same time possessing the small fifth molar in the upper jaw, placed in front of the others, which is found in no other Rodents excepting the *Sciuridæ*. The *Aplodontia*, moreover, in the form of the lower jaw, evidently links itself with the burrowing *Sciuri*. With respect to the *Myoxidæ* and *Gerboidæ* I have nothing further to add; they are well-marked sections, and it appears to me their characters cannot better be indicated in a classification than by placing them between the *Sciuridæ* and the *Muridæ*. On one point, however, I cannot quite satisfy myself, and that is the rank of these two sections,—whether they ought to be regarded as families or subfamilies. The former I am of opinion has most claim to be regarded as a family; the latter will probably merge into the *Muridæ*, and it will then be desirable to regard it as a subfamily, distinguishable by the large size of the ant-orbital opening to the skull, &c.

A very interesting new rodent, brought from Fernando Po by Mr. Fraser, naturalist to the Niger expedition, and described by me, under the name *Anomalurus Fraseri*, at the meeting of the Zoological Society for Sept. 27th, 1842, affords an interesting link, in some of its characters, between the *Myoxidæ* and the *Sciuridæ*. This animal,—which has the external appearance of a *Pteromys*, a very delicate and soft fur of a sooty colour on the upper parts of the body, freckled with yellow, and whitish beneath, and is remarkable for having on the under side of the basal third of the tail a double longitudinal series of large horny scales, with prominent angles, used by the animal to support itself on the trunks of the trees on which it lives,—has a skull nearly agreeing in general form with the Squirrels, but wanting the post-orbital process, and, what is moreover interesting, has a comparatively large ant-orbital opening, as in the *Myoxi*. The palate is contracted in

front between the molars (which are permanently  $\frac{4-4}{4-4}$ ), and is rather deeply emarginated behind\*.

Among the *Muridæ* is a tolerably well-marked section, at present limited in number of species, but to which I anticipate many novelties will be added, especially from those portions of the old world which lie between 30° and 40° north latitude, of which the genus *Spalax* may be regarded as the type, and which might conveniently be raised to the rank of a subfamily under the name *Spalacina* or *Aspalomyina* †. Agreeing essentially with the *Muridæ*, the *Aspalomyinæ* are distinguishable by the comparative great breadth of the skull, the absence or almost total absence of the vertical slit, through which in the typical *Muridæ* the infra-orbital nerve passes, and which is defended by a nearly vertical thin bony plate; and, moreover, by the equal size of the molar teeth. In this subfamily should be arranged *Spalax*, or *Aspalomys*, *Heterocephalus* (Rüppell) and *Rhizomys*.

The above families and subfamilies will therefore, according to my views, be thus arranged:—

Family 1. SCIURIDÆ; containing the genera *Sciurus*, *Pteromys*, *Sciuropterus*, *Xerus*, *Tamias*, *Spermophilus*, and *Arctomys*.

*Aberrant forms.*

Wanting post-orbital process to the frontals.

*a*, with large ant-orbital opening, and the palate contracted between the anterior molars.

\* with rooted molars  $\frac{4-4}{4-4}$  ..... *Anomalurus*.

\* From the same collection three new species of squirrels were also described by me. One, to which I gave the name *Sciurus Stangeri*; a species larger than the common squirrel, with coarse fur, freckled with black and yellow on the upper parts of the body; the abdomen very sparingly clothed, and the tail very large and bushy—also presents an interesting modification in the structure of the skull; this is unusually long, and has the ant-orbital outlet remarkably short, opening directly through the bony plate which forms the anterior root of the zygomatic arch, and not placed far forwards, and in the form of a canal, as in other squirrels which I have examined. The other two new squirrels, which were named *Sc. rufo-brachium* and *Sc. leucogenys*, are of less interest: the former resembles the *Sc. annulatus* of authors, but is rather larger, of a richer colour, and has the posterior part of the fore- and hind-legs fringed with rusty-red hairs. The *Sc. leucogenys* is of a rich brown colour above, (a tint produced by the admixture of black and rich yellow, the hairs being freckled with the latter colour,) white beneath; has the tail chiefly of a black colour, but the hairs tipped with white, and red at the base; the mesial portion of the tail beneath is, moreover, bright rusty-red; the sides of the face, as the name implies, are white. It is about equal to the common squirrel in size.

† It appears from some observations by M. Gervais ('Voyage de la Bonite') that the name *Aspalomys* of Laxmann has priority of date over that of *Spalax*, given by Guldenstedt, in which case I should take the name of the subfamily from the older name as well as that of the genus.

b, with small ant-orbital opening.

\* with rootless molars  $\frac{5-5}{4-4}$  ..... *Aplodontia*.

[Aberrant forms of *Sciuridæ*?]

\*\* with rootless molars  $\frac{4-4}{4-4}$ .

1. Folds of enamel to the molars simple ..... *Ascomys*.

2. \_\_\_\_\_ complicated..... *Castor*.

Family 2. MYOXIDÆ. Genera: *Myoxus*, *Eliomys*, *Muscardinus*, and *Graphiurus*.

Family 3. DIPODIDÆ†. Genera: *Dipus*, *Alactaga*, and *Meriones*.

Family 4. MURIDÆ. Genera: *Gerbillus*, *Psammomys*, *Mus*, *Hesperomys*, *Dendromys*, *Phlæomys*, *Cricetomys*, *Cricetus*, *Euryotis*, *Hapalotis*, *Reithrodon*, *Sigmodon*, and *Neotoma*.

Subfamily 1. *Aspalomyina*. Genera: *Rhizomys*, *Aspalomys*, and *Heterocephalus*.

Subfamily 2. *Arvicolina*. Genera: *Ondatra*, *Arvicola*, and *Lemmus*.

[To be continued.]

*See p 346*

XXXIII.—*Description of a new species of Genetta, and of two species of Birds from Western Africa.* By T. R. H. THOMSON, Esq., R.N., Surgeon of the late African Expedition.

AMONG the various specimens of natural productions which I collected during the late expedition is a new species of *Genetta*, differing very remarkably in colouring from the other species of this African genus. I received it from the Bobys or natives of the island, and they had skinned it through the mouth without making any other incision in the skin.

I have taken the opportunity of naming the *Genetta* after my friend Dr. John Richardson, the Inspector of the Naval Hospital at Haslar, so well known for his highly scientific acquirements, and so much esteemed in the naval service by all his medical brethren.

I may mention, from its being interesting as showing the wide geographic range of the animal, that I have brought home with me a large kind of cuff or arm-shield formed of the skin of *Colobus Guereza* of Rüppell, which has hitherto only been found in Abyssinia, where, according to Peirce, as quoted in the 'Synopsis of the Contents of the British Museum,' the skin is used for the same purpose. The cuff, which consists of the greater part of the back with the white stripe, differs from Dr. Rüppell's specimen of the animal in the British

† To attain uniformity of system,—taking the name of the family from one of the principal genera it contains,—I have thought it desirable to substitute the name *Dipodidæ* for *Gerboidæ*.



Museum, in the white band being considerably broader, and not furnished with quite such long hair.

*Genetta Richardsonii*, Richardson's Genette.—Rich fulvous; three streaks on the nape, numerous unequal spots on the back, side of the neck, sides and limbs, and twelve bands on the tail black; nose gray; feet grayish fulvous, scarcely spotted; legs, cheeks, throat, middle of the chest and belly and the inner side of the limbs brighter fulvous, especially on the hinder part of the abdomen; whiskers black, lower ones whitish; the pad of the toes is hairy; hair of the middle toes fulvous, of the rest gray; the central pad of all the feet bald, and the hinder foot with a narrow bald line extending nearly to the heel, like the typical *Genetta*.

Length, body and head,  $13\frac{1}{2}$ ; tail,  $12\frac{1}{2}$  inches.

*Hab.* Fernando Po.

I have sent the specimen of the *Genetta* and the fragment of the skin of the *Guereza* to the British Museum collection. I shall now proceed to describe two birds which appear to be new.

*Tchitrea atrochalybeia*. Deep shining steel-black, with the base of each feather dull black; quills and tail black, margined exteriorly with steel-black.

Length, total,  $9\frac{1}{2}$  inches; bill,  $\frac{3}{4}$ ; wing,  $3\frac{1}{4}$ ; tarsi,  $\frac{5}{4}$ ; tail, middle feather,  $5\frac{3}{4}$ ; the next exterior one,  $3\frac{1}{4}$ .

*Hab.* Fernando Po.

*Porphyrio Alleni*. Head and neck black tinged with blue; back and wings greenish olive, tinged on the rump with bluish black; beneath the body indigo-blue; bill crimson; frontlet blue; legs and toes yellow.

Length, total,  $11\frac{1}{4}$  inches; bill,  $1\frac{1}{4}$ ; wing  $6\frac{1}{2}$ ; tarsi, 2 inches and 1 line.

*Hab.* W. Africa, Idda, near the confluence of the river.

Mr. Gray, who kindly assisted me in determining these species, informs me, that besides the above, there has been recorded as found in Fernando Po the following species of Mammalia and Reptiles:—*Colobus Pennanti?*, *C. Satanas*, *Cercopithecus Martini*, *C. erythrotis*, *Galago Alleni*, *Rhinolophus Landeri*, *Genetta Poensis*, *Lutra Poensis*, *Mus Alleni*, *Antelope Ogilbii*, *Chameleo Oweni (tricornis)*, *Ch. cristatus* and *C. Bibronii*, and *Crocodylus Leptorhynchus*.

There are doubtless several others, and it is to be remarked that most of the animals found in the islands are different species to those found on the continent.

I have several new species of squirrels, especially a flying squirrel with scales under the tail; and a new species of antelope, and several new species of birds, which it is my inten-

tion to describe as soon as my packages arrive from Plymouth. These, with those above described, will be deposited in the British Museum; the fish which I collected I have sent to Dr. Richardson at Haslar.

October 15, 1842.

### XXXIV.—*Information respecting Scientific Travellers.*

MR. FORBES.

A FRIEND in Belfast informs us that he has received a letter from Mr. Forbes, dated Smyrna, H.M.S. Beacon, Sept. 9, 1842, in which he says, that the grant allocated by the British Association for dredging in the Red Sea “determines me to take Egypt on my way back, and I shall start for Alexandria soon, regulating my movements so as to be in England during the early part of January.” It would seem to be time for him to try new ground, as he observes, “Though at work every day, I now so seldom get any species of the Mollusca, Radiata, or Fish which I have not already, that it seems as if I had pretty nearly got through the treasures of the Egean.” He speaks of his fever having interfered sadly with his botanical hopes, but that he had previously collected in Lycia 800 species of Phænogamic plants, and remarked many interesting facts connected with a number of them, more especially with reference to their distribution. As he is silent respecting his health, it may be presumed that he was at the date of his letter perfectly recovered.

J. LINDEN.

The young Belgian naturalist and collector, J. Linden, has recently undertaken a second journey into South America, and intelligence of his present movements has been received to the date of April 1842, with an announcement of the despatch of his first consignment of dried plants. These have since arrived in the best possible condition, and contain some which are highly interesting (a large proportion of them ferns), and they are already in the hands of his subscribers. The sets contain 170 species. Additional subscribers are invited to join those who have already engaged for these plants; and, in order to judge for themselves, botanists who wish to do so can have the opportunity now of inspecting this series just distributed. Each plant is accompanied by a printed and numbered label. The price is fixed at 2*l.* per hundred plants, and there are no extra charges for expense of freight, &c., if application be made direct to M. Linden's London agent.

M. Linden writes thus:—“After many difficulties and a most protracted and stormy passage, I am at length arrived at this first stage of my intended Colombian expedition (*viz.* La Guayra). Before striking inland from the coast, I intend to investigate the chain of mountains which border these shores, profiting by the time of year (winter), this being the only season when one can with safety traverse these very unhealthy coasts.”

Under date Caracas, April 28, 1842, he also writes :—" I have just sent off for you to distribute to my respected subscribers the first-fruits of my journey, viz. plants collected in the province of Caracas ; they comprise about 170 species, and will, I trust, be found to contain objects of some interest, particularly the ferns ; I hope also in tolerable condition, notwithstanding the very unfavourable season we have had, the drought having now lasted for these five months. The ferns are numerous, and I think interesting ; they are for the most part from the Silla de Caracas ; very shortly I intend to leave this province altogether, directing my steps towards the High Cordilleras which cross the provinces of Truxilla and Merida, where I shall continue my researches during the remainder of this year at least, and thence proceed into New Grenada."

It may be as well to add, that M. Linden's former collections from Southern Mexico were extremely good, and, with those who have seen them, have established his character as a first-rate collector. It is intended to enumerate these plants somewhat in the same manner as Mr. Bentham has done the plants of Hartwig, the Horticultural Society's Collector.

Mr. Bentham has devoted one of his new Mexican genera to M. Linden, *Lindenia* (a genus belonging to the *Rubiaceæ*), and some species are also described and figured in Sir W. J. Hooker's 'Icones Plantarum.'

#### BIBLIOGRAPHICAL NOTICES.

*Histoire Naturelle des Isles Canaries.* Tome Troisième, Deuxième partie, *Plantes Cellulaires.* Par Camille Montagne, D.M.

THE Cryptogamic part of this splendid work being now complete, we are anxious, on account of its very great merit and usefulness, to give an early notice of it. The cryptogamic vegetation of the South of Europe and the Northern African isles in many respects so strongly resembles that of many parts of our own country, that any well-executed work relating to them cannot fail to be of especial interest even to those whose attention is principally confined to indigenous productions. So much care has been taken in the drawing up of the specific characters, the selection of synonyms, and the general illustration of species, that it cannot be consulted without advantage. The number of new species indeed, though considerable, by no means forms the only point of interest. In one department, that of Fungi, the materials which have been available by the author have been so scanty, consisting almost entirely of sketches, unaccompanied by notes, that curiosity is rather excited than satisfied.

The number of species of Cryptogams detected in the Canaries amounts almost to 500, but this can by no means be regarded, even exclusive of the Fungi, as anything approaching to a complete list. There is not a single *Verrucaria* or *Opegrapha* in the collection, which probably exist in considerable numbers. Of *Sphæriaceæ* there are but three species. The cryptogamic vegetation, as might be expected,



proves to be nearly that of the South of Europe, especially of the more southern European islands, as, for instance, Corsica and Sardinia. In a second degree there is a resemblance to that of Northern and Western Africa, even as far as the Cape of Good Hope, and in a third degree to that of the coasts of Portugal, France, and England. Some species are peculiar to the Canaries, though their types exist in Europe; others have been met with only in isolated points of Europe, Africa, or the Cape de Verd Islands.

Thus *Astrodonium canariense* has been gathered in Madagascar, *Frullania hispanica* in Asturias, *Plagiochasma Aitonia* in the Ionian Isles, *Riccia ciliifera* in Portugal, *Leptogium Burgessii* in Britain, *Leptogium ulvaceum* in the Marianne Islands, *Leptogium Brebissonii* in the west of France, *Capea biruncinata* on the coast of Cape Verd and Chili, *Caulerpa clavifera* in the Red Sea, and *Anadyomene stellata* in Brazil, the Mediterranean, and Adriatic.

The new species described are, *Hypnum Teneriffæ*, *Berthelotianum*; *Hookeria Webbiana*, *Leptodon longisetus*, *Glyphocarpus Webbii*, *Lophocolea Preauxiana*, *Frullania nervosa*, *Fimbriaria Africana*, *Agaricus Webbii*, *Coprinus spiralis*, *pilulifer*, *Plutonium*; *Cortinarius tricolor*, *Boletus Preauxii*, *Clavaria Rhodochroa*, *Morchella dubia*, *Pattellaria nitida*, *Phallus canariensis*, *Polysaccum tinctorium*, *Puccinia Atropæ*, *pseudosphæria*; *Æcidium Atropæ*, *Uredo Frankeniæ*, *Kleinia*, *microcelis*; *Evernia scorigena*, *Ramalina Webbii*, *decipiens*; *Solorina Despreauxii*, *Parmelia holophæa*, *Halymenia cyclocolpa*, *capensis*; *Dumontia canariensis*, *Dasya acanthophora*, *Polysiphonia myriococca*, *nutans*; *Griffithsia Argus*, *Callithamnion ellipticum*, *Anadyomene calodictyon*, *Conferva pachynema*, *enormis*; *Lyngbya*? *cantharidosma*, *Chroolepus ianthinus*, *Rivularia cerebrina*, *monticulosa*.

The greater part of these species, and some others not absolutely new, are illustrated by the most admirable figures, as are also two new genera of Algæ, *Capea* and *Asparagopsis*; nor must we forget to notice the admirable analysis of *Caulerpa*. A species closely allied to *Anadyomene calodictyon* has been raised to the rank of a genus by Decaisne, under the name of *Microdictyon*. On this subject the author remarks in a letter lately received, "Nul doute que son *Microdictyon* ne soit un bon genre, reste à savoir si mon *Anadyomene calodictyon* peut y entrer sans modification des caractères. Notez que Decaisne dit positivement (et cela est vrai pour l'*Hydrodictyon umbilicatum* d'Agardh), qu'il n'y a aucun trace de ces cellules disposées en éventail qui distinguent l'*Anadyomene*. Or l'*A. calodictyon* est parfaitement intermédiaire en ce qu'il présente ces veines régulièrement flabellées et qu'il est dépourvu de la membrane que les rélie entre elles. Ou il faut modifier les caractères génériques du *Microdictyon*, ou il faut faire un troisième genre."

*The London Journal of Botany.* By Sir W. J. Hooker, K.H., &c. &c.  
No. 7, July 1842, to No. 10, Oct. 1842.

Contents:—Notes on *Mimosæ*; by G. Bentham, Esq. (contained in Nos. 7, 9, 10).—Botanical Information (Nos. 7, 8). [The death

of Mr. Alexander Matthews, at Chachapoyas, on the Andes of Peru, is here recorded. This lamented botanist is well known to our readers as having been a most indefatigable and successful collector of plants in Chili and Peru.—A Letter from Mr. Jas. Drummond on the Botany of Swan River, in Western Australia.]—Boissier on Spanish Botany (No. 8.).—Notice of the life and labours of A. Guillemin, M.D. (No. 8.).—Observations on the genus *Hemitelia*; by G. Gardner, Esq. (No. 8.).—Observations on a new species of *Eriocaulon*, from Brazil; by G. Gardner, Esq. (No. 8.).—On *Oakesia*, a new genus of *Empetrea*; by E. Tuckerman, Esq. (No. 8.).—Descriptions of *Fungi*; by the Rev. M. J. Berkeley, M.A. (Nos. 8, 9.).—On two S. American species of *Chrysanthemum*; by Sir W. J. Hooker (No. 9.).—Contributions towards a Flora of S. Africa; by Prof. Meisner (No. 9.).—On the Vegetation of Hong Kong, by R. B. Hinds, Esq.; and an enumeration of the plants collected, by G. Bentham, Esq. (No. 9.).—Contributions to a Flora of Brazil; by G. Gardner, Esq. (No. 10.).—Botanical Excursions in S. Africa; by C. J. F. Bunbury, Esq. (No. 10.).

*The Phytologist : a Botanical Journal.*

No. 14, July 1842, to No. 17, Oct. 1842.

Contents:—Notice of the Linnæan Transactions (contained in No. 14.).—List of *Jungermanniæ*, &c. observed near Dumfries; by Mr. Jas. Cruickshank (No. 14.).—Notes on the genus *Utricularia*; by the Rev. J. B. Brican (No. 14.).—Varieties (Nos. 14, 15, 16, 17.).—Proceedings of Societies (Nos. 14, 15, 16, 17.).—History of the British Equiseta, *E. hyemale*; by Edw. Newman, Esq. (Nos. 15, 16, 17.).—List of Plants observed near Manchester; by Dr. Wood (No. 15.).—Notice of Transactions of Botanical Society (Nos. 15, 16, 17.).—On the authority upon which several plants have been introduced into the 'Catalogue of British Plants' published by the Botanical Society; by Charles C. Babington, Esq. (No. 16.).—On the nature of the Byssoid substance found investing the roots of *Monotropa Hypopitys*; by T. G. Rylands, Esq. (No. 17.). [In this valuable paper the author shows that this substance consists of four species of *Fungi*, which are named, described and figured.]

PROCEEDINGS OF LEARNED SOCIETIES.

BOTANICAL SOCIETY OF LONDON.

Sept. 3, 1842.—John Reynolds, Esq., Treasurer, in the Chair.

Mr. B. D. Wardale presented numerous specimens of *Lastrea cristata* (Presl), collected at Bawsey Bottom, near Lynn, Norfolk. Mr. Thomas Twining, Jun., exhibited a large collection of cultivated specimens from Twickenham.

A paper was read from Mr. R. S. Hill, being "An Inquiry into Vegetable Morphology."

Morphology is that division of botany which takes cognisance of

the various changes which occur in the condition of the vegetable organs ; both such as are normal, as the transmutation of leaves into the several floral organs, as well as such as are abnormal, and occur only accidentally.

Taking the above as the definition of the subject, we immediately see its divisibility into two heads ; the first of which treats of regular metamorphoses which are connected with the natural structure of all vegetables ; while the second includes those irregular or accidental metamorphoses which result from an imperfect or redundant performance of the several changes noticed under the first head.

These last influence particular plants or parts of plants, and occur only in occasional instances. To this division belongs the consideration of double and other monstrous flowers.

*Of regular metamorphoses.*—The great principle of regular morphology is, that the various floral organs are but modifications of one common type, which is the leaf.

Lindley endeavours to give Linnæus the credit of having been the author, or at least of having suggested the idea of this great fundamental principle, and in proof of this opinion quotes passages from his 'Systema Naturæ' and 'Prolepsis Plantarum,' in which the theory is imperfectly hinted at. At his suggestion the subject does not appear to have been taken up ; nor was it at all until Goethe published in 1770 his work 'On Vegetable Metamorphosis.' With a knowledge of the character of his poetical writings, it hardly need excite surprise, that botanists of the day should have been sceptical on a subject so new, and at first sight so opposed to the dictates of common sense. By the appearance of this work however the attention of botanists appears to have been roused to the subject, and the result of their investigations tended to confirm the correctness of his views.

Leaves are in many instances entirely wanting, or exist only in the degenerated forms of scales and spines. In these cases there is hardly any part of a plant which is not susceptible of being modified and rendered capable of performing the functions of leaves. For this purpose we find the excessive development of the stem which obtains throughout lactaceous plants ; also the stem is furnished with leafy wings or expansions which run down its sides, as is seen in *Acacia ciliata*, &c. The petiole, in the form of the *Phyllodium*, frequently takes upon itself the office of the leaf, as in most of the Acacias from New Holland. The same functions are frequently discharged by the peduncle, as in *Ruscus*, *Asparagus*, &c. ; and this appears to be the true character of the leafy organs of ferns, the true leaves of which exist in the degenerated form of scales, known by the name of ramenta.

The calyx consists of a series of leaves arranged in a whorled manner round the axis, either distinct, or more or less combined, according to the character of the plant under consideration.

To prove our position with this series of a genus, we must refer to the condition of parts in *Cactaceæ*, where we have a gradual transition from bractæ to sepals, so that it is impossible to say where



the one terminates and the other begins. Examples of partial reversion of the calyx to the character of the leaf are seen in specimens of *Trifolium repens*, the *Polyanthus* of the gardens, and in cultivated roses. In monstrous specimens we sometimes meet with the petals becoming leafy, of which M. DeCandolle gives a remarkable example in *Anemone nemorosa*, and the author had not unfrequently seen the same condition occurring in the petals of *Papaver Argemone*. Stamens appear to be formed from petals by the gradual narrowing of their lower part, so as to form the filament, while the anthers develop themselves on the upper margins. The only instance with which the author was acquainted where the carpellary leaf is to be found in an expanded or unfolded state naturally occurs in the order *Coniferae*, where it simply covers but does not inclose the ovules. The carpellary leaf in this condition manifestly approaches a bractea. It was announced that the paper would be continued at the next meeting.

Mr. Adam White laid before the Society a selection of the plants he found in the beginning of August last, at Whiting Bay, Isle of Arran. He made some observations on the mild climate of the sheltered coast, where, even during winter, as Dr. M'Naughton, in the 'New Statistical Account of Scotland,' writes, "many of the plants of warmer regions stand the whole winter in the open air, as in Mr. Paterson's garden, at the Whitehouse, and in the Duke of Hamilton's at Broderick Castle." He referred to the Rev. David Landsborough's list of the rarer plants found in Arran, and to Professor Gardner, of Glasgow, having lately found the *Funaria Muhlenbergii* in tolerable abundance, when on a trip with Mr. Landsborough.

#### ZOOLOGICAL SOCIETY.

Dec. 14, 1841.—Richard Owen, Esq., Vice-President, in the Chair.

The following paper, by Mr. Lovell Reeve, "On *Lingula*, a genus of Brachiopodous Mollusks," was then read:—

"The *Lingula* belong to a group of Bivalve Mollusks differing materially in their system of organization from any other of the great tribe of *Acephala*. They have received the title of 'the *Brachiopoda*,' on account of their being provided with two long spirally twisted arms, and are distinguished by other not less important particulars. The soft parts are differently arranged within the shell from those of other Bivalves; the valves are not united by any ligament, and there is a very distinct change in the arrangement and position of the breathing apparatus. Although Pallas has given a short anatomical description of the *Terebratulæ*, it was not until the appearance of Cuvier's memoir on the anatomy of *Lingula*, that the true characters of these remarkable animals became known; it was then determined that the *Brachiopoda* should be set apart in a separate and distinct class. The anatomy of the *Terebratulæ* and *Orbiculæ* has since been most elaborately set forth by Prof. Owen in the Transactions of this Society, and agrees in all its essential par-

ticalars with that of the *Lingula* previously described by Cuvier; subject, however, to certain modifications arising from the different situations they inhabit. The *Lingulae*, which are provided with a long pedicle, commonly live near the surface, and are found at low water, partially buried in the sand for the protection of their fragile shells against the violence of the tides; the *Terebratulæ*, on the contrary, are found in deep water, attached in clusters to fragments of rocks and corallines by a bunch of short fibrous tendons issuing through an orifice in the shell.

“The essential points in which these animals differ from other Bivalve Mollusks are as follow:—*First*, in the position of the soft parts within the shell: in the *Brachiopoda* the dorsal part of the visceral mass is against one valve, and the ventral part against the other; whilst in most of the *Tropiopoda* the back is placed directly against the hinge, and the sides against each valve. *Secondly*, in being provided with a pair of retractile brachia or arms: in the place usually occupied by the branchiæ, are two long spirally twisted arms, generally more or less fringed, and so strongly resembling in some species the branchiæ of the *Tropiopoda*, that they were at one time thought to be the true organs of respiration. These retractile arms are said to be in constant activity for the purpose of producing an inward current of water for the capture of animalculæ, and other alimentary prey. *Thirdly*, in the arrangement and position of the branchiæ: instead of the organs of respiration being distinctly formed in lateral lamellæ upon the body, as in the *Lamelli-branchiate Tropiopoda*, they consist of a number of beautiful veins and arteries incorporated within the substance of the two lobes of the mantle. The calcifying organ of the *Brachiopoda* therefore has a double function: in addition to its usual property of secreting the calcareous mucus for the formation of the shell, it is made subservient to the circulation of the aerated water. Prof. Owen observes, ‘that in this profuse distribution of vessels over a plain membranaceous surface, we perceive the simplest construction of the *water-breathing* organ, presenting a beautiful analogy with the elementary forms of the *air-breathing* organ in the *pulmoniferous Gasteropoda*.’ In consequence of this new arrangement of the respiratory system, the title of the *Brachiopoda* has been changed by De Blainville for that of the *Palliobranchiata*, or mantle-breathing Mollusca. The muscular system in these animals appears to be most complex; the *Lingulae* and *Orbiculae* are provided with three pairs of muscles, and the *Terebratulæ* have four. The large muscles are destined to open and close the shell in the absence of a hinge ligament; and the small ones assist in sliding one valve over the other for the admission of water.

“Until within the last few years only one species of *Lingula* was known, and previous to the publication of Cuvier’s memoir, before alluded to, the shell of this singular animal gave rise to much speculation amongst naturalists. Linnæus, upon the discovery of an odd valve of *Lingula* exhibiting no trace of any hinge ligament, described it as a *Patella*. Both Rumphius and Favanne took it to be the

calcareous shield of a *Limax* or land-slug. Chemnitz, upon finding that the shell of *Lingula* was really bivalve, placed it with the *Pinnæ*; and even Dillwyn includes it with the *Mytili*. Bruguière was the first to distinguish it by its present title in the plates of the 'Encyclopédie Méthodique,' in which he has been followed by Cuvier, Lamarck, and all succeeding writers.

"With regard both to the situation that the *Brachiopodous Mollusca* should occupy in the natural system, as well as the rank to which they are entitled in the classification, authors have been much divided. By Dumeril and De Roissy they were associated in a particular class with the *Lepades*, on account of a fancied resemblance in their spirally twisted arms to the cirrous tentacula of those animals; they differ however in not being articulated, and their relation altogether with the *Lepades* is one of very remote analogy. Cuvier distinguished them as a new and separate class, but still arranged them next in order to the *Lepades*. Lamarck placed them at the end of his '*Conchiferes monomyaires*' merely as a family of that order. Prof. Owen and Deshayes both consider that they are entitled to take the rank of an order; the latter author however admits that there is far less affinity between the *Brachiopoda* and the rest of the acephalous mollusks, than there is between the acknowledged divisions of *Bimuscular* and *Unimuscular*. In the arrangement of my 'Systematic Conchology' I propose to adopt the still higher rank that was assigned to them by Cuvier, namely, that of a class, placing them according to Lamarck, at the end of the *Acephala*, upon the presumption that their branchial apparatus presents a modification of structure intermediate between that of the proximate classes, the *Tropiopoda* and the *Gasteropoda*.

"The *Lingulæ* come with great propriety at the commencement of the class, because they have the nearest affinity with the *Tropiopoda*; their body is larger in proportion to that of the rest of the *Brachiopoda*, and although the branchiæ are incorporated within the substance of the mantle, they nevertheless present a certain indication of the lamellar structure. Lamarck placed them at the end of his family of '*Les Brachiopodes*,' because, in having referred the *Cranicæ* to his fossil family of '*Les Rudistes*,' he found it necessary to follow up their affinity with the *Orbiculæ*; his arrangement of the genera therefore is the reverse of that I have adopted.

"The *Lingula anatina* was for a long time the only species known, another one, the *Lingula hians*, was described by Swainson in his 'Zoological Illustrations,' and we are indebted to Mr. Cuming for five new ones; two, the *Lingulæ Audebardii* and *semen*, have been already described by Mr. Broderip in the Transactions of this Society, and I have now the pleasure of introducing three which I believe to be entirely new to science.

LINGULA OVALIS. *Ling. testâ angustâ, elongato-ovali, glabrâ quasi politâ, olivaceo-viridi; apice acuminato; valvis utrinque clausis.*  
Hab. — ?

Long.  $1\frac{3}{10}$ ; lat.  $\frac{6}{10}$  poll.



“This shell, which approaches rather in appearance to that of the *Lingula anatina*, may nevertheless be distinguished by its complete oval form; though it is somewhat acuminate at the apex, the umbones are much less prominent, and the valves are more compressed, and more closely united all round.

LINGULA TUMIDULA. *Ling. testâ corned, tenuissimâ, rubro-olivaceâ, subquadrata, versus apicem parùm attenuatâ, umbonibus vix prominulis; valvis tumidulis, marginibus irregulariter reflexis.*

*Hab.* ad oras Novæ Hollandiæ.

Long.  $2\frac{1}{10}$ ; lat.  $1\frac{5}{10}$  poll.

Reeve, *Conch. Syst.* v. i. p. 180. pl. 125. f. 4.

“The shell of the *Lingula tumidula* differs materially, both in size and composition, from that of any of the previously known species; it is considerably larger and thinner, and rather horny than calcareous, and the colour of it is a burnt olive-red. From the swollen appearance of the valves I am inclined to think that the shell is perfectly pliable and elastic during the life of the animal.

LINGULA COMPRESSA. *Ling. testâ corned, tenuissimâ, valdè compressâ, fusco-olivaceâ, subquadrato-ovali, versus apicem attenuatâ, umbonibus depressis, indistinctis; valvis utrinque clausis.*

*Hab.* ad Palanam, ins. Masbate, Philippinarum.

Long.  $1\frac{8}{10}$ ; lat.  $1\frac{1}{10}$  poll.

“This curious species was found by Mr. Cuming in sandy mud at low water at Palanas, Island of Masbate, one of the Philippines. Its shell is of the same thin horny composition as that of the *Lingula tumidula*; in fact I at first took it to be merely a local variety of that species. Upon comparison however I feel assured that it is distinct; it is more attenuated towards the apex, and from the valves being remarkably compressed and closely united all round, I am induced to suppose that the animal must be proportionably smaller. The two specimens from which the above description is drawn do not exhibit the pallial cilia, which Mr. Cuming’s usual care would have protected; they may therefore not have been exerted beyond the margin of the valves. He did not succeed in obtaining the pedicle of this species.

“Mr. Cuming exhibits on this occasion specimens of all the known *Lingulæ* from his own collection, and I am not aware that four species out of the seven exist in any other. They belong to a class of mollusks of which few recent varieties are known, and may therefore be highly esteemed for their conchological interest.”

The next paper read was from Mr. G. B. Sowerby, jun., and is entitled “Descriptions of nine species of the genus *Pupina*.”

#### Gen. PUPINA, Vignard.

*Molluscum* terrestre.

*Testa* subcylindrica, vitrea, nitidissima, anfractibus quinque ad sex, penultimo inflato, ultimo paululùm coarctato; aperturâ circulari, margine crasso, reflexo, ad basin columellæ inciso, vel emarginato.

*Operculum* corneum, spirale.

The glassy enamel, which gives a brilliant polish to the small, terrestrial shells composing this genus, seems to distinguish them even from those species of *Cyclostoma* which most nearly resemble them, in having a pupiform shape, and a notch at the base of the columella. The question has been asked, "Why not make this marginal notch the criterion of the genus?" The answer is found in the following facts: first, the notch is found in *Cyclostomata*, which have no other character in common with *Pupinæ*; second, that several *Cyclostomata* have a canal at the lower part of the whorl, which if continued would form a similar notch; third, that our *Pupina lubrica*, which could scarcely be separated from the genus, has but a very slight emargination.

The first species described under this generic name was *P. Keraudrenii*, published by Vignard in the 'Annales des Sciences,' 1829.

Mr. Grateloup subsequently described *P. Nunezii* under the generic name *Moulinia*, neither of these naturalists being acquainted with the operculum.

All the species here described, with the exception of *P. antiquata* and *P. Keraudrenii*, were recently brought to this country by Mr. Cuming from the Philippines.

\* Species spirâ axe retrorso.

PUPINA NUNEZII. *Moulinia Nunezii*, Grateloup, Ann. Soc. Linn. Bordeaux, 1840. *P. Nunezii*, Sow. jun., Thesaurus Conchyliorum, part 1. f. 8, 9, 10, 11. Published May 1842. *Testa globosa, obliqua; aperturâ magnâ, margine validè expanso, reflexo, complanato, incisurâ triangulari penitùs diviso; labio columellari concavo: anfractu ultimo propè aperturam subcomplanato.*

Long. .50; lat. .35 poll.

*Hab.* ad insulas Samar, Luzon, Catanduanus et Siquijor, Philippinarum.

Var. *a.* *Fusca margine flavido.* Samar.

Var. *b.* *Flavida, margine aurantiaco.* Albay, ins. Luzon.

Var. *c.* *Fulva rufescens.* Ins. Catanduanus.

Var. *d.* *Alba, propè aperturam purpureo-cincta, margine flavido.*  
Ins. Leyte.

More globose than any other species, the spire turned backwards, the penultimate whorl elevated, the last whorl flattened in front, the incision of the peritreme deep, the columella grooved, varying in colour from bright orange to cream-white and dark brown; the margin always either orange or yellow. Found on leaves of small plants and low bushes in several of the Philippine Islands.

PUPINA PELLUCIDA, Sow. jun., Thesaurus Conch. part 1. f. 18, 19, 20. *Testa obliqua, subglobosa, pellucida, spirâ axe valdè retrorso, anfractu penultimo elevato, ultimo complanato margine reflexo, incisurâ diviso; columellâ latâ convexâ.*

Long. .30; lat. .20 poll.

*Hab.* ad insulas Luzon et Zebu, Philippinarum.

Var. *a.* *Fulva.* Daleguete, ins. Zebu.

Var. *b.* *Grisea fulvescens, minor.* Bongabon, ins. Luzon.

Smaller, more transparent, and with the spire more bent than the last; the outer lip less expanded, the notch completely dividing the peritreme, and the columella convex. Found on small plants in woods.

\* \* Spirâ penè rectâ.

PUPINA LUBRICA, Sow. jun., Thesaurus Conch. part 1. f. 12 to 16.

*Testa subobliqua, cylindrica; spirâ brevi obtusâ, aperturâ rotundatâ; margine anticè subexpanso, paululùm incrassato, ad basin columellæ vix emarginato; columellâ callosâ.*

Long. .35; lat. .25 poll.

*Hab.* ad insulas Panay, Siquijor, et Luzon, Philippinarum.

Var. *a. Fulva.* Ins. Panay.

Var. *b. Fulva, minor.* Ins. Siquijor.

Var. *c. Alba, translucida.* Ins. Siquijor.

Var. *d. Grisea fulvescens.* Ins. Luzon.

Var. *e. Alba.* Calauang, Laguna, ins. Luzon.

In this species the notch is scarcely perceptible, and there is a rounded callosity behind the columellar lip. The inner lip is thickened on the body whorl. Found in dense woods on small plants.

PUPINA VITREA, Sow. jun., Thes. Conch. part 1. f. 6, 7. *T. subelongata, recta, anfractibus subrotundatis, margine expanso, reflexo, complanato, incisurâ diviso.*

Long. .50; lat. .25 poll.

*Hab.* Ins. Mindinao et Luzon, Philippinarum.

Var. *a. Fulva, margine luteo.* Albay, ins. Luzon.

Var. *b. Fulva, margine aurantiaco.* Cagayan, pr. Misamis, ins. Mindinao.

The spire is straight and elevated, gradually tapering towards the obtuse apex; the peritreme is expanded and flattened, the notch deep.

PUPINA SIMILIS, Sow. jun., Thes. Conch. part 1. f. 4, 5. *Testa fulva, subelongata, recta, anfractibus subrotundatis, margine pallidè fulvo, expanso, reflexo, rotundato, crasso, incisurâ usque ad dorsum diviso.*

Long. .45; lat. .26 poll.

*Hab.* Bolino, provinciam Zambales, ins. Luzon.

Resembling *P. vitrea*, but the margin not flattened, and the notch so deep that it is seen at the back of the shell. Found on leaves of bushes and trunks of trees in the island of Luzon.

PUPINA EXIGUA, Sow. jun., Thes. Conch. f. 17. *Testa parva, translucida, alba, cylindrica; anfractu penultimo inflato; margine aperturæ paululùm incrassato, incisurâ diviso.*

Long. .26; lat. .16 poll.

*Hab.* St. Nicholas, ins. Zebu, Philippinarum.

This small, transparent white species has the margin very little thickened, and the notch deep. Found on small plants.

\*\*\* Spirâ rectâ, aperturâ bicanaliculatâ.

PUPINA HUMILIS, Jaquetot, Sow. jun., Thes. Conch. part 1. f. 2.



*Testa ovalis, solida, pallidè lutea, anfractibus subrotundatis, ultimo propè aperturam paululùm complanato; aperturá rotundatá, margine crasso, expanso, reflexo; labio interno crasso, posticè plicato; columellá crassá, latá, tortuosá, reflexá; incisurá ad dorsum latá.*

Long. .60; lat. .40 poll.

*Hab.* — ? Mus. Cuming.

This being a dead shell has lost the brilliancy of the enamel. The teeth or folds at the posterior part of the inner and outer lips form a very distinct canal. The columella is tortuous and turned backwards, and the notch is seen at the back like the canal of a *Buccinum*.

PUPINA KERAUDRENI, Vignard, Sow. jun., *Thes. Conch.* part 1. f. 2.

*Testa parva, cylindrica, griseo-rufescens; spirá obtusá rectá; aperturá parvâ, margine incisurá divisâ; labio externo levitèr incrassato, posticè subplicato; labio interno plicato.*

Long. .30; lat. .15 poll.

*Hab.* Manilla and Singapore? Mus. Stainforth, Sowerby.

A pupiform species with a posterior canal.

PUPINA BICANALICULATA, Sow. jun., *Thes. Conch.* part 1. fig. 1.

*Testa parva, ovalis, alba, translucida; anfractibus ventricosis; aperturá magnâ, margine subexpanso, subincrassato, ad basin columellæ inciso; labio interno posticè plicato.*

Long. .26; lat. .16 poll.

*Hab.* St. Nicholas, ins. Zebu, Philippinarum.

This species differs from *P. Keraudrenii* in shape, being more ventricose, having a tapering spire, and a very strong fold on the inner lip. Found on small plants in the island of Zebu.

The following paper, entitled "Descriptions of four species of the genus *Chiton*, brought by H. Cuming, Esq. from the Philippine Islands," also by Mr. G. B. Sowerby, jun., was then read:—

CHITON PULCHERRIMUS. *Ch. Testá ovali, angulatá, ad dorsum elevatá, pallidè subviridi, fasciis binis rubris distantibus dorsalibus, maculis rubris dorsalibus et lateralibus nonnullis intus viridi; areis centralibus longitudinaliter foveolatim sulcatis; areis lateralibus prominentibus, utrinque granulatim tricostatis; areis terminalibus costis moniliformibus numerosis radiatis; margine minutè squamoso, maculis rubris fasciato.*

Long. .95; lat. .55 poll.

*Hab.* Gindulman, ins. Bohol, Philippinarum. H. Cuming legit.

The few specimens of this shell which have been brought in fine condition present an appearance of exquisite finish and great beauty, both in sculpture and colouring. They were found in the crevices of rocks at low water.

CHITON LAQUEATUS. *Ch. testá ovatá, depressá, granulatá, pallidè fulvá vel viridescente, purpureo et viridi maculatá; costá dorsali purpureá, sublævi; valvá primá costis quinque laqueatá; valvis medianis unicastatis ad latera quadratis; valvá ultimá valdè de-*

*pressâ, margine lato, irregulariter rugoso, rubro, viridi, alboque maculato. Variat testâ angustiore, margine rosedâ.*

Long. .55; lat. .45 poll.

*Hab.* Calapan, ins. Mindoro, Philippinarum. H. Cuming legit.

Remarkable for the character of the first valve, which is broadly fluted by five radiating ribs. The four or five central valves, in several specimens, are nearly covered by a dark purple colour, the two last patched with green, and the first nearly white, but subject to some variations. Found in coarse sand among small stones at a depth of nine fathoms.

**CHITON FLOCCATUS.** *Ch. testâ ovali depressâ, anticè angustatâ, pallidè fulvâ; nigro, fusco, viridi, roseoque maculatâ: valvis terminalibus radiatim sulcatis, valvis medianis utrinque unicos-tatis, areis centralibus longitudinaliter sulcatis; areis lateralibus granulatis, marginibus serratis; valvâ terminali obtusè elevatâ; margine rubro vel fusco, maculis et punctis albis fasciato.*

Long. .80; lat. .45 poll.

*Hab.* Cagayan, Misamis, ins. Mindinao, Philippinarum. H. Cuming legit.

This species is found at Mindinao, under stones at low water, and at Calapan on small stones, at a depth of fifteen fathoms. The margin is sprinkled with white patches resembling flakes of snow, on a reddish brown ground.

**CHITON LUZONICUS.** *Ch. testâ ovali, angulatâ, stramineâ, viridi longitudinaliter strigatâ: valvarum areis terminalibus et lateralibus radiatim granulatis; areis centralibus acutè longitudinaliter sulcatis, margine sublevi.*

Long. .35; lat. .20 poll.

*Hab.* Sorsogon, pr. Albay, ins. Luzon, Philippinarum. H. Cuming legit.

This small and apparently insignificant shell is very sharply ribbed in the central areas, and presents a very nicely sculptured surface when viewed through a magnifying glass. The specimens were taken on dead shells at a depth of fifteen fathoms.

Mr. Waterhouse next proceeded to characterize the following new species of *Curculionidæ* from the collections of Mr. Darwin and Mr. Bridges.

#### Divisio CLEONIDES, Schoenherr.

##### Genus LISTRODERES, Scho.

**LISTRODERES SUBCOSTATUS.** *Listr. niger, opacus, fusco-squamosus; antennis piceis; rostro brevi, carinato; thorace punctatissimo, subquadrato, posticè angustiore, setis fuscis instructo; elytris punctato-striatis, fusco-setosis, interstitiis alternatis subelevatis.*

Long. corp. et rostri, 6 lin.; lat.  $2\frac{1}{4}$  lin.; long.  $4\frac{3}{4}$ , lat. 2 lin.

*Hab.* Valleys of Petorca.

Rostrum about half as long again as the head, with three costæ above, the central one but little developed, and the lateral costæ indistinct; the space between the costæ finely rugose; the whole sur-

face of the rostrum covered with distinct yellowish hairs. Head thickly punctured, the punctures confluent, and with an impressed point between the eyes. Thorax about one-third broader than long, emarginated in front, nearly straight behind, but slightly indented in the middle; the broadest part of the thorax is about the anterior third; from this point it is contracted in width, both before and behind, in nearly equal proportions; the upper surface is nearly flat, and very thickly and distinctly punctured; the punctures more or less confluent; a faint dorsal ridge is sometimes perceptible; small spiny semierect hairs cover the thorax; elytra moderately long, with the humeral angles forming right angles; the apex rounded, the width about one-fourth greater than that of the thorax; the upper surface moderately convex, covered with brown scales, and having interspersed erect spiny hairs; punctate-striated, the interstices very finely shagreened; the third, fifth, and the seventh from the suture, raised; a few black spots are irregularly scattered over the elytra, and in some specimens are some whitish spots arranged in lines on the apical portion of the elytra.

From the collection of Mr. Bridges.

*LISTRODERES PILOSUS.* *Listr. niger, opacus, setosus, fusco-squamosus; antennis tarsisque fusciscentibus; rostrum indistinctissimè carinato; thorace crebrè punctato, subquadrato, lateribus subrotundatis; elytris punctato-striatis. Capite, thorace, elytrisque squamis fuscis atque nigrescentibus densè tectis.*

Long. corp. et rostri,  $3\frac{1}{3}$  lin.; lat.  $1\frac{1}{4}$  lin.

*Hab.* Valleys of Petorca.

About equal in size to *Sitona fusca*. Rostrum a trifle longer than the head, slightly rugose, and with a very indistinct longitudinal carina. Head thickly punctured, the punctures confluent, and an impressed line between the eyes. Thorax subquadrate, and somewhat depressed; very thickly, but not coarsely punctured, the punctures confluent; the width greater than the length; the sides nearly straight and parallel, excepting near the base and apex of the thorax, where the width is gradually contracted. Elytra but little wider than the thorax, somewhat convex and elongated; the humeral angles rounded, and the apical portion rather attenuated, but with the tip rounded; the sides subparallel; punctate-striated; the punctures, of moderate size, are rather close together; the interstices of the striæ nearly flat, and apparently slightly rugose.

The sculpturing of the rostrum, head, thorax and elytra is with difficulty examined, all these parts being densely clothed with scales; these are chiefly of a brown colour, but in parts they are of a blackish hue. On the thorax is an indistinct dusky line in the middle, and one or two dusky patches at the sides; the elytra are variegated with deep and pale brown.

From the collection of Mr. Bridges.

*Listroderes costirostris*, Scho. Several specimens of this species are contained in Mr. Darwin's collection, having been collected at Maldonado; and there are, moreover, specimens collected at Coquimbo which present no distinguishing character, excepting in being



of a larger size, viz. total length  $5\frac{1}{2}$  lines, width  $2\frac{1}{4}$  lin.; those from Maldonado being  $4\frac{1}{2}$  lines in length and  $1\frac{3}{4}$  in width.

**LISTRODERES ROBUSTUS.** *Listr. breviter ovatus, niger, opacus, fusco-squamosus, setosus; antennis fusciscentibus; rostro longiusculo, carinato, pilis minutis decumbentibus tecto; thorace crebrè punctulato, brevi, vittâ albâ ornato, lateribus subrotundatis; elytris breviter ovatis, punctato-striatis, fasciâ albescente, ad latera interruptâ, ornatis, singulatim tuberculo subapicali instructis.*

Long. corp. et rostri,  $4\frac{1}{3}$  lin.; lat.  $2\frac{1}{2}$  lin.

*Hab.* Coquimbo.

In size and form this species may be compared to the *Phytonomus punctatus*. Rostrum about twice as long as the head, covered with minute decumbent brownish hairs, and with a longitudinal carina. Thorax rather broader than long, very suddenly contracted in front, and broadest near the fore-part; the sides slightly rounded, or nearly straight; the posterior angles rounded, and the posterior margin indistinctly produced in the middle; the surface very thickly punctured and covered with pale brownish scales, and having interspersed minute hairs; in parts the scales assume a deeper hue, and in the middle is a whitish line. Elytra about one-third broader than the thorax, convex, and of a short ovate form; punctate-striated; the interstices obscurely punctured, and slightly convex; they are covered with brownish scales, and have interspersed minute pale hairs; rather behind the middle is a broadish curved mark, which is obliterated on the sides of the elytra; and towards the apex is a small angular tubercle.

From the collection of Mr. Darwin.

**LISTRODERES APICALIS.** *Listr. squamosus, fusco-albescens; antennis piceis; rostro carinâ longitudinali fuscâ; capite notis duabus fuscis anticè convergentibus; thorace anticè quam posticè latiore, ad latera ferè recto, anticè foveâ incurvatâ, lined albâ longitudinali; elytris thorace duplo latioribus, punctato-striatis; singulis notâ nigrescente obliquâ, ad apicem albescente, tuberculo distincto subapicali.*

Long. corp. et rostri,  $3\frac{1}{4}$ ; lat.  $1\frac{1}{3}$  lin.

*Hab.* Monte Video.

This species is considerably less than the *L. costirostris*, being about equal in size to the *Phytonomus rumicis*. The rostrum is rather slender, nearly twice as long as the head, covered with minute decumbent hairs, which are of a whitish brown colour; in the middle is a longitudinal carina. The thorax is broader than long; the broadest part is considerably in front of the middle; in front it becomes somewhat suddenly contracted; the sides of the thorax converge from near the anterior part towards the base, and are nearly parallel; the posterior margin is slightly rounded, being produced in the middle; the hinder angles are obtuse; the upper surface of the thorax is nearly plane, presenting scarcely any convexity, and in the fore-part is a curved impression, the extremities of which lead up to the anterior angles; it is densely clothed with scales, and these are of a very

pale brownish colour; in parts the scales are of a deep brown colour, and in the middle is a longitudinal line, formed of whitish scales; besides the scales are some very minute, semierect, scattered dusky hairs; the sculpturing cannot well be seen, owing to the covering of scales, but the thorax appears to be very thickly though not coarsely punctured. The elytra are oblong, about one-third broader than the thorax; the humeral angles are prominent and rounded; the sides nearly straight, and the apex rounded; the surface is convex, but somewhat depressed at the basal portion of the elytra; punctate-striated; covered with pale brownish scales, having moreover some very minute scattered spines; the third and fifth interstices of the striæ on each elytron are slightly raised; rather behind the middle is an oblique deep brown patch, behind which the scales are white, or nearly so; a distinct angular tubercle is observable on each elytron, at a short distance from the apex. The legs and antennæ are brown, and covered with minute palish hairs; near the apex of each of the femora is a whitish ring.

In the collection of Mr. Bridges are several species of *Curculionidæ* closely allied to *Listroderes*, but differing in having the antennæ more slender and elongated; the club is very long, distinctly jointed, and very slightly incrassated; the legs are longer, and the body is covered with minute hairs, or hair-like scales, whilst all the species of *Listroderes* examined by me have the body distinctly clothed with scales. Moreover, in none of the insects under consideration do I find the tubercles on the apical portion of the elytra, which are so common in the *Listroderes*. Such differences, though readily seen, it is impossible to express by a generic term. I have determined to designate this new genus by the name

ADIORISTUS\*, nov. gen.

*Antennæ* longæ, tenues; scapus ad apicem subincrassatus; articuli funiculi obconici, 1<sup>o</sup> longo; clava elongata distinctè triarticulata.

*Rostrum* capite ferè duplo longius, crassiusculum, subarcuatum, versus apicem incrassatum, suprâ carinatum: mandibulæ tenues paulo elongatæ.

*Oculi* subovati, subdepressi.

*Thorax* transversus, ponè oculos lobatus, suprâ subdepressus.

*Elytra* elongato-ovata, convexa, ad apicem rotundata.

*Tarsi* elongati, subtenuis, subtùs spongiosi.

ADIORISTUS PUNCTULATUS. *Ad. niger, fusco-pilosus; antennis, tibiis tarsisque piceis; rostro brevi, crasso, carinato; thorace punctulato, brevi subquadrato, anticè angustiori, posticè utrinque subemarginato; elytris oblongo-ovatis, convexis, punctato-striatis, interstitiis alternatis maculis parvulis nigris atque albescentibus ornatis.*

Long. corp. et rostri,  $6\frac{1}{3}$  —  $8\frac{2}{3}$  lin.; lat.  $2\frac{1}{2}$  —  $3\frac{1}{3}$  lin.

*Hab.* Valleys of Petorca.

The whole insect is covered with minute decumbent hairs, and these are of an ashy-brown colour. The rostrum is stout, considerably dilated at the apex, and about twice as long as the head;

\* From ἀδιόριστος, undefined, &c.

rugose, and has fine longitudinal keels on the upper surface, of which the central one is most strongly developed, and the one next it on each side indistinct. The head is convex above, and thickly punctured. The thorax is about one-third broader than long; the anterior margin is straight, and the lateral margins are very nearly straight; the anterior part is rather narrower than the hinder part; the hinder margin is in the form of a segment of a circle, being produced in the middle, and joins the lateral margin so as to form a somewhat salient but obtuse angle; the upper surface is but very slightly convex, and thickly and distinctly punctured. The elytra are convex, and of an elongate-ovate form, and scarcely one-third broader than the thorax; the upper surface is densely clothed with minute hairs; punctate-striated, the punctures not very large, and distinctly separated; the interstices are plane, or indistinctly convex, and are very finely punctured. On each stria is a series of small black and whitish spots, and these most of them are oblong.

*ADIORISTUS ANGUSTATUS.* *Ad. niger, fusco-pilosus; antennis, tibiis tarsisque fusciscentibus; rostro brevi, crasso, carinato; thorace punctulato ad latera et posticè subrotundato; elytris thorace pauld latioribus, elongatis, subovatis, punctato-striatis, maculis parvulis nigris ornatis.*

Long. corp. et rostri,  $5\frac{1}{2}$  lin.; lat. 2 lin.

*Hab.* Valleys of Petorca.

This species closely resembles the last in many respects, and especially in its colouring, and in being covered with minute ashy-brown decumbent hairs, but it is of a narrower and more elongated form, and of a much smaller size.

The rostrum is about half as long again as the head, rugose, and has three parallel keels on the upper surface, of which the central one is the most prominent. The head is thickly punctured. The thorax is scarcely one-third broader than long, slightly emarginated in front; the sides are nearly straight and parallel, but near the anterior part they gradually converge, so as slightly to contract the width of the thorax at this part; about the posterior third of the thorax the sides also converge towards the posterior margin, so that the thorax may be described as obliquely truncated on each side behind: the posterior margin is straight; the upper surface is nearly flat, and thickly and distinctly punctured. The elytra are moderately convex and of an elongated ovate form, and about half as broad again as the thorax; punctate-striated, the punctures of moderate size and distinctly separated, excepting on the hinder part of the elytra; they are densely clothed with decumbent ashy-brown hairs, and on each stria is a series of oblong blackish spots; the interstices are very delicately but thickly punctured.

*ADIORISTUS CONSPERSUS.* *Ad. niger, subopacus, fusco-pilosus; antennis tarsisque fusciscentibus; rostro brevi, crasso, carinato; thorace punctatissimo, subquadrato, posticè pauld angustiore, modicè convexo, lateribus subrotundatis; elytris quoad latitudinem thorace ferè coequalibus, lateribus subparallelis, punctato-striatis, interstitiis planis.*



Long. corp. et rostri,  $5\frac{1}{2}$  lin. ; lat.  $2\frac{1}{4}$  lin.

*Hab.* Valleys of Petorca.

Rostrum about half as long again as the head, much dilated at the apex, with three distinct carinæ, and the two outer carinæ converging slightly towards the base of the rostrum; between the carinæ are minute longitudinal rugæ, but these are hidden by the numerous small brownish hairs which cover this and other parts of the insect. The head is thickly punctured, and there is a minute oblong depression between the eyes. The thorax is subquadrate, about one-fourth broader than long; the anterior margin is straight; the sides are slightly rounded, but nearly straight towards the hinder part of the thorax; the greatest width is at the anterior third; the posterior margin is straight, and the posterior angles are very nearly right angles; the upper surface is nearly flat, being but very slightly convex, and thickly but rather finely punctured. The elytra are moderately elongated, but little broader than the thorax, and moderately convex above; the sides are nearly parallel, being very little dilated in the middle; the apical portion is rounded; they are punctate-striated, and the interstices are finely punctured; a series of small blackish spots is observable on each of the striæ; on other parts the very minute hairs which cover the elytra are brownish.

*ADIORISTUS SIMPLEX.* *Ad. piceo-niger, pilis fuscescentibus tectus; antennis piceis; rostro brevi, carinato, ad basin transversim impresso; thorace rugoso-punctato, subcylindraceo, lateribus paulò rotundatis; elytris oblongo-ovatis, punctato-striatis, punctis aliquantò profundis, interstitiis ferè planis et punctulatis.*

Long. corp. et rostri,  $3\frac{3}{4}$  lin. ; lat.  $1\frac{1}{2}$  lin.

*Hab.* Valleys of Petorca.

A small species, about equal in size to *Phyllobius alneti*. The rostrum short and stout, being but little longer than the head, is furnished with a central carina and a carina on each side, which is less distinct, and the space between these ridges has longitudinal rugæ, which are partially hidden by the scattered hairs which cover this and all other parts of the body. The head is thickly punctured, and the punctures are confluent; a small oblong impression is observable between the eyes, and in front of the eyes is a transverse depression, separating, as it were, the rostrum from the head. The thorax is nearly cylindrical, broader than long, and slightly narrower behind than near the fore-part; the anterior and posterior margins are straight; the upper surface is thickly and rather coarsely punctured, and the punctures are many of them confluent. The elytra are of an elongated ovate form, convex, somewhat attenuated, but rounded at the apex; punctate-striated, the punctures moderately large and rather deep, and nearly joining each other; the interspaces between the striæ are nearly plane, indistinctly punctured in parts and slightly rugose; the minute but somewhat spiny hairs which cover the elytra are not sufficiently abundant to hide the sculpturing, and are semi-erect.

A species of the present genus is contained in Mr. Darwin's collection, which differs from either of the above: it is almost destitute

of the small hairs which give the brownish colouring to the other species here described.

*ADIORISTUS SUBDENUDATUS.* *Ad. oblongus, niger, pilis minutissimis atque squamulis albescentibus adpersus; antennis tarsisque fusciscentibus; rostro carinato, punctulato; capite inter oculos transversim impresso, crebrè punctulato; thorace subcylindraceo in medium paulò dilatato, punctis minutis impresso; elytris oblongo-ovatis, punctato-striatis, interstitiis paulò convexis, obsoletè punctulatis.*

Long. corp. et rostri,  $6\frac{1}{2}$  lin.; lat.  $2\frac{1}{2}$  lin.

*Hab.* Mendoza.

This insect is intermediate in size between the *Ad. punctulatus* and *Ad. angustatus*, and is readily distinguished from either of the species here described by its denuded appearance; the scales and hairs, which are sparingly scattered over the body, only become visible with the assistance of a moderately strong lens.

The rostrum is about twice as long as the head, very thickly though finely punctured, and the punctures are confluent; in the middle is a distinct carina. The head is separated from the rostrum by a transverse and somewhat shallow depression, and in the middle of this depression is a small fovea: the upper surface of the head, as well as the thorax, is very thickly and finely punctured, and the punctures are confluent. The thorax is rather broader than long, subcylindrical, truncated before and behind; the upper surface is slightly convex, and the sides are somewhat rounded, being slightly dilated a little in front of the middle. The elytra are of an elongate-oval form, moderately convex, somewhat attenuated at the apex, but with that part rounded; they are distinctly punctate-striated; the punctures are arranged closely together, and the interstices of the striæ are narrow, slightly convex, and very delicately punctured.

*Cylydrorhinus angulatus.*—Under this name M. Guerin-Meneville describes, in the 'Revue Zoologique' (No. 7, 1841, p. 217), a species of *Curculio*, from Port Famine, which I am inclined to regard as specifically identical with specimens brought by Mr. Darwin from St. Cruz and St. Julian.

M. Guerin states that the elytra are covered above with large deep punctures arranged in longitudinal striæ, at the base of each of which is a very small tubercle, and which are united together by an indistinct transverse impression.

In the specimens brought by Mr. Darwin, the elytra are deeply punctate-striate at the base, but from the base towards the apex the punctures gradually decrease in size; the minute tubercles are situated on the anterior margin of each puncture, and in addition to the striæ of punctures, the elytra are for the most part covered with somewhat irregular transverse rugæ; these are most distinct on the sides of the elytra (or rather what appears to be the side, for the elytra are strongly keeled at some little distance from the lateral margin, so that that part is hidden as we view the insect from above), less distinct on the apical portion, and do not extend to the disc. The apical portion of each elytron is slightly produced, and the

elytra appear as if were terminated by a tubercle; near the apex, on each side, is another tubercle. The thorax has a distinct fovea on each side, in the middle and near the lateral margin. The size of the specimens from Port St. Cruz varies from length  $9\frac{1}{2}$  lin., width  $4\frac{1}{3}$  lin., to length  $7\frac{3}{4}$  lin., width  $3\frac{1}{3}$  lin.

A specimen from St. Julian differs in being considerably smaller and more deeply sculptured, and in having a small patch of white scales near the apex of the elytra; the interstice between the fourth and fifth striæ is somewhat raised. Length 7 lines.

In the collection is a specimen, without label, which agrees with this variety, as I presume it is. Length  $6\frac{1}{2}$  lines.

Two out of three specimens from St. Cruz have pitchy red colour legs; in the third the legs are black. The specimen from St. Julian has also black legs.

Mr. Darwin found this *Curculio* "lying dead by thousands on all parts of the plains at St. Julian, both far in the interior and near the coast."

#### MICROSCOPICAL SOCIETY.

At a meeting of the Microscopical Society held October 19th, 1842, J. S. Bowerbank, Esq., in the Chair, a paper was read by William B. Carpenter, M.D., "On the Structure of the Animal Basis of the common Egg-shell, and of the Membrane surrounding the Albumen." The author found on examining the thin membrane surrounding the albumen of the hen's egg (*membrana putaminis*) that it consisted of several laminæ, each lamina being composed of interlacing fibres, between which numerous interspaces are left; on comparing this with a portion of egg-shell decalcified by means of dilute acid, both presented the same structure, but the laminæ were more numerous in the latter; he supposes that the deposit of calcareous matter takes place in the interspaces left by the reticulation of the fibres, and concludes that this fibrous membrane is analogous to the chorion of Mammalia. A preparation showing the identity of the two structures accompanied the paper.

Another paper was also read by Arthur Hill Hassall, Esq., entitled "An Explanation of the Cause of the Rapid Decay of many Fruits, more especially of those of the Apple tribe." After some preliminary observations, the author proceeded to state, that on placing a portion of decayed apple under the microscope, he observed vast numbers of ramified filaments passing in all directions between and around the cells of the parenchyma of the fruit; these filaments were regarded as those of a minute fungus or fungi\*, which by insinuating themselves between the cells of the pulp of the fruit, detached them from their connections with each other, destroyed their vitality, and ultimately produced a decomposition of their contents.

\* Complete observations on this interesting subject have been made known by Prof. Ehrenberg so far back as 1820 in the 'Regensburger Flora,' ii. p. 535, and more fully in the 'Nova Acta Nat. Cur.' vol. x., under the title *De Mycetogenesi Epistola*.—ED. ANV.



The author then gives his reasons for supposing the fungi to be the cause and not the effect of the decay; and concludes by describing the several stages of development of the fungi, and their mode of entrance within the fruit. Specimens of the fungi were exhibited to the Society after the reading of the paper.

#### GEOLOGICAL SOCIETY.

Nov. 17, 1841.—A letter addressed to Dr. Fitton, by Mr. Lyell, and dated Boston the 15th of October, 1841, was read.

Mr. Lyell's attention, between the period of his arrival in the United States and the date of his letter, had been principally devoted to the grand succession of Silurian, Devonian, and Carboniferous strata in the state of New York and on the borders of Pennsylvania, having been accompanied during a portion of his tour by the States' Geologist, Mr. J. Hall; but he had also visited, in company with that gentleman, the Falls of Niagara and the adjacent district, and he states, that he purposes to communicate a paper on the phenomena of the recession, drawn from new arguments, founded on the position of a fluviatile deposit below the Cataract. He expresses his intention of also communicating a notice of five localities of Mastodon bones which he had visited, digging up some remains himself, and collecting the accompanying shells, which he says, seem to have been neglected. He had likewise examined, accompanied by Prof. Silliman and his son, the new red, with intrusive trap, in Connecticut; and, assisted by Mr. Conrad, he had collected fossils in every member of the cretaceous system in New Jersey\*. The principal object, however, of the present communication is, to point out the extension to the United States of Mr. Logan's generalizations on the beds of fire-clay containing *Stigmaria*, formerly laid before the Society in a paper on the coal-field of South Wales. Mr. Lyell had met Mr. Logan at New York, previously to that gentleman's visit to the anthracite coal-field of Pennsylvania, and he adverts to the delight which Mr. Logan must have felt in witnessing the occurrence of beds of *Stigmaria* fire-clay to an extent far exceeding what could have been expected. On the confines of the states of New York and Pennsylvania, Mr. Lyell found remains of *Holoptychius* and other fishes in the old red sandstone, and at the bottom of the overlying coal series a thick quartzose conglomerate; and he says that the coal-measures, with their imbedded plants, bear an exact analogy to British coal-measures, both in detail and as a whole. In investigating the coal district of Blossberg, Mr. Lyell had for a guide Dr. Saynisch, president of the mines. The first point which they examined presented three seams of bituminous coal resting on fire-clay containing *Stigmariæ*, with the leaves

\* Mr. Lyell mentions incidentally having observed between Easton and Trenton, on the Delaware, and in 40° of north latitude, that all the trees were barked on one side, at the height of twenty-two feet above the present level of the river, owing to a freshet and stoppage by ice in the spring of 1841. The stuccoed parts of the houses were also strangely scraped; and in one place the canal, the towing-path of which is twenty-two feet above the river, was so filled with gravel that carriages did not cross by the bridges.

attached to the stems, and extending in all directions through the clay; and they observed, in a gallery lighted on purpose, that the stems seen *in situ* were very nearly all parallel to the planes of stratification, only one being in an oblique position. Every stratum underlying a coal-seam examined by Mr. Lyell, presented the same phenomena, except one, and in that case the bed was so sandy that it could not be considered as a fire-clay. The thickness of these Stigmaria deposits varied from one foot to six feet. The roof of the Blossberg coal-seams consists usually of bituminous slates, but occasionally of very micaceous grit, and it contains great varieties of ferns, as well as other plants, agreeing, generically at least, with those common in the British coal-measures.

Mr. Lyell next examined the anthracitic coal-district at Pottsville, on the Schuylkill, in the southern part of the Alleghanies. This district had been examined and described, as well as modelled, by Mr. R. C. Taylor, and the model had been inspected by Mr. Lyell previously to his visit. The whole of Pennsylvania has been mapped by Prof. H. D. Rogers, by direction of the State Legislature. Mr. Lyell refers to this survey, and he states that, by consulting Prof. Rogers's map, it will be found that the Alleghanies, or more properly the Appalachians, which, viewed geologically, are 120 miles broad, consist of twelve or more great parallel ridges, or anticlinal and synclinal flexures, having a general north-north-east and south-south-west strike, but in Pennsylvania a nearly east and west strike prevails. The strata are most tilted on the southern border of the chain, where their position is often inverted, and the folds become less and less towards the central ridges and troughs, which again increase in breadth the more northward their position, till at last the beds are almost horizontal. The oldest formations also are chiefly exposed in the most southern or disturbed regions, where syenite and other plutonic rocks are intruded into the lower part of the Silurian series. It has long been observed, that the anthracitic coal is confined to the southern or Atlantic side of this assemblage of small parallel chains, and that the bituminous occurs in the more inland or less disturbed region; the conclusion, therefore, Mr. Lyell states, seems inevitable, that the change in the condition of the coal was a concomitant of the folding and upheaval of the rocks. The conversion, moreover, is most complete where the beds have been most disturbed; and there are tracts in Pennsylvania and Virginia, near the centre of the chain, where the coal is in a semi-bituminous state. Chemical analysis, likewise, has shown that a gradation from the most bituminous to the most anthracitic coal may be found in crossing the chain from north to south\*. The associated shales, &c., of the disturbed regions exhibit no alterations.

It has also been supposed that the anthracite belonged to the transition, and the bituminous coal to the secondary period; but this belief, Mr. Lyell says, has been gradually abandoned, as the knowledge of the geological position and the fossil plants of the coal-districts have become better known. Both the anthracitic and the bituminous

\* See papers by Prof. H. D. Rogers, Dr. Silliman, &c.



coal overlies the old red sandstone, and contain the same ferns, *Sigillariæ*, *Stigmariæ*, *Asterophyllites*, &c.; and they are as abundant and perfect in the anthracite as in the bituminous coal.

At the first point where Mr. Lyell, accompanied by Prof. Rogers, examined the Pottsville coal-measures, the strata are nearly vertical, being cut off by a great fault from the less inclined beds which form the northern prolongation of the measures. They present thirteen beds of anthracite, the lowest of which alternate with the uppermost strata of the coarse underlying conglomerate. The southern wall of an excavation from which the coal had been removed, and which wall occupied the place of the underclay, presented impressions of the stems and leaves of *Stigmaria*; and on the more solid and slaty beds of the opposite wall, or original roof, there were leaves of *Pecopteris*, reed-like impressions, and *Calamites*. In the slightly inclined northern continuation of the coal-measures, Mr. Lyell observed in the Peachmount vein, three miles north-east of Pottsville, a bed of anthracite eight feet thick, overlaid by the usual roof of grey grit, and underlaid by blue clay or shale with *Stigmariæ*. Impressions of ferns were likewise noticed in the coal itself. Only one instance was met with in the Pottsville coal-district, by Mr. Lyell and Prof. Rogers, of a *Stigmaria*, placed at right angles to the plane of stratification.

The Pottsville, or southern anthracitic coal-field of Pennsylvania was illustrated by a section resulting from the former labours of Prof. Rogers, under whose guidance Mr. Lyell examined the country. The following remarks may explain the general structure of the country; the names applied to the formations are not, however, those previously employed by the American geologists, but those suggested by Mr. Lyell, in conformity with the conclusions at which he arrived after his tour in New York, and a comparison of the strata of that state with their British equivalents. The contrast between the relative importance of most of the Silurian and Devonian groups in Pennsylvania and in New York, Mr. Lyell states, is very great, arising from a larger portion of sandstones and grits in the Pennsylvanian rocks. The section extends from north of Pottsville to the country ranging immediately south of Orwigsburg. To the south of the vertical coal-measures and the subjacent conglomerate there are displayed successively—1st, a vast series, composed of red shales 3000 feet thick, of grey sandstone 2400 feet thick, and of red sandstone 6000 feet thick, the whole being considered by Mr. Lyell as portions of the old red sandstone; and 2nd, of olive-coloured shale containing Devonian fossils. The dip of the strata is either nearly vertical or inverted. Still further south, and a short distance north of Orwigsburg, the olive-coloured shales are succeeded by very highly inclined or inverted beds of upper Silurian rocks flanking a protruded band of lower Silurian strata; and lastly, on the southern confines of the section is a trough of the Devonian olive-coloured shales resting on the upper Silurian strata.

Beautiful exhibitions of the underclay with its associated plant, and of the overlying roof with its distinct remains, were observed by Mr. Lyell and Prof. Rogers at Tamaqua, in the southern coal-field.



The thinning out of the grits and conglomerates of the west causes the beds of anthracite to be brought more nearly together in this district; and Mr. Lyell says, the decrease in the thickness of the intervening strata prepares the observer for the union of several of the seams still farther east, and for the enormous thickness of the anthracite at various places near the village of Mauch Chunk, or Bear Mount, particularly at the well-known Lehigh-Summit Mines. At this point a mass of anthracite forty feet thick, deducting three intercalated fire-clays and a fine thin vein of impure coal, is quarried in open day, a covering of forty feet of sandstone being entirely removed. In the south mine, where there is a sharp anticlinal fold in the coal, the *Stigmariæ*-clay, four feet thick, was well seen, with nearly forty feet of coal above it and four below. In the Great mine Mr. Lyell observed the following section:—

Top, yellow quartzose grit.

Coal, two or three inches of the uppermost part of the bed being in the state of dust, as if they had been crushed or rubbed by the yellow quartzose grit. . . . .	5 feet.
Blue fire-clay with <i>Stigmariæ</i> . . . . .	15 inches.
Coal, including two or three seams of an impure slaty nature . . . . .	25 feet.
Blue fire-clay with <i>Stigmariæ</i> . . . . .	2 feet.
Coal, with an intervening layer of hard, bituminous slate	8 feet.

The anthracite, as in other parts of these coal-measures, often exhibits a texture exactly like that of charcoal; and frequently impressions of striated leaves, exactly resembling, as pointed out by Prof. Rogers, those of liliaceous plants, particularly the iris.

Mr. Lyell, accompanied by Prof. Rogers, afterwards examined the Room Run mines, on the Nesquahoning, where he saw a splendid exhibition of *Stigmariæ* in a bottom clay, one stem, about three inches in diameter, being no less than thirty-five feet in length. In the roof of slaty sandstone were impressions of *Pecopteris*, *Glossopteris*, and other ferns.

At Beaver Meadow, or the middle coal-field, a bed of anthracite is overlaid as well as underlaid by *Stigmariæ* blue clay; the upper fire-clay, however, soon thins out, and is replaced by sandstone. No coal rested upon it, but Mr. Lyell observes that the carpeting of coal may not be always large enough to cover the flooring of fire-clay, or some change of circumstances or denudation may have interfered with the usual mode of deposition. Upon the whole, Mr. Lyell says, the accumulation of mud and *Stigmariæ* was, in Pennsylvania as in South Wales, the invariable forerunner of the circumstances attending the production of the coal-seams. The two extreme points at which he observed the *Stigmariæ*-clay, Blossberg and Pottsville, are about 120 miles apart in a straight line, and the analogy of all the phænomena at those places, and still more on both sides of the Atlantic, is, he says, truly astonishing. In conclusion, Mr. Lyell states, that he had just received a letter from Mr. Logan, announcing the existence of the bottom clay, with *Stigmariæ*, in Nova Scotia; and that Mr. Logan had visited Mauch Chunk.

Dec. 1.—A paper was read containing a “Description of the Remains of Six Species of Marine Turtles (*Chelones*) from the London Clay of Sheppey and Harwich.” By Richard Owen, Esq., F.R.S., F.G.S., Hunterian Professor in the Royal College of Surgeons.

The author commences by quoting the generalizations given in the latest works which treat of Fossil Chelonians, and examines the evidence on which those from the Eocene clay of Sheppey had been referred exclusively to the freshwater genus *Emys* by Cuvier and others, and he points out the circumstances which invalidate the conclusions that had been deduced from it. He then proceeds to describe the fossils and to show the characters by which he has established the existence of five species of marine turtles from the London Clay at Sheppey, and a sixth species from the same formation near Harwich.

1. *Chelone breviceps*.—The first species, found at Sheppey, is called by the author *Chelone breviceps*, and its unequivocal marine nature was recognised by a nearly perfect cranium, wanting only the occipital spine, and presenting a strong and uninterrupted roof, extended from the parietal spine on each side over the temporal openings; the roof being formed chiefly by a great development of the posterior frontals. Further evidence of its marine origin exists in the large size and lateral aspect of the orbits, their posterior boundary extending beyond the anterior margin of the parietals; also in the absence of the deep emargination which separates the superior maxillary from the tympanic bone in freshwater tortoises, especially the *Emys expansa*.

In general form the skull resembles that of the *Chelone Mydas*, but it is relatively broader, the anterior frontals are less sloping, and the anterior part of the head is more vertically truncate: the median frontals also enter into the formation of the orbits in rather a larger proportion than in *C. Mydas*. In *Chelone imbricata* they are wholly excluded from the orbits.

The trefoil shape of the occipital tubercle is well-marked; the laterally expanded spinous plate of the parietal bones is united by a straight suture to the post-frontals along three-fourths of its extent, and for the remaining fourth with the temporal or zygomatic element.

These proportions are reversed in the *Emys expansa*, in which the similarly expanded plate of the parietals is chiefly united laterally with the temporal bones. In other freshwater tortoises the parietal plate in question does not exist.

The same evidence of the affinity of the Sheppey Chelonite in question to the marine turtles is afforded by the base of the skull:—the basi-occipital is deeply excavated; the processes of the pterygoids which extend to the tympanic pedicles are hollowed out lengthwise; the palatal processes of the superior maxillary and palatine bones are continued backwards to the extent which characterizes the existing Chelonianæ; and the posterior or internal opening of the nasal passages is, in a proportional degree, carried further back in the mouth. The lower opening of the zygomatic spaces is wider in the Sheppey Chelonite than in the *Emys expansa*.



The external surface of the cranial bones in the fossil is broken by small irregular ridges, depressions, and vascular foramina, which give it a rough shagreen-like character.

The lower jaw, which is preserved in the present fossil, likewise exhibits two characters of the marine turtles; the dentary piece, *e. g.*, forms a larger proportion of the lower jaw than in land or fresh-water tortoises. The under part of the symphysis, which is not larger than in *Chelone Mydas*, is slightly excavated in the fossil.

In the rich collection of Sheppey fossils belonging to Mr. Bowerbank, there is a beautiful Chelonite, including the carapace, plastron, and the cranium, which is bent down upon the forepart of the plastron; and which, though mutilated, displays sufficient characters to establish its specific identity with the skull of the *Chelone breviceps* just described. The outer surface of the carapace and plastron has the same finely rugous character as that of the cranium, in which we may perhaps perceive a slight indication of the affinity with the genus *Trionyx*.

The carapace is long, narrow, ovate, widest in front, and tapering towards a point posteriorly; it is not regularly convex, but slopes away, like the roof of a house, from the median line, resembling in this respect, and its general depression, the carapace of the turtle. There are preserved eleven of the vertebral plates, the two last alone being wanting. The eight pairs of expanded ribs are also present, with sufficient of the narrower tooth-like extremities of the six anterior pairs to determine the marine character of the fossil, which is indicated by its general form. Other minute characters are detailed; and a comparison with the Chelonite from the tertiary beds near Brussels, figured by Cuvier, is instituted.

The sternum of the *Chelone breviceps*, although more ossified than in existing Chelonixæ, yet presents all the essential characters of that genus. There is a central vacuity left between the hyosternals and hyposternals; but these bones differ from those of the young *Emys* in the long pointed processes which radiate from the two anterior angles of the hyosternals, and the two posterior angles of the hyposternals.

The xiphisternals have the slender elongated form and oblique union by reciprocal gomphosis with the hyposternals, which is characteristic of the genus *Chelone*.

The posterior extremity of the right episternal presents the equally characteristic slender pointed form.

With these proofs of the sternum of the present fossil being modified according to the peculiar type of the marine Chelones, there is evidence, however, that it differs from the known existing species in the more extensive ossification of the component pieces: thus, the pointed rays of bone extend from a greater proportion of the margins of the hyo- and hyposternals, and the intervening margins do not present the straight line at right angles to the radiated processes.

In the *Chelone Mydas*, for example, one half of the external margin of the hyo- and hyposternals, where they are contiguous, are straight, and intervene between the radiated processes, which are developed from the remaining halves; while in the *Chelone breviceps* about a



sixth part only of the corresponding external margins are similarly free, and there form the bottom, not of an angular, but a semicircular interspace.

The radiated processes from the inner margins of the hyo- and hyposternals are characterized in the *Chelone breviceps* by similar modifications, but their origin is rather less extensive; they terminate in eight or nine rays, shorter and with intervening angles more equal than in existing *Chelones*. The xiphisternal piece receives in a notch the outermost ray or spine of the inner radiated process of the hyposternal, as in the *Chelones*, and is not joined by a transverse suture, as in the *Emydes*, whether young or old.

The characters thus afforded by the cranium, carapace, plastron, and some of the bones of the extremity, prove the present Sheppey fossil to belong to a true sea-turtle; and at the same time most clearly establish its distinction from the known existing species of *Chelone*; from the shortness of the skull, especially of the facial part as compared with its breadth, the author proposes to name this extinct species *Chelone breviceps*.

2. *Chelone longiceps*.—The second species of Sheppey turtle, called *Chelone longiceps*, is founded upon the characters of the cranium, carapace, and plastron. The cranium differs more from those of existing species, by its regular tapering into a prolonged pointed muzzle, than does that of the *Chelone breviceps* by its short and truncated jaws.

The surface of the cranial bones is smoother; and their other modifications prove the marine character of the fossil as strongly as in the *Chelone breviceps*.

The orbits are large, the temporal fossæ are covered principally by the posterior frontals, and the exterior osseous shield completely overhangs the tympanic and ex-occipital bones. The compressed spine of the occiput is the only part that projects further backwards.

The palatal and nasal regions of the skull afford further evidence of the affinities of the present Sheppey Chelonite to the Turtles. The bony palate presents in an exaggerated degree its great extent from the intermaxillary bones to the posterior nasal aperture, and it is not perforated, as in the *Trionyxes*, by an anterior palatal foramen.

The extent of the bony palate is relatively greater than in the *Chelone Mydas*; the trenchant alveolar ridge is less developed than in the *Chel. Mydas*; the groove for the reception of that of the lower jaw is shallower than in the existing *Chelonixæ*, or the extinct *Chel. breviceps*, arising from the absence of the internal alveolar ridge.

The present species is distinguished by the narrowness of the sphenoid at the base of the skull, and by the form and groove of the pterygoid bones, from the existing *Chelonixæ*, and *à fortiori* from the *Trionyxes*; to which, however, it approaches in the elongated and pointed form of the muzzle, and the trenchant character of the alveolar margin of the jaws.

The general characters of the carapace are next given, and a specimen from Mr. Bowerbank's collection is more particularly described.

This carapace, as compared with that of the *C. breviceps* in the same collection, presents the following differences: it is much broader

and flatter; the vertebral plates are relatively broader; the lateral angle, from which the intercostal suture is continued, is much nearer the anterior margin of the plate; the *C. longiceps* in this respect resembling the existing species: the expanded portions of the ribs are relatively longer; they are slightly concave transversely to their axis on their upper surface, while in *C. breviceps* they are flat. The external surface of the whole carapace is smoother, and although as depressed as in most turtles, it is more regularly convex, and sloping away by two nearly plane surfaces from the median longitudinal ridge of the carapace.

Among the minor differences of the two Sheppey fossils the author states, that the first vertebral plate of *C. longiceps* is more convex at its middle part, and sends backwards a short process to join the second vertebral plate, in which it resembles the *C. Mydas*. The second plate is six-sided, the two posterior lateral short sides being attached to the second pair of ribs, in which the present species differs from both *C. Mydas* and *C. breviceps*. The third vertebral plate is quadrangular instead of the second, as in *C. breviceps* and *C. Mydas*. The impressions of the epidermal scutes are deeper, and the lines which bound the sides of the vertebral scutes meet at a more open angle than in the *C. breviceps*, in which the vertebral scutes have the more regular hexagonal form of those of the *C. Mydas*.

The plastron is more remarkable than that of the *C. breviceps* for the extent of its ossification, the central cartilaginous space being reduced to an elliptical fissure. The four large middle pieces, called hyosternals and hyposternals, have their transverse extent relatively much greater, as compared with their antero-posterior extent, than in *C. breviceps*. The median margins of the hyosternals are developed in short toothed processes along their anterior two-thirds; and the median margins of the hyposternals have the same structure along their posterior halves.

The xiphisternals are relatively broader than in *C. breviceps* or in any of the existing species, and are united together by the whole of their median margins. The entosternal piece is flat on its under surface.

Each half of the plastron is more regularly convex than in *C. Mydas*. The breadth of the sternum along the median suture, uniting the hyosternals and hyposternals, is five inches; and the breadth at the junction of the xiphisternals with the hyposternals is two inches.

The posterior part of the cranium is preserved in this fossil, withdrawn beneath the anterior part of the carapace; the fracture shows the osseous shield covering the temporal fossæ; and the pterygoids remain, exhibiting the wide and deep groove which runs along their under part.

It has been most satisfactory, the author says, to find that the two distinct species of the genus *Chelone*, first determined by the skulls only, should thus have been established by the subsequent observation of their bony cuirasses; and that the specific differences manifested by the cuirasses should be proved by good evidence to be characteristic of the two species founded on the skulls.

Thus the portion of the skull preserved with the carapace first



described, served to identify that fossil with the more perfect skull of the *Chelone breviceps*, by which the species was first indicated. And, again, the portion of the carapace adhering to the perfect skull of the *Chelone longiceps* equally served to connect with it the nearly complete osseous buckler, which otherwise, from the very small fragment of the skull remaining attached to it, could only have been assigned conjecturally to the *Chel. longiceps*; an approximation which would have been the more hazardous, since the *Chel. breviceps* and *Chel. longiceps* are not the only turtles which swarm those ancient seas that received the enormous argillaceous deposits of which the isle of Sheppey forms a part.

3. *Chelone latiscutata*.—A considerable portion of the bony cuirass of a young turtle from Sheppey, three inches in length, including the 2nd to the 7th vertebral plates, with the expanded parts of the first six pairs of ribs, and the hyosternal and hyposternal elements of the carapace, most resembles that of the *Chelone coniceps* in the form of the carapace, and especially in the great transverse extent of the above-named parts of the sternum; it differs, however, from the *Chel. longiceps* and from all the other known Chelonites in the great relative breadth of the vertebral scutes, which are nearly twice as broad as they are long.

The central vacuity of the plastron is subcircular, and, as might be expected, from the apparent nonage of the specimen, is wider than in the *Chel. longiceps*; but the toothed processes given off from the inner margin of both hyo- and hyposternals are small, subequal, regular in their direction, and thus resemble those of the *Chel. longiceps*.

The length of the expanded part of the third rib is one inch seven lines; its antero-posterior diameter or breadth, six lines; in the form of the vertebral extremities of the ribs and of the vertebral plates to which they are articulated, the present fossil resembles the *Chel. longiceps*.

The author knows of no recent example, however, of the *Chelone* that offers such varieties in the form of its epidermal scutes as would warrant the present Chelonite being considered a variety merely of the *Chel. longiceps*; and he therefore indicates the distinct species which it seems to represent, by its main distinctive character, under the name of *Chelone latiscutata*.

4. *Chelone convexa*.—The fourth species of *Chelone*, indicated by a nearly complete cuirass, from Sheppey, holds a somewhat intermediate position between the *C. breviceps* and *C. longiceps*; the carapace being narrower and more convex than that of *C. coniceps*; broader, and with a concavity arising from a more regular curvature than in *C. breviceps*. The expanded parts of the ribs have an intermediate length with those of the two *Chelones* with which this specimen is compared, and therefore is a difference independent of age.

The distinction of *C. convexa* is still more strikingly established in the plastron, which in its defective ossification more nearly resembles that of the existing species of *Chelone*. All the bones, especially the xiphisternals, are more convex on their outer surface than in other turtles, recent or fossil. The internal rays of the hyosternals are



divided into two groups; the lower consisting of two short and strong teeth projecting inwards, while the rest extend forwards along the inner side of the episternals. The same character may be observed in the corresponding processes of the hyposternals, but the external process is relatively much narrower than in *C. breviceps*. The following differences are stated to distinguish the sternum of *C. convexa* from that of *C. Mydas*. The median margin of the hyposternals forms a gentle curve, not an angle: that of the hyposternals is likewise curved, but with a slight notch. The longitudinal ridge on the external surface, and near the median margin of the hypo- and hyposternals, is less marked in the Sheppey fossil; especially in the hyposternals, which are characterized by a smooth concavity in their middle.

The suture between the hypo- and hyposternals is nearer to the external transverse radiated process of the hyposternals. The median vacuity of the sternal apparatus is elliptical in the *Chel. convexa*, but square in the *Chel. Mydas*.

The characteristic lanceolate form of the episternal bone in the genus *Chelone* is well seen in the present fossil.

The true marine character of the present Sheppey Chelonite is likewise satisfactorily shown in the small relative size of the entire femur which is preserved on the left side, attached by the matrix to the left xiphisternal. It presents the usual form, a slight sigmoid flexure, characteristic of the *Chelones*; it measures one inch in length. In an *Emys* of the same size, the femur, besides its greater bend, is  $1\frac{1}{2}$  inch in length.

5. *Chelone subcristata*.—The fifth species of *Chelone* from Sheppey, distinguishable by the characters of its carapace, approaches more nearly to the *Chelone Mydas* in the form of the vertebral scutes, which are narrow in proportion to their length, than in any of the previously described species; but is more conspicuously distinct by the form of the 6th and 8th vertebral plates, which support a short, sharp, longitudinal crest. The middle and posterior part of the first vertebral plate is raised into a convexity, as in the *Chel. longiceps*, but not into a crest.

The keeled structure of the sixth and eighth plates is more marked than in the fourth and sixth plates of *Chelone Mydas*, which are raised into a longitudinal ridge.

The characters of the carapace are then minutely described.

Sufficient of the sternum is exposed in the present fossil to show, by its narrow elongated xiphisternals, and the wide and deep notch in the outer margin of the conjoined hypo- and hyposternals, that it belongs to the marine *Chelones*.

The xiphisternals are articulated to the hyposternals by the usual notch or gomphosis; they are straighter and more approximated than in the *Chel. Mydas*; the external emargination of the plastron differs from that of the *Chel. Mydas* in being semicircular instead of angular, the *Chel. subcristata* approaching, in this respect, to the *Chel. breviceps*.

The shortest antero-posterior diameter of the conjoined hypo- and hyposternals is two inches seven lines. The length of the xiphi-

sternal two inches six lines. The breadth of both, across their middle part, one inch three lines.

The name proposed for this species indicates its chief distinguishing character, viz. the median interrupted carina of the carapace, which may be presumed to have been more conspicuous in the horny plates of the living animal than in the supporting bones of the fossilized carapace.

6. *Chelone planimentum*.—This species is founded on an almost entire specimen of skull and carapace of the same individual, in the museum of Prof. Sedgwick; on a skull and carapace belonging to different individuals, in the museum of Prof. Bell; and on a carapace in the British Museum; all of which specimens are from the London clay at Harwich.

The skull resembles, in the pointed form of the muzzle, the *Chel. longiceps* of Sheppey, but differs in the greater convexity and breadth of the cranium, and the great declivity of its anterior contour.

The great expansion of the osseous roof of the temporal fossæ, and the share contributed to that roof by the post-frontals, distinguish the present, equally with the foregoing Chelonites, from the fresh-water genera *Emys* and *Trionyx*. In the oblique position of the orbits, and the diminished breadth of the interorbital space, the present Chelonite, however, approaches nearer to *Trionyx* and *Emys* than the previously described species.

Its most marked and characteristic difference from all existing or extinct Chelones is shown by the greater antero-posterior extent and flatness of the under part of the symphysis of the lower jaw, whence the specific name here given to the species.

Since at present there is no means of identifying the well-marked species of which the skull is here described with the Chelonite figured in the frontispiece to Woodward's 'Synoptical Table of British Organic Remains,' and alluded to without additional description or characters as the '*Chelonia Harvicensis*' in the additions to Mr. Gray's 'Synopsis Reptilium,' p. 78, 1831; and since it is highly probable that the extensive deposit of Eocene clay along the coast of Essex, like that at the mouth of the Thames, may contain the relics of more than one species of our ancient British turtles, the author prefers indicating the species here described by a name having reference to its peculiarly distinguishing character, to arbitrarily associating the skull with any carapace to which the vague name of *Harvicensis* has been applied.

Besides the specimen of Chelonite from Harwich, in the museum of Norwich, figured by Woodward, there is a mutilated carapace of a young *Chelone* from the same locality in the British Museum. This specimen exhibits the inner side of the carapace, with the heads and part of the expanded bodies of four pairs of ribs. It is not sufficiently entire to yield good specific characters, but it demonstrates unequivocally its title to rank with the marine turtles. It is figured in Mr. Kœnig's 'Icones Sectiles,' pl. xvi. fig. 192, under the name of *Testudo plana*.

The carapace of a larger specimen of *Chelone*, from the coast of Harwich, was purchased, by the British Museum, of Mr. Charles-



worth, by whom a lithograph of the inner surface of this Chelonite, of the natural size, has been privately distributed, without description.

The carapace in the museum of Prof. Sedgwick, forming part of the same individual (*Chelone planimentum*) as the skull above described, exhibits many points of anatomical structure more clearly than the last-mentioned Chelonite in the British Museum; it also displays the characteristic coracoid bone of the right side in its natural relative position. The resemblance of this carapace in general form to that of the *Chelone caretta* is pretty close; it differs from that and other known existing turtles, and likewise from most of the fossil species, in the thickness and prominence of the true costal portions of the expanded vertebral ribs, which stand out from the under surface of the plate through their entire length, and present a somewhat angular obtuse ridge towards the cavity of the abdomen.

In the large proportional size of the head, the *Chelone planimentum* corresponds with the existing turtles; and that the extinct species here described attained larger dimensions than those given above, is proved by a fossil skull from the Harwich clay, in the collection of Prof. Bell, which exhibits well the character of the broad and flattened symphysis.

A carapace of a smaller individual of *Chelone planimentum* from the Harwich coast, with the character of the inwardly projecting ribs strongly marked, is likewise preserved in the choice collection of the same excellent naturalist. One of the hyosternal bones enclosed in the same nodule of clay testifies to the partial ossification of the plastron in this species.

In the summary of the foregoing details the author observes, that they lead to conclusions of much greater interest than the previous opinions respecting the Chelonites of the London basin could have originated. Whilst these were supposed to have belonged to a fresh-water genus, the difference between the present fauna and that of the Eocene period, in reference to the Chelonian order, was not very great; since the *Emys* or *Cistudo Europæa* still abounds on the Continent, and lives long in our own island in suitable localities: but the case assumes a very different aspect when we come to the conviction, that the majority of the Sheppey Chelonites belong to the true marine genus *Chelone*; and that the number of species of the Eocene extinct turtles already obtained from so limited a space as the isle of Sheppey exceeds that of the species of existing *Chelone*.

Notwithstanding the assiduous search of naturalists, and the attractions to the commercial voyager which the shell and the flesh of the turtles offer, all the tropical seas of the world have hitherto yielded no more than five well-defined species of *Chelone*, and of these only two, as the *C. Mydas* and *C. caretta*, are known to frequent the same locality.

The indications which the Sheppey turtles afford of the warmer climate of the latitude in which they lived, as compared with that which prevails there in the present day, accord with those which all the organic remains of the same depositary have hitherto yielded in reference to this interesting point.

That abundance of food must have been produced under such influences cannot, Mr. Owen states, be doubted; and he infers, that to



some of the extinct species—which, like the *C. coniceps* and *C. platygnathus*, exhibit either a form of head well adapted for penetrating the soil, or with modifications that indicate an affinity to the *Trionyxes*—was assigned the task of checking the undue increase of the extinct crocodiles of the same epoch and locality, by devouring their eggs or their young, becoming probably, in return, themselves an occasional prey to the older individuals of the same carnivorous saurian

## MISCELLANEOUS.

### RESULTS OF DEEP DREDGING.

*To the Editors of the Annals of Natural History.*

GENTLEMEN,—Observing my name in connection with an article in your Magazine of last month, showing the results of deep dredging off the Mull of Galloway, I am induced to trouble you with a few remarks as to those results.

The depths mentioned in that article are, I believe, far greater than any which had been previously explored on the British coast. My own experience (which has been very considerable) has not enabled me to obtain the result of any greater depth than 50 fathoms. But I was somewhat disappointed on perusing the article to observe such a scanty list of rariora and total absence of novelties, where such discoveries might have been well looked for, and also at the rare occurrence of living specimens. The species which appear to be peculiar to the west and north coasts of Scotland, and all of which I noticed in my list of Oban shells, (viz. the *Trichotropis acuminatus*, *Pecten niveus* and *Astarte semisulcata*,) appear to be wanting at the depths and locality explored by Capt. Beechey; besides the *Pecten aculeatus*, which has been also dredged off the Isle of Arran and in Cork Harbour. The *Trochus elegans* in my list of Oban shells (named *millegranus* in your Magazine) has been obtained by me from seven or eight different localities in Scotland and Ireland; and I this autumn procured it abundantly, by dredging off Fishguard, on the Pembrokeshire coast. *Nucula minuta*, and all the three species of *Lima*, have been found on different parts of the English coast. *Eulima Donovanii* (*E. polita* of British authors, but not of Risso, who first published the name,) was found by me to be not uncommon in the Shetland Isles.

Nothing at present occurs to me with reference to the recorded results of dredging obtained by my friend Mr. Forbes, as I presume his researches were instituted principally with a view to elucidate certain geological principles.

I take this opportunity of observing, that the *Eulima decussata* (n. s.) in my list of Oban shells had been previously found at Exmouth by Mr. Clark, who named it "*Pyramidella Jeffreysii*," and this autumn by myself at Fishguard. The *E. crassula* in the same list has not, as far as I can learn, been obtained from any other locality. The *Corbula rostrata* in the same list had been, it seems, previously published by Capt. Brown, under the name of *Anatina rostrata*, and Mr. Gray has proposed for it the new generic name of *Neara*.

I am, Gentlemen, your faithful servant,

10th October, 1842.

J. GWYN JEFFREYS, F.R. & L.SS.

*Description of a new species of Thracia.* By C. B. Adams.  
*Thracia inequalis.* T. testa fragili, per-inequilaterali, per-inequivalvi, irregulariter striata, postice truncata; valva sinistra subplanulata; altera per-convexa; callo nymphali cochleariformi, anterieus elongato; ossiculo lunato, semicirculari.

*Shell* white, very thin, before broadly and behind narrowly truncate, very inequilateral and inequivalve, much deflected to the left anteriorly; with the striæ of growth unequal, numerous and crowded at the extremities, where, under a magnifier, the surface appears shagreened by minute wrinkles of the striæ; *epidermis* very thin, brownish, thicker at the extremities; *left valve* nearly flat, with five obtuse angles radiating from the beak; *right valve* much larger and very convex, emarginate in the whole of the posterior truncation, with a groove and elevated umbonal angle defining the areolar region, its inferior margin sinuous; *beaks* small, pointed, lamelliform, the right one moderately excavated for the reception of the other; *nymphæal callosities* spoon-shaped, very much produced forwards and inwards; *ossiculum* semicircular and lunate, with an impression on the centre of each side, but much deeper on one side, situated between the spoon-shaped apophyses and the dorsal margin.

*Dimensions.*—Length 1·2 inch; height ·75 inch; width ·45 inch; length of ossiculum ·1 inch\*. *Hab.* Gulf of Mexico.

*Remarks.*—A single specimen of this interesting species was presented to the cabinet of this college by the Rev. Wm. T. Hamilton, of Mobile, Ala. It is remarkable for the disparity of the valves, the irregularity of its form, and the sharp lamelliform beaks.—*From Siliman's American Journal for July 1842.*

#### BIRDS OF KENT.

Mr. Mummery of Margate sends us the following notices of birds which have lately been met with by him in and near the Isle of Thanet.

Sept. 29, near Reculvers, having just shot several red-starts, *Sylvia Phœnicurus*; he observed a small bird not unlike a female red-start, and having shot it found it to be a very fine female blue-throated warbler, *Sylvia suecica*, only two instances of the occurrence of which are recorded by Mr. Yarrell. It is placed in the Margate Museum. A very fine adult male hen-harrier, *Buteo cyaneus*, has just been received, shot by W. Mockett, Esq., of Sandwich, and presented by him to the museum. Sept. 9, near Reculvers, *Scelopax major*, very large, weighing half a pound and half an ounce. About the middle of September several specimens of the spotted crane. A great number of the common gannet have made their appearance as usual at this season. These birds pay us a regular visit with the herrings, following them for food; I have known several to be picked up along the coast either dead or in a stupid state.

"This autumn," Mr. Mummery adds, "we have had very few terns; in fact, I never knew so few. The common tern used to breed rather plentifully along the coast between Margate and Reculvers; but within these ten years they have abandoned the beach

\* The ossiculum is enlarged about  $2\frac{1}{2}$  linear diameters.



altogether, and betaken themselves to better quarters about Lydd, near Romney. The lesser tern I have formerly obtained pretty plentifully about Sandwich flats, but this autumn I have not seen one. I do not know how to account for their non-appearance.

“The common gull, black-headed gull, Kittiwake gull and herring-gull are very abundant, appearing in immense flights intermixed with the great black-backed gull. This last is a beautiful and noble bird, but very difficult to get a shot at. Of the herring-gull, a few pairs breed every year about the high cliffs at St. Margaret’s, near Dover, as well as the common or foolish guillemot, the young affording fine sport for the visitors about September.

“The glaucous gull and the lestris I have noticed in your Magazine before. Two beautiful specimens of Leach’s petrel have been taken: they are in our museum. One of them was found near Margate, the other near St. Nicholas, about seven miles from thence: the first was found alive, and was secured without any difficulty. These birds often visit our coast in rough windy weather, as well as the stormy petrel; the last being more plentiful. They are often brought to me alive by sailor-boys, who when they find them set up a-hallooing with all their might: the bird then is soon caught, running anywhere for security.

No. 8, Cecil-street, Margate.

“S. MUMMERY.”

**METEOROLOGICAL OBSERVATIONS FOR SEPTEMBER 1842.**

*Chiswick*.—September 1. Constant rain: temperature increasing towards night. 2. Overcast: sultry. 3. Overcast: clear. 4. Cloudy and fine. 5. Foggy: very fine. 6. Very fine: clear. 7. Slight fog: fine. 7—10. P.M. violent thunder-storm, much sheet- and sometimes forked lightning: heavy rain, with some hail: clear at night. 8. Boisterous, with heavy rain. 9. Rain: cloudy. 10. Showery. 11—15. Very fine. 16. Foggy: fine. 17. Cloudy: rain. 18. Fine, with slight haze: rain. 19. Cloudy: showers. 20. Showery. 21. Cloudy and fine: clear. 22. Foggy: cloudy and fine: slight rain. 23. Overcast: heavy rain. 24. Rain: overcast. 25. Slight showers: stormy, with rain at night. 26. Heavy clouds and showers: clear. 27. Overcast: stormy and wet. 28. Fine. 29. Clear: boisterous, with rain. 30. Clear and fine: slight rain. Mean temperature of the month  $0^{\circ}47'$  above the average.

*Boston*.—Sept. 1. Cloudy: rain early A.M. 2—5. Fine. 6. Cloudy. 7. Fine: rain, with thunder and lightning at night. 8. Cloudy. 9. Cloudy: rain early A.M.: rain P.M. 10. Cloudy: rain early A.M.: rain P.M., with thunder and lightning. 11. Cloudy. 12. Cloudy: rain early A.M. 13. Fine. 14—16. Cloudy. 17. Fine: rain P.M. 18, 19. Cloudy: rain early A.M. 20. Fine. 21. Cloudy. 22. Rain. 23. Rain: rain early A.M.: rain P.M. 24. Fine. 25. Cloudy: rain early A.M. 26, 27. Cloudy. 28. Stormy: rain early A.M. 29. Rain and stormy: rain early A.M. 30. Cloudy: rain early A.M.

*Sandwich Manse, Orkney*.—Sept. 1—3. Showers. 4. Showers: cloudy. 5. Bright: rain. 6. Rain: clear. 7. Damp: cloudy. 8. Rain. 9. Cloudy: rain. 10. Clear: aurora. 11. Bright: fog. 12. Bright: cloudy. 13. Drizzle: cloudy. 14, 15. Bright: cloudy. 16. Cloudy: drops. 17. Cloudy: clear. 18. Bright: clear. 19. Cloudy: rain. 20. Cloudy. 21. Rain: clear. 22. Rain: drizzle. 23. Damp: drizzle. 24. Cloudy. 25. Bright: cloudy. 26. Cloudy: showers. 27. Bright: cloudy. 28, 29. Cloudy: clear. 30. Cloudy.

*Applegarth Manse, Dumfries-shire*.—Sept. 1. Very wet morning. 2. Fair but cloudy. 3. Rain P.M. 4. Fine and fair. 5. Thick: rain P.M. 6. Fair but cloudy. 7. Fair and fine. 8. Heavy rain early A.M. 14. Cloudy and moist. 15, 16. Fair but cloudy. 17. Rain A.M. 18. Fair and fine: lightning. 19. Fair and fine: thunder. 20. Fair and fine. 21. Fair and fine: thunder. 22. Fair and fine till P.M.: rain. 23. Rain early A.M. 24. Rain. 25—28. Fair and cool. 29. Fair and cool: a few drops. 30. Fair and cool.





THE ANNALS  
AND  
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No. 65. DECEMBER 1842.

XXXV.—*On the Life and Writings of J. P. E. Vaucher.*

By ALPHONSE DECANDOLLE.

[Concluded from p. 168.]

IN general M. Vaucher distinguishes two species of fecundation, one direct, the other indirect. In the first, the grains of pollen are immediately applied or fall from the anther on the stigma. This is the case with tulips, rushes, *Petunia*, *Myriophyllum*, &c.

In the second case, the grains of pollen at first fall on other parts of the flower, and then act on the stigma in an indirect (*détournée*) manner, which he expresses vaguely by the word *émanation*, or by analogous terms. In the indirect fecundation, it often appears to him that the hairs of the interior of the corollas contribute, with the nectar, to determine the action of the pollen. Here are some examples:—

“The bottom of the flowers of the *Lagenaria* is a melliferous basin, formed by the depression of the torus, and which supplies the honeyed matter in such abundance, that it rises between the stamens and bathes their summits. . . . Fecundation takes place more easily in the *Lagenaria* than in the other *Cucurbitaceæ*, because the limb of their corolla is horizontally disposed; nevertheless, as the anthers and the pistils continue entirely merged (*engagés*) in the tube, there can be scarcely a doubt but that it takes place by means of the glutinous and moist hairs which cover the interior part of the petals, and to which the pollen at first attaches itself, whose globules bursting transmit their *émanations* to the stigma. After fecundation the corolla closes, and the honeyed humour issues in abundance out of the cup, for the purpose of bathing the stigma entirely and accomplishing the impregnation. This manner of fecundation applies to the greater part of the *Cucurbitaceæ*.”

In speaking of the genus *Clematis*, M. Vaucher remarks a lateral rather than an extrorse position in the anthers, as is

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generally described in the true *Ranunculaceæ*. He adds that the *C. integrifolia* has introrse anthers, which is perfectly accurate. "The exterior stamens open first, and spread themselves backwards (*s'écartent*), after having scattered their whitish powder, which falls abundantly to the bottom of the flower. The others take their place and elongate in their turn. The stigma is always an enlarged ligula (*languette*), papillose and turned outwards. I am not aware that I perceived any nectariferous organ; but I have often remarked, especially in the *C. Vitalba*, *cirrhusa*, &c., honeyed drops adhering to the filaments of the stamens. . . . . In those species whose styles are hairy, the hairs without doubt serve to retain and to preserve the pollen for a longer time; but in the *Viticellæ* with drooping flowers, where the styles, almost always smooth, are placed in close juxtaposition, the anthers, which are exactly lateral, turn back the edges of their walls (*parois*) in order to cast their pollen on the stigmas; and gradually as they shed their pollen they fall back to make way for others situated more interiorly, which also turn themselves backwards in a similar manner. In the *Flammulæ* with erect flowers, whose extrorse lateral anthers do not elevate themselves above the stigmas ordinarily arranged in close juxtaposition, the fecundation appeared for a long while inexplicable, or, if I may venture so to speak, badly contrived, until I discovered the singular manner in which it was effected. The sepals are felt-like, and have their interior covered with moist and glandular hairs, which are the agents in effecting it; for this purpose they receive the pollen immediately from the anthers, which with their filaments fall after shedding their pollen; at the same time the stigmas, wonderfully papillose, cast themselves down, and turn about in different directions for the better reception of the molecules of the pollen; as may be seen in the *Flammula*, the *Vitalba*, and especially in the *orientalis*."

The flowering of the *Garidella Nigellastrum* is described in the following manner:—"At the epoch of fecundation the stamens are curved over the centre of the flower, and their anthers cover the as yet undeveloped stigmas (*stigmates non encore conformés*). In this situation they open their walls (*parois*) from bottom to top, so that their pollen, always adherent, is situated exteriorly and out of all contact with the stigmas. It can then only scatter itself on the swollen and glutinous hairs at the summit which cover the bilabiate petals or nectaries, and by which it is retained. It is then afterwards, and only when the anthers in withering have uncovered it, that the bi-



labiate and at that time papillose stigma can in my opinion receive the fecundating dust; moreover this stigma is very short.”

I quote these observations on the flowers of some plants in the author's own words, not for the sake of adhering to his theory on the action of the nectar, with which I think he is rather too much possessed, but to show the use which may be made of his book. In it we find accurate descriptions of the situation of the nectariferous glands, of the evolution of the floral organs, of their relative approximation, of the epoch when the pollen issues from the anthers, &c., things very important, but until the present time little known. This is the true service which M. Vaucher has rendered to science. As to the indirect fecundation by the nectar, I confess that I feel doubts in the greater part of the cases, as he himself acknowledges with much sincerity in some of the examples\* of which he speaks. I cannot comprehend how grains of pollen, opening in the nectar at the bottom of the flower, can get upon the stigma; I see that the rupture of the grains of pollen by any other liquid than the viscous humour of the stigma, for example by the rain, is a vexatious accident, which hinders the fecundation; in short, I do not comprehend why certain plants with direct fecundation, according to M. Vaucher himself, are provided with nectaries, and produce a very abundant honeyed humour†. Had we been so happy as to have had M. Vaucher amongst us after the publication of his book, I should have submitted these scruples to him, and with his usual honesty and sincere desire to ascertain the truth, he would have removed or adopted them.

The respect which I feel for his memory cannot be combined with a disguise which he detested. I therefore do not conceal my doubts. If fresh observations, directed by the work of our ingenious countryman, should lead me to his opinion, I shall hasten to avow it. However, the attention of botanists is awakened to this class of phænomena, and this alone is a service rendered by M. Vaucher.

Observations of another kind, and very various, are also to be found in his work. The following are some taken at hazard:—“When at the end of the summer we visit the running or tranquil waters which the *Myriophylla* inhabit, we see their bare stems stretched in long cords on the surface of these same waters whose level is lowered. We then find that their roots of the year are destroyed, and that others have succeeded them, and we easily recognise underneath the new stems the

\* Vol. i. pp. 60, 62.

† It is the case with the tulips and the crown imperial.

point of rupture of the old ones. These plants are also reproduced in two other ways: first, by natural slips (*boutures*), as the greater part of aquatic plants; and also in the manner of the *Utricularia*, by their sterile stems. At the end of summer, indeed, we see the tops of these stems forming a dense bud of undeveloped leaves, destitute of stipules and scales, but copiously covered with a resinous varnish: now this bud, which we should suppose destined to prolong the stem, on the contrary becomes detached from it, and in spring-time develops on one side leaves and on the other roots."

In the *Nymphæaceæ* the seeds germinate near the surface of the water at the beginning of spring.

The *Melampyrum pratense*, *arvense* and *sylvaticum* turn their flowers towards the light, which is not the case with *Melampyrum cristatum*. There is a similar observation on the *Narcissi*, the flowers of which incline towards the light by a double movement, that of the pedicel which bends, and that of the peduncle which twists. During maturation the pedicel and the capsule become erect, but the peduncle remains twisted.

"The most remarkable characteristic of the genus *Alstrœmeria* is the tendency of the leaves to twist upon their petioles; and what is singular in this is, that they have been predisposed for this arrangement, for, contrary to others, their upper surface is dull and whitish, whilst the lower surface is shining and of a fine green colour. This singularity, which pertains in different degrees to all the *Alstrœmeriæ*, is so independent of temperature and of various atmospheric circumstances, that these leaves, twisted at the base, do not unroll when they are plunged into water."

The capsule of *Cerastium*, at first ovoid, lengthens insensibly, and finally becomes a tube more or less curved in the form of a trumpet, and ordinarily divided into a number of teeth double that of the styles. This singular conformation serves in the first instance to protect the seeds, and afterwards favours their dissemination instead of hindering it. The walls of the curved tube are in fact so thin and so elastic, that on the least agitation of the air, and sometimes even in the calmest weather, the seeds may be seen to escape by sliding rapidly along the tube, whose structure increases the movement. I have often tried to follow them with a magnifying glass, but they always escaped me by their extreme rapidity. We may assert that they are projected by an unknown power.

"The bulbs of *Orchis* are placed alternately right and left, so that they cannot be truly said to advance always on the same side, since, on the contrary, they constantly occupy the

same place. The gemma, or point whence the new plant proceeds, is situated near the summit, and at the side or rather at the summit of the bud of the year; thus the *Orchis* is a plant which never dies.

“The *Neottia nidus-avis* often grows in the midst of the remains of half-decomposed leaves, and this is the reason it was for a long time considered a parasite; but I found its form of reproduction in the middle of the plexus of its cylindrical radicles. In fact, when we examine these roots, which in their general appearance resemble a bird’s nest, we see some amongst them lengthen and branch out in the form of a star at the summit, in order to put forth from this star-shaped centre a small conical stem entirely covered with undeveloped radicles; it is this stem, already swollen into a bulb and remarkable for its whiteness, which is destined to form the new plant of the new year, and this is the reason why the *nidus-avis* grows several together, and does not remain solitary as do most of the *Orchideæ*. From the month of August we see its dried-up stem ruptured at the base, and its non-proliferous radicles perished, whilst the others elongate and grow. From this dead plexus in short proceed one, two, three, or even four new gemmæ destined to flower the following year. Independently of this reproduction by the roots, the *nidus-avis* often sends forth a leaf-bud at its base, which is to produce a new stem.”

I might multiply these quotations, but I am averse to mangle a work which forms a whole, and I prefer inducing botanists to consult it. At first they will find that the new facts are scattered in the midst of things known and of descriptions or characters borrowed from other writings; but they will soon remark how much the order followed by the author, and the tables which he has added, render inquiry easy. We ought to premise that M. Vaucher does not strictly limit himself to the plants of Europe, and that he also frequently speaks of cultivated genera, particularly those in the Botanic Garden of Geneva.

The varied observations of M. Vaucher, on the successive phenomena of the vernalization of the leaves, of the flowering or of the dissemination of the seeds, often tend in their results to confirm the division of genera into natural sections. These groups, which the author sometimes calls types, sometimes according to general custom sections, appear to him as a necessity proceeding from physiological facts. Descriptive botanists establish them according to the configuration of organs, which it is easy to ascertain in the herbarium. It is not surprising that the same results should be obtained from these



two points of view apparently so different. The functions, indeed, result from the presence and from the nature of the organs. If the causes differ between two groups of species, the effects must also differ. Two groups may therefore be recognised as well by the effects as by the causes, by the successive development of the phænomena as well as by a careful analysis of the internal organization\*. M. Vaucher's mode of procedure, which consists in observing the physiological actions of the organs, possesses the advantage of confirming, by a process inverse to the ordinary one, the greater part of the sections proposed by M. DeCandolle in the 'Prodromus,' and by other botanists who have imitated his division of genera into natural sections. When M. Vaucher has distinguished two groups or types amongst the species corresponding to one of the sections of the 'Prodromus,' which occasionally happens, botanists should pay attention to this: more probably there exist differences of structure evidenced by the two modes of fecundation or of dissemination, and consequently another section to be distinguished in the genus. In this point of view the perusal of M. Vaucher's book deserves to accompany that of works of descriptive botany. It should confirm or invalidate our classifications by indications which the sight of herbaria cannot give, and which the observation of living plants has not as yet sufficiently confirmed.

The method employed by M. Vaucher will, we hope, elicit further results. It will certainly be used by persons who have a taste for botany, but who do not possess the necessary resources in books and herbaria to enter upon every part of the science. Agriculturists residing in the country, sedentary persons or invalids, who are obliged to concentrate their observations on the plants of their garden, will find great interest in this mode of study, and will be enabled to contribute their contingent of new observations to botany in general. In the immense picture of nature there is as much to see in the depth as on the surface. Subjects of study are not wanting, and in natural history a good observation is always useful. Without doubt the crowd of amateurs will always content themselves with the names of plants, because inferior minds are satisfied with words in all things; but a certain number of more inquisitive men will be disposed to follow M. Vaucher over the ground of his detailed physiological observations. To them we will recommend the following questions, which require neither herbaria, nor a considerable library, nor a mi-

\* These remarks of M. Alph. DeCandolle are particularly deserving of the attention of the student.—Ed.

croscope, and which nevertheless are not yet solved, or have not even been touched upon.

1. To sow varieties of pears, apples, vines, &c., well known, well verified and protected from increase by transfer of pollen, in order to know which are the qualities that are preserved by seed, during how many generations, and with what degree of constancy they keep themselves distinct. It is clear that complete descriptions of the plant must be made at each generation, and that drawings or models in wax of the fruit obtained must be preserved. The young and persevering, or those who leave after them children endowed with the spirit of observation, may study this important question, the consequences of which in natural history, both theoretical and practical, are incalculable.

2. To make similar observations on cultivated annual or biennial species, when there is no hope of seeing the fruit of sown trees ripen.

3. To verify the duration of the faculty of germination in seeds, not only in the air, but also in fresh and in salt water. Experiments made in sea-water would possess great interest, by showing what plants may possibly have been transported by marine currents to great distances, and what plants must have originally sprung up in the isles wherein they now grow. It would be necessary to extend these experiments to a great number of species of different families.

4. To describe plants in the following manner, which would complete existing botanic works. On the examination of each species to read the description of two or three of those classical works which are in every amateur's library, and at the same time M. Vaucher's book; then to add all that is wanting. It would be seen that in general the most common species are not known in all respects; that, for example, the veneration of the leaves has been overlooked, or their disposition on the stem according to the modern methods, or their inflorescence, or æstivation, or any other of those characters on which attention has been fixed since the time of the publication of certain fundamental works.

5. To note down every year not only the period of flowering which has often been remarked, but also that of the foliation, of the ripening of the fruits, of the fall of the leaves, and even, when it is possible, of the ascending sap in spring and in summer. Good and long-continued observations of this kind would approximate to tables of temperature; in short, we should know the heat necessary for each function in each species, and thence many applications to agriculture and to geographical botany.

Some of these questions comprise several others. To solve them two things only are necessary, accuracy and perseverance. M. Vaucher has afforded us an example of both these qualities. His history of the *Confervæ* is remarkable for its precision in the explanation of new and delicate facts. His last work required the average duration of man's life, and we may say, in general, that during sixty years M. Vaucher rarely turned aside from botany. From it he derived lively gratification; the result of his works has enriched the science; let us hope that others may endeavour to imitate him, and let us ever religiously preserve the memory of a philosopher so well entitled to our respectful recollection. ALPH. DEC.

XXXVI.—On some hitherto unnoticed peculiarities in the Structure of the Capsule of *Papaveraceæ*; and on the Nature of the Stigma of *Cruciferaæ*. By J. W. HOWELL, Esq., M.R.C.S.

THE capsule of *Papaver* apparently bears so close a resemblance to that of *Nymphæa*, that it forms one of DeCandolle's reasons for considering the *Papaveraceæ* and *Nymphæaceæ* to be allied\*. The capsule in each genus is syncarpous, with ovuliferous dissepiments, and is crowned with a many-rayed stigma, the number of rays corresponding to that of the dissepiments. The chief structural difference hitherto observed between these capsules consists in that of *Nymphæa* being composed of several carpels surrounding the axis, and having the dissepiments formed by the juxtaposition of the ovuliferous sides of the perfect cells with intermediate plates of connecting cellular tissue; whilst in *Papaver* the inflected sides of the conjoined carpels not being continued to the axis, the imperfect ovuliferous dissepiments project only midway into the cavity of the capsule, and thus leave it one-celled.

On a more attentive examination, however, a difference will

\* "Ob structuram fructus et stigmatis *Papaveri* valde similem."—Regni Veget. Syst. Nat. vol. ii. p. 42.

This similarity of structure is repeatedly alluded to by this author; thus, in "*Nymphæaceæ*—Styli \* \* \* connati stigmatibus supra urceolum peltatum (exactè ut in *Papavere*) radiatis basi connatis apice liberis," vol. ii. p. 39. Again: "\* \* \* structura fructus *Papaveris* parum recedit a vera *Nupharis* structura," p. 43. Again: "*Papaveraceæ* accedunt hinc mediante *Papavere* ad *Nymphæaceas*," p. 68.

In 'Flore Franc.,' DeCandolle included *Nymphæa* and its immediately allied genera in *Papaveraceæ*, in which this great botanist followed the example of Linnæus, who had previously referred *Nymphæa* to his twenty-seventh Order, *Rhæadeæ*, which very nearly corresponds with the *Papaveraceæ* of modern authors.



be detected, which has never to my knowledge been noticed. This difference will be found of very considerable interest and importance, from its affording an apparent exception to a general law of great value in systematic botany, and from the assistance which, when rightly understood, it is capable of affording in the elucidation of other obscure and apparently anomalous forms of structure. The peculiarity to which I allude consists in the difference of the relation which the stigmatic rays bear to the dissepiments in the capsules of the *Nymphæaceæ* and in the *Papaveraceæ*. In the *Nymphæaceæ* the stigmatic rays *alternate* with the ovuliferous dissepiments, in correspondence with the law (hitherto considered intact), that “parietal placentæ must alternate with the stigmas;” whilst in *Papaveraceæ* the stigmatic rays are *opposite* to the dissepiments! This important differential character, which I detected in 1832, appears not even at this time to be known to those systematists who have written on the natural orders of plants; at least it is not mentioned by Jussieu, ‘Tab. du Règne Vég.,’ par Vent.; Smith, ‘Eng. Flora;’ DeCandolle, ‘Syst. Nat.’ and ‘Prodromus;’ S. F. Gray, ‘Nat. Arrang. Brit. Pl. ;’ Salisbury, who established the Order *Nymphæaceæ* in ‘Annals Bot. ;’ Lindley, ‘Int. Nat. Syst.’ and ‘Synopsis Brit. Fl. ;’ Burnett, ‘Outlines to Bot. ;’ Don, ‘Gen. Syst. Bot. ;’ Royle, ‘Bot. of Himalayas;’ Hooker, ‘Bot. Mag.’ arranged according to natural orders; nor Drs. Torrey and Asa Gray, ‘Flora of North America,’ 1840, which is the latest published systematic work. Indeed, so entirely unaware are even the latest of these writers of the existence of this character, as a differential one, serving to separate by abruptly defined limits those otherwise nearly allied orders, that Lindley, Hooker, and the authors of the ‘Flora of North America,’ in describing the relation of the dissepiments to the stigmas in *Papaveraceæ*, in which alone they notice it, describe it wrongly; the first two writers entirely so, and the latter in part! Dr. Lindley says, “stigmas *alternate* with the placentas” (!), which Drs. Torrey and Asa Gray repeat, excepting only *Papaver* itself, in which they correctly say they are “opposite,” and *Meconopsis*, which they distinguish by a mark of doubt (?).

There seem to be but two possible modes of accounting for this apparent anomaly in the *Papaveraceæ*:—first, that the seminiferous dissepiments are not true placentas formed by the adhesion of the inflected sides of contiguous carpels (which would appear to necessitate their *alternation* with the stigmas), but are merely projections of cellular tissue forming seminiferous plates extending into the cavity of the capsule, and proceeding from the centre of the internal face of each of the carpellary valves. The assumption, however, that ovules may be

generated upon the *centre* of the face of the carpellary valves, is opposed to all that is certainly known upon the subject. Even in those cases in which the ovules are indeed borne on a great portion of the inner face of the carpel, the centre is entirely destitute of them, as in *Limnocharis*. The first supposition, therefore, based on this untenable assumption, cannot be entertained; in fact, it is only mentioned to show the greater necessity for receiving the remaining mode of explanation, notwithstanding its apparent paradoxical nature, viz. that the seminiferous dissepiments are true parietal placentas, but that *each stigmatic ray is double,—formed of the adjacent lateral portions of the stigmas of two contiguous carpels; the two portions of the stigma of each carpel in the more complex capsules of the higher species being separated by an intervening membrane!* Ex. *Argemone, Papaver*.

It is obvious that nothing less than the most rigorous demonstration will suffice to establish so remarkable a mode of explanation, and this can only be effected by tracing the successive steps of gradually increasing elaboration of the capsule, from its most simple condition in *Bocconia*, through *Macleaya*, *Chelidonium*, *Glaucium*, *Hunnemannia*, *Eschholtzia*, *Meconopsis* and *Argemone*, to the state of greatest complexity in *Papaver somniferum*. Notwithstanding the great difference in the forms and appearances of the capsules of these genera, they exhibit a perfect similarity in all *essential* particulars of their structure, their differences being dependent, not on the relative disposition of their constituent parts, but on their proportion, magnitude, and number.

The simplest state of the capsule in the *Papaveraceæ* is exhibited by *Bocconia*, Linn., in which it consists of two dorsally-compressed carpels united by their margins, forming a flattened one-celled capsule containing a single seed, which is attached to the inferior part of the replum or annular receptacle formed by the united margins of the carpels, from which the greater portion of the latter separates in the form of valves. This annular receptacle is shown to be identical with true parietal placentas, although, except at a single point at its base, it does not bear ovules, by the latter being developed throughout its entire vertical extent on both sides the capsule in the cognate species, *Macleaya cordata*, Brown (*Bocconia cordata*, Linn.). The capsule is crowned by a deeply bifid stigma, whose internally plumose halves being widely reflexed *correspond* in situation and direction to their subjacent valves, and therefore *alternate* with the intervalvular parietal placentas.

It is interesting to remark, that in this, the simplest state of the structure of the capsule, the relation of parts exemplifies the law which expresses the necessary *alternation* of stigmas



with parietal placentas; and that it is therefore the reverse of that exhibited by the more complex capsules.

In *Macleaya cordata* the two parietal placentas bear several ovules; and the lobes of the stigma, though capable of separation, are vertical and in close apposition, forming a furrowed stigmatic line, which necessarily *corresponds* to the placentas, and consequently *alternates* with the valves.

In *Chelidonium* the stigmatic lobes (which in *Macleaya* were capable of separation and complete reflexion) are more rigidly erect, but the furrowed line bears the same relation to the placentas, which now exhibit their bi-carpellary origin by bearing a double row of ovules.

In *Glaucium* the stigmatic lobes become enlarged, but otherwise remain as in the last example. The parietal placentas are furnished with a linear spongy growth projecting from between the rows of ovules of each placenta, and uniting with that of the opposite side in the centre of the capsule, which is thus converted into two cells. This spongy dissepiment is usually described as arising from the extension of the placentas; an attentive examination at different periods of growth, however, will show that it is really distinct in structure, though attached to them.

In *Hunnemannia* we have the first indication of an addition of parts; the stigma being obscurely four-lobed, indicating the manner in which new carpels will, in other genera, become interposed between the two primary ones, which alone exist in the preceding instances.

In *Eschscholtzia* the additional stigmas (which are only indicated in *Hunnemannia*) are considerably developed, but are separate from the primary ones. The fact of their being the superadded stigmas is however indicated by their being shorter than the others.

[In consequence of the separation of the stigmas in this genus, the primary or longer ones bear the normal relation to the placentas, i. e. *alternate* with them, as already described in *Bocconia*; and the superadded stigmas (the shorter ones), which are *opposite* to the placentas, are so only in consequence of the non-development of the carpels to which they really belong. It will be perceived, that whilst in this genus the approach towards a greater complexity of structure takes place in some organs, others appear to have retrograded towards the normal state as it is exhibited in *Bocconia*, the first instance in the series; thus, the increased development of the superadded stigmas which necessitates the placing of the genus after *Hunnemannia*, and consequently after *Glaucium* and *Chelidonium*, is attended by the separation of all the stigmas, and the consequent alternation of the primary ones with the



parietal placentas, which is the normal state. This co-existence of structural progression and retrogradation is not peculiar to the present case, but obtains in all kinds of organized beings, and effectually negatives any attempt at linear arrangements, either of individual organs or of species themselves.]

In *Meconopsis* the additional carpels (only sketched forth and indicated, as it were, by the additional stigmas in *Hunne-mannia* and *Eschscholtzia*) are perfected, each carpellary valve contributing by its margins to the formation of two parietal linear placentas, which latter correspond with the stigmatic rays. Each stigmatic ray is formed precisely similar to the stigma of *Macleaya*, *Chelidonium* and *Glaucium*, being furnished with a central depressed line, indicating its formation from the union of the corresponding halves of the two contiguous carpels.

In *Argemone* the radiated stigma presents an undulatory folded appearance in consequence of the increased growth of the intervening tissue, which in the preceding genera (excepting *Eschscholtzia*) separates the lateral portions of the stigmatic extremity of each carpel.

[If the reader experience any difficulty in understanding the complicated folded stigma of *Argemone*, let him compare one of the folds with the stigma of *Glaucium*, and the difficulty immediately vanishes; for he will perceive that the undulated stigma of *Argemone* results merely from the structure of *Glaucium* being several times repeated, and arranged in a circular manner around an imaginary axis.]

We now arrive at *Papaver*, in the different species of which the capsule presents several states of complication by the successive addition of a greater number of carpels, which in *P. somniferum* sometimes amount to sixteen. The parietal placentas, which in all the preceding genera are linear, now project in towards the centre of the capsule, partially dividing it into as many imperfect cells. The stigmatic rays, which, as in the preceding instances, are equal in number to the placentas, and opposite to them, are, as already described, double, and only differ from those of *Argemone* in having the intervening tissue, which separates the two margins of the stigmatic extremity of each carpel, plane instead of folded.

We now see that the radiated stigma of *Papaver*, however much it may appear to resemble that of *Nymphæa*, differs from it in such important particulars as effectually to prevent any union of the two orders to which these genera belong; unless, indeed, species of *Nymphæaceæ* should hereafter be discovered with bi-carpellary capsules, which would form, with *Bocconia*, the means of union with *Papaveraceæ* at the commencement of the two series.

What are the practical bearings of this anatomical peculiarity in the stigmas of *Papaveraceæ*? Observe the assistance it affords in elucidating the hitherto controverted structure of the stigma and capsule of *Cruciferæ*. In this order the variably elongated capsule consists of a single cell with two linear parietal placentas, each of these terminating superiorly in a stigma! The placentas are occasionally united by an intervening membrane, converting the capsule into two cells. When ripe the capsule separates into three parts—two lateral valves and an intervening replum, formed of the persistent parietal placentas, which are crowned by the two permanent stigmas!

Dr. Brown appears to have been the first to establish a general principle for explaining the structure of complex capsules; his words are, “*Capsulas omnes pluriloculares e totidem thecis conferruminatas esse, diversas solum modis gradibusque variis cohæisionis et solubilitatis partium judico,*” ‘*Prod. Fl. Nov. Holl.*,’ p. 558, 1810. In 1818, ‘*Linn. Trans.*,’ he applied this principle to the explanation of the seed-vessel of the *Compositæ*, and showed its one-seeded achenium to be an extreme state of simplification of an organ arising from deprivation of parts, and to be in reality a bi-carpellary capsule, in which only a single seed is developed on one parietal placenta and none on the other—the parietal placentas being represented by two delicate cords; and referred also to *Bocconia*, as an analogous instance in *Papaveraceæ*; and likewise to *Proteaceæ*, for other instances illustrative of the successively increasing imperfection which leads from the normal type to the most anomalous conditions. In 1821, DeCandolle, in a memoir on the *Cruciferæ*, ‘*Annales du Muséum,*’ and in the article on the same family in ‘*Systema Naturale,*’ described the capsule in strict conformity with the principles of Brown (without acknowledging himself indebted to the latter), as being composed of two carpels whose corresponding inflected margins formed the parietal placentas; the bi-carpellary origin of each placenta being indicated by its bearing a double row of ovules. [See diagram of structure of the silique in DeCandolle’s Memoir.] In 1826, Brown, in ‘*Appendix to Denham’s Voyage,*’ p. 217, having substantiated his claim to priority of discovery of the bi-carpellary nature of the capsule of *Cruciferæ*, by referring to his observations of 1810 and 1818, as quoted above, and having absolved DeCandolle from any charge of plagiarism, further proved the double nature of the placentas and dissepiment, by showing that the two lamellæ of which the latter is composed are frequently separable, and that when this is not the case, the constituent lamellæ are rendered evident by the want of correspondence of their

vascular areolæ. Thus far, then, the two highest botanical authorities agree in considering the silique to be composed of two carpels, and such is really the case,—but, as Lindley justly remarks, ‘Int. Nat. Syst.,’ ed. 1, “This does not remove the difficulty of the stigmata being *opposite* the placentas, instead of alternate with them.” To meet this difficulty, DeCandolle (according to Lindley) proposed a theory, which, in addition to some untenable assumptions, included the supposition of each stigma being composed of two lateral halves, in a state of cohesion, each half being the continuation of the lamella of the placenta of the corresponding carpel. As, at the time this theory was proposed, the assumption here quoted was altogether gratuitous, there being no actually observed structures then known to corroborate it, Lindley (Op. cit. and ‘Bot. Register,’ fol. 1168 with diagrams) proposed another, founded on the structure of *Eschscholtzia*, wherein he concludes that the silique of *Cruciferae* is formed of *four* carpels, instead of *two*; that the alternate ones are reduced in lateral extent, but have their placentas perfect; and that *the stigmata of the silique belong to them*, while the two remaining carpels have lost their placentas and stigmata, and are thus reduced to the form of valves. In this manner, the correspondence of the stigmata with the parietal placentas was shown not to be an exception to the law which expresses their necessary alternation, but to be in strict conformity with it, the correspondence of the stigmata and placentas being only apparent, not real. The object in forming this ingenious though complex theory was to avoid DeCandolle’s hypothetical assumption of the compound nature of the stigma, which Lindley rejected, notwithstanding that Brown considered its truth to be rendered probable by the evidence of some monstrous varieties of the siliquose capsule. As, however, the admission of the compound structure of the stigma meets all the difficulties of the case, and explains the apparently anomalous arrangement of parts in an easy and concise manner, and as of two proposed theories we are warranted in selecting that which is most simple, I have much satisfaction in being the first to adduce proof, derived from *actual structures*, that the individual stigmata of syncarpous capsules are occasionally compounded of the adjacent lateral halves of contiguous carpels. Hence I conclude, with Brown and DeCandolle:—

1st. That it is most probable that the silique of *Cruciferae* is composed of two carpels, whose inflected margins form two bi-lamellate parietal placentas; and that the apparently anomalous disposition of the stigmata arises from their being formed of two lateral halves, each of which belongs to the corresponding subjacent carpel.



2nd. That the alliance of the *Papaveraceæ* and *Brassicaceæ* (*Cruciferae*) is, in respect of the structure of the capsule, more close than heretofore supposed; in illustration of which we find that the two-celled, many-seeded silique of *Glaucium* has its perfect analogue in that of *Brassica*, whilst the comparatively imperfect state of the one-celled, single-seeded silicule of *Isatis* in the second order, is represented in the first by the similarly-constructed capsule of *Bocconia*.

3rd. That the enunciation of the law which expresses the necessary alternation of stigmas with dissepiments (Lindley's 'Key to Structural Botany,' § 379.), and with parietal placentas, must be modified to embrace the above-described facts, and may be conveniently and correctly expressed thus: *That in syncarpous capsules, parietal placentas, and therefore dissepiments, always alternate with simple stigmas formed by single carpels, but are opposite to those which are formed by the union of the adjacent margins of contiguous carpels.*

Bath, 5 Axford's Buildings.

[*Note.*—In Kunth's 'Flora Berolinensis,' (published in 1838) we find (v. i. p. 29) the stigma of *Papaveraceæ* described as follows:—"Stigmata tot quot placentæ, cum his alternantia, magis minusve connata, \*\*\* sinubus inter stigmata sæpe ampliatis lobosque referentibus cum stigmatibus alternantes (a plurimis pro his sumptos) placentisque oppositos." In the generic description of *Papaver* (p. 30) he says, "Stigma magnum, sessile, 5-20-lobum: lobi sursum inflexi, \*\*\* marginibus stigmaticis per paria contiguos radios formantes tot quot lobi, placentis oppositos; sinubus sæpe ampliatis inque lobos productis spurios, cum legitimis alternantes." No other description of this curious structure has come under our notice\*.—*Ed. Ann. Nat. Hist.*]

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XXXVII.—*Descriptions of some new Genera and fifty unrecorded Species of Mammalia.* By J. E. GRAY, Esq., F.R.S.

MY DEAR SIR,

British Museum, Oct. 10, 1842.

I HAVE sent you for insertion in the 'Annals' the characters of the following species of Mammalia, which I believe have

\* It had escaped our attention till Mr. Howell's paper was already in type and our day of publication close at hand, that those of his observations which relate to the opposition of stigmata to placentæ in *Papaveraceæ*, and to the composition and cohesion of stigmata, had already been published by Mr. Brown in his account of the *Cyrtandraceæ* in Horsfield's 'Plantæ Javanicæ:' Mr. Howell appears not to have been aware of this fact.

In a subsequent number we shall be enabled to refer more fully to Mr. Brown's dissertation.

not hitherto been recorded. The greater part of them are in the collection of the British Museum.

Yours very truly,

R. Taylor, Esq.

J. E. GRAY.

Fam. SIMIADÆ.

*Presbytis nobilis*. Bright rufous, without any streak on the shoulders.

*Hab.* India. Brit. Mus.

This species differs from the *Simia melalophus* of Raffles in being darker, and not having a black crest; from *P. flavimanus* in being of a nearly uniform auburn, and not yellow, with a blackish back, and in having no black streak across the shoulder or on the cheek.

*Cercopithecus Burnettii*. Grayish black; head, neck, and upper part of the back yellow dotted; throat, cheek, abdomen, inner sides of fore legs and thighs grayish white; face black; hair of cheek and forehead yellow, with a small tuft of black hair over each eye; fur very thick; hairs long, rather rigid, pale at the base, then grayish black; those of the head, neck, and upper part of the back and base of the tail with two or three broad yellow-brown subterminal bands. Length of body and head, 19 inches; tail end injured.

*Hab.* Fernando Po, Thomas Thomson, Esq., R.N.

Fam. CEBIDÆ.

*Pithecia Pogonias*. The face hairy; forehead and cheek with long close-set yellow hair; face surrounded with black hair; hairs of the back and limbs blackish, with a broad white subterminal ring.

*Hab.* Brazils. Brit. Mus.

This species differs from *P. leucocephalus*, with which it agrees in having a hairy face, in the hair of the body not being pure black; and from *P. irroratus* in the face, cheeks, and forehead not being naked.

The two species of Douroucouli are evidently distinct; they may be characterized thus:—

*Nyctipithecus trivirgatus* (N. vociferus, Spix?). Pale; forehead with three narrow converging streaks meeting on the nape, the side ones extended on the cheek; tail rather darker.

*Hab.* Brazils. Brit. Mus.

*Nyctipithecus felinus*, Spix, *Cheirogaleus Commersonii*, Vigors and Horsfield. Gray-brown; tail blackish, reddish at the base; face and a triangular spot over each eye white, with a black streak on each side and a broad rhombic spot in the centre between them on the forehead.

*Hab.* Brazils. Brit. Mus.

*Eriodes frontatus*. Thumb of the fore hand none; reddish brown, beneath yellowish brown; forehead, elbows, knees and the upper side of the arms and of the four hands black.

Young like the adult, but with long white hairs on the cheeks and amongst the black hair on the forehead.

*Hab.* S. America. Capt. Belcher, R.N., C.B., &c. Brit. Mus.

## Fam. LEMURIDÆ.

*Lemur coronatus*. Ashy above, limbs and beneath pale yellowish; face white; orbits gray; cheeks and forehead bright rufous, with a large black spot on the crown; tail thick, end blackish.

*Hab.* Madagascar. Brit. Mus.

*Cheirogaleus Smithii*. Pale brown; streak up the nose and forehead, the chin and beneath paler; tail redder.

*Hab.* Madagascar. Brit. Mus.

This species differs from the *Ch. typicus* of Dr. A. Smith in the British Museum, in being much smaller and differently coloured, that being gray-brown; head redder brown; orbits black; cheeks and beneath white.

*Galago minor*. Pale gray; back rather browner washed, beneath whitish; tail elongate, depressed, narrow.

*Hab.* Madagascar. Brit. Mus.

Not more than half the size of *Galago Senegalensis*.

## Fam. VESPERTILIONIDÆ.

*Phyllophora megalotis*. The groove of the lower lip not fringed on the edge; fur blackish, rather paler beneath; nose-leaf large, ovate-lanceolate, longer than broad; ears very large, as long as the head, rounded; fore-arm bone 1" 3"; body and head 2 inches.

*Hab.* Brazils. Brit. Mus.

*Phyllostoma elongata*. The front of the lower lip with a large triangular space divided by a central groove; ears rounded, large; tragus slender, lanceolate; nose-leaf elongate, lanceolate, tapering.

*Hab.* Brazils. Brit. Mus.

## STURNIRA, n. g.

The tail and interfemoral membrane wanting; nose-leaf lanceolate, simple; tragus distinct, inner surface of the lips bearded on the sides; hind feet large; lower lip with a single larger wart surrounded by a series of small ones. America.

*Sturnira Spectrum*. Fur brown, with darker tips to the hairs, beneath pale whitish; membranes dark blackish.

*Hab.* Brazils. Brit. Mus.

*Rhinolophus Morio*. The front central lobe of the nose-leaf large, 3-lobed; fur reddish brown.

*Hab.* Malacca, Singapore. Brit. Mus.

Very like *R. luctus* in general appearance, but that species is described as black, with a slight ashy tinge; but perhaps the colour may have been changed by the specimen having been taken from spirits.

## SCOTOPHILUS.

I am inclined to confine this genus to the species which have the wings attached to the ankle as far as the base of the toes; as *S. Temminckii* and *S. fulvus* of Asia, which have the interfemoral membrane smooth; as *S. serotinus*, *S. discolor*, *S. Leisleri*, and *S. murinus* of Europe, and *S. lobatus* of India, which have cross lines of hair on the under side of the interfemoral membrane.

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## NOCTULINIA, n. g.

With the feet quite free, the wing being only attached to the ankle; they are otherwise like *Scotophilus*, as *N. proterus* and *N. fulvus*.

## VESPERTILIO.

This genus may be confined to the species which have the feet free, with the wings only attached to the ankles; their interfemoral membrane furnished with only a few scattered hairs, and the face short and hairy, as *V. mystacinus*, *V. Daubentonii* of Europe, *V. Caroli* of America. From these may be separated the three following genera and a new section of the subfamily which is to follow the others, in my "Revision of the Genera of Bats." See Mag. Zool. and Bot. ii. 498.

## TRILATITUS, n. g.

With the feet free, the wings being only attached to the ankles; the interfemoral membrane with distant cross bands of small tufts of hair beneath; face short, hairy; ears moderate or small, as *T. Hasseltii*, Temm., *T. macellus*, *T. Blepotis* from India, and other Asiatic species.

## KERIVOULA, n. g.

With the feet hairy above, half attached, the wing arising from the base of the toes; face short, hairy, the interfemoral membranes with cross band bearing small tuft of hair beneath, as *Vesp. Hardwickii*, Horsf., *V. picta*, Pallas, *V. tenuis*, *V. Görtneri*.

*Kerivoula griseus*. Ears moderate; fur gray, lower part of the hairs red with whitish gray tips; wings brown; face whitish; hairs rather rigid. Length of body and head, 1" 3"; fore-arm-bone, 1" 2"; of shin-bone, 5".

*Hab.* — ? Brit. Mus. in spirits.

*Kerivoula Poensis*. Yellowish gray; the side of the body bright yellowish white; whitish gray on the head and neck; hair blackish at the base, with a white tip on the head, and yellowish brown tip on the body; ears moderate, half covered with close hair; tragus moderate, half ovate, blunt; heel-bone elongate, slender; thumb rather elongate, compressed.

*Hab.* Fernando Po, Thomas Thomson, Esq., R.N.

## MYOTIS, n. g.

The feet partly free; the wings attached to the base of the toes; interfemoral membranes with distinct hairy bands beneath; face elongate; ears large; tragus very long and slender, as *Myotis murinus*, *M. Bechsteini*, and *M. Natereri* of Europe.

† † † † *Ears lateral, separate; nostrils rather tubular and separate, and more or less produced.*

## MURINA, n. g.

Head round; face elongate, hairy; nostrils produced, separate, sub-tubular; ears large; wings broad, thin; tail elongate; interfemoral membrane large, truncated, with cross lines of hair beneath; heel-

bone elongate; feet attached, the wing united to the whole length of the outer toes of each foot. Cutting teeth  $\frac{2 \cdot 2}{4}$ , small.

*M. suillus*, *Vespertilio suillus*, *Temm.*

From India, Dargellan. Brit. Mus.

#### HARPIOCEPHALUS, n. g.

Head rounded; face short, rather naked, glandular; ears moderate; wings broad, thin; feet free to the ankles, hairy to the claws; toes thick.

*H. rufus*, *Vesp. Harpia*, *Temm.*

#### CENTURIO, n. g.

Head rather large; face naked, flattened and covered with various symmetrical plaits; nostrils separate, placed on each side of a triangular subcordate plate with raised edges on the side and behind, but without any edge below; ears large, with a large separate oblique fold at the base of the upper edge of the conch, a conical erect lobule, and short denticulated tragus; limbs strong; interfemoral membranes deeply cut in; the heel-bone is short and strong; the toes of the hind feet are equal; tail none; wings broad, the membrane between the two inner fingers, and the hinder finger and the fore-arm-bone with regular parallel transverse fibres contracting the membrane into fine regular close plaits; the thumb elongate, slender. Cutting teeth  $\frac{1 \cdot 1 \cdot 1 \cdot 1}{4}$ , small, upper conical far apart, lower close, truncated; canines large; grinder large, with very acute conical tubercles; lips ciliated within at the angle of the mouth; fur soft, brown; the nostril with a high convex ovate tubercle between them, ending above and below in a slight acute tip, each surrounded on the outer side by a half ovate raised edge, bent in towards the tubercles at the tip, and bent outwards on the edge of the lip, having two tubercles on the upper part of the outer edge, each furnished with a single bristle, and giving off a slightly curved process on the middle of the upper edge, ending in a small tubercle bearing a similar bristle; the eyes are surrounded with a raised edge, with two or three similar bristles bearing tubercles; the ridge from the upper edge of the eyelid extends towards the middle of the face, and is then sharply turned up at an angle before it reaches the central line, and after a short space bent round at the top towards the outer edge of the front of the lunate cross ridges on the forehead; behind the larger upper cross ridge on the forehead is a slight cross groove with a swollen hinder edge.

The upper edge of these ridges and the tip of the lobule of the ear is dark brown and callous; the chin projects beyond the mouth and is keeled below; the cheek, chin and throat are covered with various symmetrical wrinkles, and on the middle of the chin is a rather broad, and on the top of the ridge on each side of the chin is a narrow, horny callous plate.

*Centurio senex*, the Wrinkled-faced Epaulet Bat. Pale brown; tip of the hairs whitish, beneath paler, small epaulet-like tuft on each

shoulder pure white; the membrane behind the index and middle finger transparent white; the wing near the body, the fore-arm bones and the legs covered with hair.

*Hab.* Amboyna, Capt. Belcher, R.N., C.B.

Fam. FELIDÆ.

*Leopardus griseus.* Gray. Sides with brownish gray round spots, black edged, often confluent into bands; dorsal line, belly and limbs black spotted; forehead, shoulders, feet and sides in the centre of the rings black dotted; orbits, cheeks, lip and beneath white; forehead with two, nape with five black streaks; throat with two black half-collars.

*Var.* 1. The spot separate, scarcely confluent.

*Hab.* Central America. Both varieties in Brit. Mus.

In our specimen the spots on the two sides are not similar nor equally confluent; on the left side there are three parallel oblique bands, formed of united spots; on the right side the front band alone is present, and the other spots which would form the band if united are separate, but there is a horizontal band along the side of the belly.

*Leopardus pictus.* Fulvous; sides paler, with brown spots, each surrounded with three, four or five black ones; middle of the back and upper part of the leg with oblong black spots; forehead, feet and shoulders with black dots; orbits, lips, cheeks and beneath white, black spotted; forehead with two, nape with six or seven black radiating streaks, the side ones broad with a central brownish line; back with a series of large solid spots.

*Hab.* Central America. Brit. Mus.

*Leopardus Ellioti.* Fur pale fulvous; back and head rather darker, with large irregular-shaped black spots; those on the shoulders and back larger, elongate, with a narrow dorsal line; two larger shoulder spots united to the lateral nape streak; orbits and forehead with two whitish streaks.

*Hab.* Madras. Brit. Mus.

*Leopardus Horsfieldii.* Pale yellowish, with two rows of oblong black spots on the vertebral line; sides of back with irregular unequal black spots; tail short with small round spots; beneath white, with two black bands on the throat; throat, sides of body and beneath with large black spots.

*Hab.* India, Bhotan. Mus. India House.

OSMETECTIS.

Head elongate; nose long, slender; muzzle truncated, with a sharp ridge above; toes 5.4? claw short, rather blunt, elevated; tail long, cylindrical; soles of feet —?

The Indian representative of the *Nasua*.

*Osmetectis fusca*, Viverra fusca, Gray, *Illustr. Ind. Zool.* I. t. 5.

*Hab.* India. Garden of Taaje Mehal at Agra.

Only known from figures which were made under General Hardwicke's inspection from a living animal.



## Fam. URSIDÆ.

*Procyon Psora*, n. s. Yellowish brown and gray, grised; face, temples, side of neck, chest, belly and sides of body dirty yellow; forehead, cheeks under the eyes, each side of the throat and back of the ears dark blackish brown; fur rather long, close, dark brown, longer hairs yellow-white, those of the back, shoulders and head brown tipped; tail short? perhaps destroyed?

*Hab.* Sacramento California, Capt. Belcher, R.N.: called *Psora*.

The front upper tubercular grinder square, as long as broad; the second rather broader than long, slightly narrowed on the inner side; the last ovate, triangular, transverse; the teeth much worn; canines conical, not grooved; face in the skull short, broad. Length, body and head, 27 inches; tail, 3?; hind foot,  $4\frac{1}{2}$ .

## Fam. MACROPIDÆ.

*Phascogale leucopus*. Fur gray, washed with blackish; head rather redder; lips, chin, throat, chest and belly, inside of limbs and feet white; tail slender, lower half white, upper blackish brown; ears large.

*Hab.* Australia. Brit. Mus.

This species is very distinct from *P. leucogaster*, Gray, with which alone it can be confounded, in the feet being white.

## Fam. TALPIDÆ.

*Crossopus Himalayicus*. Slate-coloured black, with scattered black hairs, which are longer and white-tipped on the sides and rump; lower part of the throat and the middle of the belly rusty brown; tail elongate, scaly, with adpressed dark brown hairs above and elongate rigid whitish hairs beneath, and brown elongated rigid hairs near the tip; feet rather naked; whiskers numerous, elongate, brown; teeth white. Length of the body and head,  $5\frac{1}{2}$  inches; tail, 3; hind feet,  $\frac{3}{4}$ " nearly.

*Corsira nigrescens*. Blackish lead-colour washed with rufous; chin and beneath pale and rather more rufous; the whiskers dark; the feet and tail rather naked, scaly; the claws white; the front one elongate, compressed, acute; ears hid in the fur; cutting teeth white, brown at the tip. Length of body and head, 3" 6''' ; tail, 1" 4''' ; hind foot and claws,  $6\frac{1}{2}$  lines.

*Hab.* India. Brit. Mus.

## Fam. HYSTRICIDÆ.

*Atherura Africana*, *A. fasciculata*, Bennett, Garden and Menag. Zool. Soc. 1. 175. Spines all dull steel-black; of the back strong, elongate, end compressed, angular; of the head, under parts and limbs flat, channeled; whiskers black, bristly; tail elongate, tapering, one-third the length of the body, with a tuft of wavy, compressed, elongate white quills; ears rounded, somewhat naked, black; eyes convex, black.

*Hab.* West Africa, Sierra Leone, Whitfield. Brit. Mus.

There is a living specimen of this species in the magnificent me-

nagerie of the Earl of Derby, and a dead one in the British Museum; it is very different from the figure of the Indian *A. fasciculata* figured in Hardwicke's drawing, and copied in my 'Illustrations of Indian Zoology.'

*Sphiggurus melanurus*. Spines yellow with black tips; fur blackish, with scattered yellowish gray stronger hairs covering the spines; the feet, and the bristles on the lower sides of the base, and of the whole of the middle of the tail black. Length, body and head, 15 inches; tail, 10.

*Hab.* Brazils, Lord Steuart. Brit. Mus.

This species differs from the three specimens described by Brandt in the colour of the tail.

*Alactaga Indica*, Gray. Back dusky; hairs yellow at the end and black at the tip; sides bright yellow, some of the hairs black tipped; tail yellow, some of the hairs of the tuft black tipped; the pads under the toes of the hind feet are compressed, with 3 to 5 grooves on each side, and crenated on the front edge; the pad under the sole is large, conical and smooth; the underside of the end of the tail under the tuft with a quantity of short, rather rigid, spreading hairs. Length, body and head, 3" 6<sup>'''</sup>; hind feet, 2" 0<sup>'''</sup>; ears, 1" 4<sup>½</sup><sup>'''</sup>; tail, 6" 0<sup>'''</sup>.

*Hab.* India, Candahar, at Quettah.

It agrees with *A. acotium* in size and in the length and proportion of the hind feet, but it differs from the specimens both of it and *A. vexillaris* in the British Museum in being yellowish, and in the hairs of the tuft of the tail (which remain) being yellow with black tips, while in those species the black hairs are one-coloured to the base; and the specimens of *A. vexillaris* indicate no appearance, and *A. acotium* very slight indication, of the very peculiar form of the pads to the hind toes, so strongly developed in the Candahar specimen.

#### Fam. JERBOIDÆ.

*Pteromys Derbianus*. Blackish brown, gray grised; hairs dull black-brown with whitish tips; shoulders whitish; tail and feet black, tail round; chest, belly, inside of the limbs to the edge of the membranes grayish white; membranes nakedish below (like back above), with a straight edge to the one between the back of the thighs and the tail, and a lobe supported by a cartilage in front; head above and below, and the upper part of the neck blackish gray; cutting teeth yellow. Length, body and head, 14 inches; tail, — ?

*Hab.* W. Africa, Sierra Leone, Mr. Whitfield. Museum of the Earl of Derby.

*Sciuropterus caniceps*. Blackish brown, varied with red bay; hairs long, dark blackish, with red bay tips; outside of the legs redder, beneath reddish yellow; head iron-gray with longer black interspersed hairs; throat white; chin black; small lunate spot on the upper edge of each eye red, and roundish spots near the base of the ears bright-red; tail flattish, black, with some reddish tipped hairs, fewer near the end. Body and head, 9 inches; tail, 8<sup>½</sup>.

*Hab.* India, Dargellan, Mr. Pearson. Mus. Ind. Comp.

*Young or n. s.* About one-third smaller in length and breadth;

paler above and below; head coloured like the back, no red spot over the eye or behind the ears; tail flatter and broader.

*Hab.* India, Dargellan, Mr. Pearson. Mus. Ind. Comp.

The bones showed no indication of the specimen being young: I should call it provisionally, after my companion in my medical studies, who sent it to this country, *S. Pearsonii*.

*Sciuropterus nobilis*. Bright chestnut-brown, with yellow tips to some of the hairs, pale rufous beneath; the top of the head, the shoulders, and a narrow streak down the middle of the upper part of the back pale fulvous; parachute large.

*Hab.* India, Dargellan, Mr. Pearson. Mus. Ind. Comp.

*Sciurus splendidus*. Bright red bay; hair uniform red bay to the base; head rather paler; cheeks and chin rather paler still; throat from under the eyes, chest, belly, and inside of the limbs to the wrists pure white; whiskers and tuft of hairs on the temple black; ears somewhat naked; tail flat, two-rowed, bright red; hair one-coloured to the base.

*Hab.* —? Mus. Earl of Derby.

Size of English squirrel, but brighter red.

*Sciurus rufogularis*. Black; cheeks and side of the throat iron-gray, grisled; throat, side of the neck, shoulders, fore-legs, abdomen, inside of the thighs and the hind feet deep red; streak along each side of the body and the outer side of the thighs white.

*Hab.* China.

Very like *S. Rafflesii*, but only half the size, and has no white on the cheeks, and the shoulders and side of the neck are red.

*Sciurus rufonigra*. Black; throat, inner side of the legs and beneath bright red; an indistinct streak along each side, and the outer side of the thigh white, grisled.

*Hab.* India.

*Sciurus rufogaster*. Reddish, grisled; head, sides of the neck, and outside of the limbs leaden gray, grisled; tail and feet black; belly red.

*Hab.* Malacca.

*Sciurus atrodorsalis*. Gray; middle of the back blackish, slightly grisled; cheeks and whiskers yellowish; ears, chest, belly and under-side of limbs dull rufous; tail blackish, hair with a broad black central band.

*Hab.* Bhotan.

*Sciurus castaneoventris*, Gray. Very like *S. hippuris*, but only half the size, and the ears are gray. Var. rather paler; chin grayish, beneath yellowish red.

*Hab.* China, John Reeves, Esq.

*Sciurus caniceps*. Pale gray, grisled; back yellowish, beneath paler gray; tail long, gray, black varied, ringed, hair with three broad black bands.

*Hab.* Bhotan.

*Sciurus Belcheri*. Black, minutely dotted with bright yellow; side of the head and outside of the limbs more orange, and feet dark bay; edge of the eyes and underside of the body bright orange; lips



and throat paler; streak along the side of the body between the two colours pure black; whiskers black; ears hairy, slightly pencilled; tail flat, rather narrow, black and red varied, with long white tips to the hairs. Length, body and head,  $7\frac{1}{2}$  inches; tail,  $4\frac{1}{2}$ ; hind foot, 2.

*Hab.* Columbia, Capt. Belcher, R.N., C.B.

*Sciurus Richardsonii.* Black, brown, varied; hairs black, with a broad subcentral brown band; cheeks and the sides brown; middle of the throat, chest, belly and the inner side of the limbs white; hair of tail with long white tips; feet black; ears hairy. Length of the body and head, —?; of tail, —?

*Hab.* Honduras. Brit. Mus.

*Tamias Hindei.* Rufous brown, with three rather close black streaks on the middle of the back, the outer ones edged with a white streak, having an indistinct black edge to it on its outer side; head darker, with a reddish streak from the end of the nose inclosing the eye; throat and beneath white; feet rusty brown; hair of body dark at their base; tail roundish; hair red at the base, with a broad black subterminal band and a whitish tip; ears hairy, blackish, hinder edge and tip white. Length, body and head,  $5\frac{1}{2}$  inches; tail,  $4\frac{1}{2}$ ; hind foot,  $1\frac{1}{2}$ .

*Hab.* California, Capt. Belcher, R.N., C.B., &c. Brit. Mus.

Named in honour of Mr. Richard Brinsley Hinde, the surgeon of Captain Belcher's surveying vessel, who laboured most industriously during the voyage to collect specimens and facts connected with the countries he visited.

*Xerus trivittatus.* Dark brown, minutely grised with gray; outer sides of the limbs with longer brown hair; broad streak on each side of back, belly, cheeks, lips, throat, lower part of sides and inside of limbs white; a narrow streak on the middle of the back gray-brown; tail broad, hair whitish, with three broad black bands, one near the base and the upper one some distance from the tip.

*Hab.* India?

Easily known from the other species by the narrow vertebral band and the darker colour.

#### Fam. LEPORIDÆ.

*Dasyprocta punctata.* Uniformly grised with greenish yellow; hair black with greenish yellow rings; hair of the back scarcely elongate and ringed to the base; throat yellow; feet rather blacker.

*Hab.* South America.

*Dasyprocta nigra.* Black, grised with white; shoulder and haunches blacker; legs black; throat gray; belly rather grayer; hair of the back elongated, flattened, white at the base.

*Hab.* South America.

*Dasyprocta albida.* Whitish gray, nearly uniform, the hair of the back elongated, white at the base.

*Hab.* St. Vincent's, West Indies.

Size of a guinea-pig, *Cavia Cobaya*.

#### Fam. MURIDÆ.

#### NESOKIA, n. g.

Cutting teeth very large, flat in front and smooth; grinders 3:3;

front upper large with three cross ridges; the middle oblong, and the hinder much narrowed behind, each with two cross ridges; the front lower grinder larger, narrowed in front with three cross ridges; hinder each with two ridges, the hindmost smallest, rather narrowed behind; tail short, thick, with whorls of scales and scattered bristles; toes 4—5, moderate, the three middle subequal, long, the outer moderate; claws small, compressed; front thumb tubercular, with a rudimentary claw; ears moderate, naked.

This genus is easily known from the Rats (*Mus*) by the large size of the cutting teeth and the shortness of the tail; it appears to be intermediate between the Rats (*Mus*) and *Rhizomys*.

*Nesokia Hardwickii*, *Mus. Hardwickii*, Gray, *Mag. N. Hist.* Reddish brown, with longer dark brown hairs on the rump; sides gray and paler; hair lead-coloured at the base.

*Hab.* India, General Hardwicke.

The *Hypudæus Guira*, Langsdorf, in Brandt's 'Mem. Peters.' iii. 1835, t. 14, is very much like this animal in external appearance, and may be a second species of the genus.

#### VANDELEURIA, n. g.

Upper cutting teeth triangular, with a deep groove near the middle on the oblique front edge; grinders —? ears hairy; hind feet very long, slender, soles bald beneath; toes 4·5, long, slender, compressed, the three middle subequal, the hinder middle very long; the front outer very rudimentary, scarcely visible; the front inner weak, the hinder outer longer than the inner; claws small; tail very long, scaly, with scattered hairs, with longer more crowded hairs at the tip; fur soft, with scattered longer bristles on the back and rump.

Lives on trees in India.

Very like the American *Gerbilli* in external appearance and form of hind feet; differs from the African *Dendromys* in the form and proportion of the toes.

*Vandeleuria oleraceus*, *Mus oleraceus*, Sykes? *Walter Elliot's Madras Journ.* x. 214. n. 37. *Mus. longicaudatus*, *W. Elliot's Madras Journ.* x. 94. Chestnut-brown; back blacker; feet, lips, and beneath white; tail half as long again as the body and head, brown-olive, white below.

*Hab.* Madras, Walter Elliot of Wolf Lee.

"Lives always in bushes or trees, up which it runs with great facility."

*Arvicola Roylei*. Rufous gray, beneath gray; hair dark lead-colour at the base, gray at the top, those of the back rufous at the tip; ears moderate, rounded, hairy; tail about one-third the length of the body, covered with pale rigid hairs; the cutting teeth yellow in front, smooth, grooveless. Length of the body and head, 3" 6"; of tail, 1" 2"; of the hind feet and toes, 0" 9".

*Hab.* India (Cashmere). Brit. Mus.

The lower grinder wide in front, narrow behind; the first one has a large rhombic anterior process, and three folds on the outer side and four on the inner one; the two other grinders have three nearly

equal folds on each side, the hinder tooth being the narrowest; the first upper grinder has three equal alternating folds; the second has three on the outer and two on the inner side, and the hinder one is elongate, narrow, with three slight folds on each side, and an oblong elongated lobe behind.

Hitherto no true species of *Arvicola* has been described as inhabiting Southern Asia or South America.

*Arvicola Americana*. Fur soft, brown, rather paler beneath; tail about two-thirds the length of the body; the front cutting teeth yellow, with a slight groove on the outer edge.

*Hab.* South America. Brit. Mus.: three specimens. ???

This species is exactly like the English water-rat in appearance, but about half the size, and the skull is small in proportion. The cutting teeth of the *A. amphibia* are usually smooth, but I have one with the teeth grooved as in these specimens.

#### FAM. LEPORIDÆ.

*Lagomys rufescens*. Fur rather long, pale gray, with a bright rufous tinge, brighter on the head; base of the hairs dark lead-colour; slightly varied with black on the hinder part of the back; side of the face, middle of the throat, abdomen, inner sides of limbs and feet whitish; ears large, hairy, rounded; whiskers black, some white at the tip; claws black.

*Hab.* India, Cabul, Rocky Hills near Baker Tomb, at about 6000 or 8000 feet elevation. Very quick and wary.

This is easily known from all the other Old World species by its pale colour and rufous tinge.

#### FAM. ASPALACIDÆ.

*Rhizomys minor*. Fur gray, with browner ends, long, very silky; whiskers brown; sides of head rather browner; tail naked. Length, body and head,  $6\frac{1}{2}$  inches; tail,  $1\frac{3}{4}$ .

*Hab.* India or Cochin China?

*Gerbillus erythrourea*. Fur gray-brown, rather grised, under fur lead-coloured; chin and throat pure white; the abdomen and inner side of the limbs whitish; tail covered with rather rigid pale chestnut-brown hairs, those near the end black-tipped; whiskers black and white; the upper cutting teeth pale yellow, with a deep central groove in front; soles of the hind feet flattened; hinder half naked, with a band of hair behind the toes; the toes hairy on the edge. Length, body and head,  $5'' 3'''$ ; tail,  $4'' 3'''$ ; hind foot and toes,  $1'' 3'''$ .

*Hab.* India, Afghanistan.

#### FAM. BOVIDÆ.

*Cephalophora coronata*. Pale brown, with a narrow naked streak on the cheek; inner side of the fore legs and thighs, chin and beneath white; end of tail blackish; crown and tuft of hair between the horns bright reddish brown.

*Hab.* Western Africa, Mr. Whitfield. In the menagerie of the Earl of Derby.



*Antilope annulipes*, Aquetoun, native of *Gambia*; Bush-Goat, *English at Gambia*. Fur pale yellowish brown; orbits, lips, chin, base of the ears, chest and beneath, the inner parts of the fore legs and thighs, and a band over the hoofs white; inside of the ears, the fetlock, and a streak up the front of the fore and hind legs, and the front of the fore leg above the knee black; end of tail blackish; throat yellowish; legs slender, elongate; male horns thick, sublyrate, black, with strong knobs in front; female similar, hornless.

*Hab.* Western Africa, Mr. Whitfield. In the menagerie of the Earl of Derby.

*Antilope Scripta*, Pallas. Back with a compressed ridge of blackish hair in both sexes. The male with a high compressed ridge of long loose white hairs, extending the whole length of the back and tail.

*Hab.* Western Africa.

*Cephalophorus Ogilbyii*, *Antilope Ogilbyii*, *Waterhouse*. Splendid golden brown, beneath paler; face, ears, back of the neck with scattered black rigid hairs, which are crowded together and form a broad dorsal line; feet above the hoofs and the front part of the legs blackish; horns short, conic, thick at the base, with five or six irregular cross ridges.

*Hab.* Fernando Po, Th. Thomson, Esq., R.N.

*Capra (Ibex) Warryato*,—*Warryato* or Hill Goat of the Tamooleans, *Hardw. MSS. Icon. ined. (B.M. n. 10, 975.) t. 192, sketch improved from former by Colonel Hamilton Smith, t. 193.* Head dark brown, slightly grised with yellowish; horns short, bent back with close cross rings; the outer side rounded, the inner strongly keeled in front; the horn of the females smaller but similar.

*Hab.* India, Hardwicke. Nepal, Mr. Partridge.

Head and horns of both sexes in the Museum, presented by R. Partridge, Esq.

XXXVIII.—*Excerpta Botanica, or abridged Extracts translated from the Foreign Journals, illustrative of, or connected with, the Botany of Great Britain.* By W. A. LEIGHTON, Esq., B.A., F.B.S.E., &c.

No. 11. *On the Structure of the Nucleus of the genera Sphærophoron of the Family of the Lichenes, and Lichina of that of the Byssaceæ.* By CAMILLE MONTAGNE, M.D. (*Ann. des Sc. Nat. n. s. xv. p. 147.*)

THE apothecium of *Sphærophoron* is at first only a simple ellipsoid swelling of the extremity of a branch. If at this period this be divided longitudinally, the cavity occupied by the nucleus is observed to have a sigmoid form. This is owing to a hemispherical projection of the medullary or central layer of the thallus, representing a sort of torus, from

all points of which the sporidigerous tubes or thecæ diverge. Already is the upper part of the sporangium filled with that scobiform substance altogether different from the sporidia, and of a beautiful indigo-blue by transmitted light, but of an opaque black *en masse*, which finally tinges the thecæ and sporidia of a similar but less deep tint. The cavity gradually enlarges, not only from the swelling of the extremity of the branch, but also from the insensible shrinking of the interior projection formed by the medullary layer of the thallus.

The nucleus contained in the apothecium differs very slightly from that of other Lichens. It is composed of erect filaments pressed against each other, precisely as in the proligerous lamina of a *Lecidea*, and united by the intervention of a mucilaginous substance which greedily absorbs water. These tubular filaments, open at their free extremity, have exactly the form of the asci or utricules of a *Peziza*. They are linear, obtuse at the summit, and attenuated into a short pedicel at the base, which seems to be the continuation of the filaments of the medullary layer. In their young state they are perfectly transparent, and contain an opaline humour, in which at a later period appear hyaline globules, which are hence only visible on moving the diaphragm of the microscope. Gradually these filaments, which can be considered as no other than the true thecæ, assume a bluish tint, which becomes more intense with age, but which, nevertheless, never loses its blue tinge when viewed by transmitted light.

The sporidia also become more and more apparent in the thecæ, being globose or oblong, and arranged in a single series. On the final rupturing of the theca they are set free and become mingled with that mass of black powder, from which however they are clearly distinct, and whose origin it is very difficult to determine, because it exists in the very earliest period of the formation of the apothecium.

The theca is from the 500th to 600th of a millimetre long, and 200th of a millimetre in diameter. The sporidium, either entirely spherical or slightly longer than broad, attains when set free a diameter of 100th of a millimetre, and is bounded by a hyaline margin and coloured blue similar to the thecæ.

I cannot assert that paraphyses do not exist in it, but if they do, we are unable to distinguish them from the true thecæ, except by their transparence and the absence of sporidia in their tube, and every one is aware that these organs are only abortive thecæ.

These observations were made on a specimen of *Sphærophoron coralloides* collected by myself in the Vosges.

Among the closed *Phyceæ* this genus has for its analogue

*Thamnophora*, among the *Byssaceæ*, *Lichina*, and among the *Hypoxyleæ*, *Thamnomycetes*; note however that I say *genera analoga, non autem affinia*.

The typical plant of the genus *Lichina*, first observed by Micheli, was considered by him as a lichen. Linnæus, and all succeeding botanists, including Agardh, the founder of the genus, have arranged it among the *Phyceæ*; not however unanimously, for Acharius considers the second species of the genus, *L. confinis*, Ag. (regarded as a variety only by Turner and Hooker), as a lichen, and refers it to the *Sphærophoron*. In 1825 Fries established under the name *Byssaceæ* a family intermediate between *Lichenes* and *Phyceæ*, and included in it *L. confinis*, regarding *L. pygmæa* as a true *Hydrophycea*. Fries recognises the affinities of *Lichina* with *Collana*, near which he arranges it, and especially its resemblance to his own genus *Synalyssa*.

But the two species cannot be separated nor placed in distinct families; for though their true nature be ambiguous, and their systematic place necessarily uncertain, we can assert that they possess the frond of the *Fucaceæ* and the fructifications of Lichens.

Turner, Lyngbye and Agardh, either through the imperfection of their instruments, or from other causes, have not obtained right views of the fructification. Greville's description and figure (*Algæ Brit.* p. 21, and *Scot. Crypt. Fl.* t. 219. fig. 7.) are founded on a *horizontal* section of the fructification.

A thin longitudinal section of the mature apothecium of *Lichina pygmæa*, viewed with a power of 600 diameters, shows that the mucilaginous nucleus (*lamina prolifera*) is composed of extremely delicate, erect, flexuose filaments recurved and crisped at their superior or free extremity. Their diameter is at most  $\frac{1}{800}$ th of a millimetre, and their length varies between  $\frac{1}{10}$ th and  $\frac{1}{15}$ th of a millimetre. They are slightly swollen at the summit, which is bent and somewhat recurved. In the midst of these filaments we easily see the long thecæ or utricles in different stages of development. The shorter ones contain only in the centre a shapeless greenish sporaceous mass extending through nearly the whole length of the tube. Others already enclose the sporidia, though their form is as yet ill-defined. Others still more numerous exhibit these sporidia in their perfect state. I presume that on their first formation they are ranged in single series, but later some of them are placed two and two, and thus render the theca distended in the part occupied by them. These thecæ are shorter than the filaments in the midst of which they are situated;



their form is linear, slightly attenuated towards the base; their very delicate membrane is in due time ruptured, and the sporidia escape as in many *Lichenes* and *Hypoxyleæ*. The sporidia, in number ordinarily eight, are of an elliptical or oblong form, their length being  $\frac{1\frac{1}{2}}{500}$ ths, or nearly 300ths, and their width a little more than 100th of a millimetre. They generally contain a greenish cellular substance, and are surrounded by a very marked transparent margin. Sometimes they are empty and pellucid, only marked with a longitudinal plait. These facts, which are easily verified, have been observed in a specimen of *L. pygmæa* gathered by myself on the shores of Brittany.

The organization of the nucleus of *L. confinis* differs in no other respect than in the dimensions of the parts, which is worthy of attention, as the plant is one half smaller. The filaments, thecæ and sporidia are similar in form as in *L. pygmæa*. The sporidia alone have this remarkable peculiarity, that, being one-third shorter than those of *pygmæa*, they still are equal in width, which renders them nearly spherical. In a young state, on a specimen collected by M. Durieu at Gijon, on the coasts of Spain, they are slightly longer than broad, entirely pellucid, pressed together and longitudinally plaited, although always marked with a margin. In an older state they are turgid, filled with an utricular mass, and nearly globose. This, which I presume is the adult state, is seen on a specimen collected on the coast of Normandy by M. Lenormand.

Hence it is evident that *Lichina* (comprising the two species *pygmæa* and *confinis*) must be removed from the *Phyceæ* and arranged in the tribe *Collanaceæ*, near the genus *Synalyssa* in the family *Byssaceæ*, or at all events among the Lichens, in case we do not admit Fries's intermediate family of the *Byssaceæ*.

As the genus *Lichina* contains only these two species there will be little difficulty in distinguishing them, but the generic characters must be modified as follows:—

Apothecia terminalia, primo globosa, poroque simplici pertusa, demum scutellato-urceolata, nucleum gelatinoso-filamentosum hyalinum foventia. Asci erecti ampli, lineari-clavati, sporidia oblongo-elliptica suboctona serie unica disposita continentes, paraphysibus tenuissimis apice crispulo-incurvis stipati.

Thallus cartilagineus, dichotomo-ramosus, teres vel plano-compressus, olivaceo-nigrescens.

XXXIX.—*Descriptions of Chalcidites discovered in Valdivia*  
by C. Darwin, Esq. By FRANCIS WALKER, F.L.S.

*Pachylarthrus Sariaster*, Mas. *Viridis, antennæ luteæ, pedes flavi, alæ limpidaæ*.—Fem. *Cupreus, antennæ nigræ, pedes fulvi, femora viridia*.

*Mas.* Corpus crassum, convexum, nitens, viride cupreo-varium, scite squameum, parce pubescens: caput magnum, transversum, breve, viride, thorace latius; vertex latus, cupreo-varius; frons impressa, abrupte declivis: oculi rufi, mediocres, non extantes: os flavum; palpi maxillares clavati; antennæ luteæ, graciles, subfiliformes, 13-articulatæ, thorace paullo longiores; articulus 1<sup>us</sup> longus, gracilis; 2<sup>us</sup> longicyathiformis; 3<sup>us</sup> et 4<sup>us</sup> minimi; 5<sup>us</sup> et sequentes usque ad 10<sup>um</sup> mediocres, subæquales; clava longiconica, acuminata, articulo 10° fere duplo longior: thorax ovatus, robustus; prothorax transversus, brevis, antice angustus: mesothoracis scutum longitudine latius; parapsidium suturæ bene determinatæ, postice approximata; paraptera et epimera magna; scutellum subconicum, sat magnum: metathorax mediocris, obconicus, declivis: petiolus sat longus: abdomen rhombiforme, contractum, læve, glabrum, latitudine non longius, thoracis dimidii longitudine; segmentum 1<sup>um</sup> maximum, dorsum obtegens: pedes flavi, simplices, subæquales; coxæ virides; unguis et pulvilli fusi: alæ limpidaæ; squamulæ luteæ; nervi fulvi; nervus humeralis ulnari multo longior, radialis ulnari vix brevior, cubitali duplo longior; stigma minutum.

*Fem.* Cupreus, parum nitens: caput thorace vix latius: palpi maxillares simplices: antennæ nigræ, subfiliformes, thorace non longiores; articulus 2<sup>us</sup> cyathiformis; 5<sup>us</sup> et sequentes usque ad 10<sup>um</sup> subæquales, approximati; clava conica, articulo 10° longior: petiolus brevis: abdomen ovatum, supra fere planum, subtus carinatum, apice acuminatum et attenuatum, thorace vix longius; segmentum 1<sup>um</sup> magnum, 2<sup>um</sup> et sequentia brevia: pedes fulvi; coxæ virides; femora viridia, apice fulva. (Corp. long. lin. 1—1 $\frac{1}{3}$ ; alar. lin. 1 $\frac{3}{4}$ —2 $\frac{1}{4}$ .)

*Dicyclus Lynastes*, Fem. *Viridi-æneus, antennæ nigræ, pedes fulvi, femora ænea, alæ limpidaæ*.

Corpus breve, convexum, viridi-æneum, nitens, scitissime squameum, parce hirtum: caput transversum, breve, thorace paullo latius; vertex latus; frons impressa, abrupte declivis: oculi rufi, mediocres, non extantes: antennæ nigræ, graciles, subclavatae, thorace vix longiores; articulus 1<sup>us</sup> longus; 2<sup>us</sup> cyathiformis; 3<sup>us</sup> et 4<sup>us</sup> minimi; 5<sup>us</sup> et sequentes usque ad 10<sup>um</sup> subæquales, approximati; clava conica, compressa, acuminata, articulo 10° multo longior: thorax ovatus: prothorax transversus, brevis, antice angustus: mesothoracis scutum longitudine latius, parapsidium suturæ remotæ, sat bene determinatæ, postice approximata; paraptera et epimera magna; scutellum subconicum, mediocre: metathorax brevi-obconicus, declivis: petiolus brevis: abdomen subrotundum, supra fere planum, subtus carinatum, apice acuminatum, thorace brevius; segmentum 1<sup>um</sup> magnum: pedes fulvi, simplices, subæquales; coxæ æneæ; femora ænea, apice fulva; tarsi apice fusi: alæ limpidaæ; squamulæ piceæ; nervi fulvi; nervus humeralis ulnari multo longior, radialis ulnari vix brevior, cubitali longior; stigma minutum. (Corp. long. lin.  $\frac{3}{4}$ ; alar. lin. 1 $\frac{1}{4}$ .)

*Lamprotatus Natta*, Mas. *Viridi-cyaneus, antennæ nigræ, pedes flavi, alæ limpidaæ*.

Corpus angustum, sublineare, convexum, viridi-cyaneum, nitens, scitissime squameum, parce hirtum: caput transversum, breve, viride, thorace latius; vertex latus, æneo-varius; frons impressa, abrupte declivis: oculi rufi,

mediocres, non extantes : antennæ nigræ, graciles, subfiliformes, thorace vix breviores ; articulus 1<sup>us</sup> longus, sublinearis ; 2<sup>us</sup> longicyathiformis, 3<sup>us</sup> et 4<sup>us</sup> minimi ; 5<sup>us</sup> et sequentes usque ad 10<sup>um</sup> subæquales, approximati ; clava longiovata, acuminata, articulo 10<sup>o</sup> multo longior : thorax longi-subovatus : prothorax transversus, mediocris, antice paullo angustior : mesothoracis scutum longitudine latius ; parapsidum suturæ bene determinatæ, postice approximata ; paraptera et epimera magna ; scutellum subconicum, mediocre : metathorax magnus, declivis, obconicus : petiolus sat longus : abdomen breviovatum, læve, glabrum, thorace multo brevius : pedes flavi, simplices, subæquales ; coxæ virides ; tarsi apice fuscii : alæ limpida ; squamulæ fuscæ ; nervi fulvi. (Corp. long. lin. 1 ; alar. lin. 1½.)

Lamprotatus Bisaltes, Mas. *Æneo-viridis, antennæ nigræ, pedes flavi, femora viridia, alæ limpida.*

Corpus convexum, æneo-viride, nitens, scitissime squameum, parce hirtum : caput transversum, breve, thoracis latitudine ; vertex latus ; frons impressa, abrupte declivis : oculi rufi, mediocres, non extantes : antennæ nigræ ? : thorax ovatus : prothorax transversus, brevissimus : mesothoracis scutum longitudine latius ; parapsidum suturæ bene determinatæ, postice approximata ; paraptera et epimera magna ; scutellum conicum, mediocre : metathorax brevi-obconicus, declivis : petiolus brevissimus : abdomen sublineare, læve, glabrum, fere planum, thorace angustius et multo brevius ; segmentum 1<sup>um</sup> maximum : pedes flavi, simplices, subæquales ; coxæ virides ; femora viridia, apice flava ; tarsi apice fuscii : alæ limpida ; squamulæ piceæ ; nervi fuscii ; nervus humeralis ulnari fere duplo longior, radialis ulnari paullo brevior, cubitali paullo longior ; stigma parvum. (Corp. long. lin. 1 ; alar. lin. 1½.)

Lamprotatus Orobia, Fem. *Viridis, cupreo-variis, antennæ nigræ, pedes rufi, femora basi viridia, alæ limpida.*

Viridis, convexus, nitens, scitissime squameus, parce pubescens : caput transversum, mediocre, thoracis latitudine ; vertex sat latus ; frons abrupte declivis, ad antennarum receptionem excavata : oculi picei, mediocres, non extantes : antennæ subfiliformes, nigræ, graciles, pubescentes, thorace non longiores ; articulus 1<sup>us</sup> longus, gracilis ; 2<sup>us</sup> longicyathiformis ; 3<sup>us</sup> et 4<sup>us</sup> vix conspicui ; 5<sup>us</sup> longicyathiformis ; 6<sup>us</sup> et sequentes breviores : thorax longiovatus : prothorax mediocris, transversus, antice angulum utrinque fingens non angustior : mesothoracis scutum longitudine vix latius ; parapsidum suturæ bene determinatæ, postice approximata ; paraptera et epimera magna ; scutellum mediocre, conicum : metathorax mediocris, declivis, obconicus : petiolus brevis : abdomen ovatum, nitens, læve, fere glabrum, apice acuminatum, thorace paullo brevius : segmenta antica magna, postica breviora : oviductus non exertus : pedes graciles, recti, subæquales, pallide rufi, pubescentes : coxæ virides ; trochanteres piceæ ; femora basi viridia ; tarsi apice fuscii : alæ limpida, mediocres ; squamulæ viridi-piceæ ; nervi fuscii ; nervus humeralis ulnari fere duplo longior, cubitalis radialis brevior ; stigma minutum. (Corp. long. lin. 1¼ ; alar. lin. 2¼.)

*Var. β.*—Capitis vertex viridi-æneus : thoracis discus cupreo-æneus : abdomen cupreo-variis.

Pteromalus Megareus, Fem. *Viridi-æneus, antennæ nigræ, pedes flavi, femora viridia, tibiæ fusco-cinctæ, alæ limpida.*

Corpus viridi-æneum, convexum, parum nitens, scitissime squameum, parce pubescens : caput transversum, breve, thorace paullo latius ; vertex sat latus ; frons abrupte declivis, excavata : oculi picei, mediocres, non extantes : antennæ nigræ, subclavatæ, pubescentes, sat graciles, thorace non longiores ;



articulus 1<sup>us</sup> viridis; thorax breviovatus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum latum; parapsidum suturæ non bene determinatæ; scutellum subrotundum, mediocre: metathorax brevis, declivis, obconicus; petiolus brevissimus: abdomen longiovatum, nitens, læve, fere glabrum, supra planum, subtus carinatum, apice acuminatum, thorace longius et angustius: pedes flavi; coxæ virides; femora viridia, apice flava; tibiæ fusco-cinctæ; tarsi apice fusi: alæ limpidae; squamulæ piceæ; nervi fulvi; nervus humeralis ulnari multo longior, cubitalis radiali multo brevior; stigma minimum. (Corp. long. lin. 1; alar. lin. 1½.)

Closterocerus Xenodice, Mas et Fem. *Viridis cyaneo-varius, abdomen cupreum, antennæ nigræ, pedes flavi, femora viridia, tibiæ fusco-cinctæ, alæ fusco-maculatæ.*

*Mas.* Corpus sublineare, angustum; depressum, læte viride, nitens, læve, parce hirtum: caput transversum, brevissimum, inter oculos impressum; vertex sat latus; frons abrupte declivis: oculi mediocres: antennæ subsectæ, nigræ, hirtæ, thorace non longiores: thorax ovatus: prothorax brevissimus: mesothoracis scutum longitudine vix latius; parapsidum suturæ vix conspicuæ; scutellum subovatum: metathorax obconicus, declivis, mediocris: petiolus brevissimus: abdomen sublineare, cupreum, basi cyaneo-viride, thorace angustius non longius: pedes flavi; coxæ virides; femora viridia; tibiæ fusco-cinctæ; tarsi apice fusi: alæ mediocres, ciliatæ, fulvo-tinctæ, in discum obsolete fusco-maculatæ; squamulæ piceæ; nervi fulvi; nervus ulnaris humerali multo longior, radialis vix ullus, cubitalis brevissimus in alæ discum abrupte declivis; stigma minimum.

*Var. β.*—Tibiæ omnino fuscæ: alis maculæ vix conspicuæ.

*Var. γ.*—Alæ omnino limpidae.

*Fem.* Cyaneo-viridis: antennæ setacæ, thorace breviores: abdomen ovatum, thorace paullo brevius vix angustius. (Corp. long. lin. ¼—½; alar. lin. ½—1.)

*Var. β.*—Tibiæ nigro-fuscæ, apice flavæ.

Platygaster Paches, Mas et Fem. *Atra, antennæ nigræ, pedes nigri, tarsi picei, alæ subfuscæ.*

*Mas.* Corpus convexum, atrum, nitens, læve, fere glabrum: caput transversum, breve, thorace vix latius; vertex sat latus; frons abrupte declivis: oculi picei, parvi, non extantes: antennæ nigræ: thorax ovatus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum longitudine latius; parapsidum suturæ non bene determinatæ; scutellum subrotundum, non productum: metathorax parvus, obconicus, declivis: petiolus brevis: abdomen longiovatum, thorace paullo angustius non longius; segmentum 1<sup>um</sup> magnum, 2<sup>um</sup> et sequentia breviora: pedes nigri, subæquales; femora clavata; genua picea; tibiæ clavatæ; tarsi picei: alæ subfuscæ; squamulæ piceæ. (Corp. long. lin. ½; alar. lin. ¾.)

*Fem.* Caput thoracis latitudine: antennæ subclavatæ: abdomen longiovatum, apice acuminatum, thorace angustius et paullo longius.

Inostemma Quinda, Fem. *Atra, antennæ flavæ, apice fuscæ, pedes flavi, alæ limpidae.*

Corpus atrum, angustum, sublineare, convexum, læve, nitens, pubescens: caput transversum, subrotundum, thorace vix latius; vertex latus; frons abrupte declivis: oculi parvi, non extantes: antennæ subclavatæ, flavæ, apice fuscæ: thorax ovatus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum transversum, sulcis 2 indistinctis postice approximatis; parapsidum suturæ non bene determinatæ; scutellum obconicum, non productum: metathorax brevi-obconicus, declivis: petiolus crassus, brevissimus: abdomen longiovatum, glabrum, apice acuminatum, thorace paullo longius

non angustius; segmentum 1<sup>um</sup> maximum: pedes flavi, simplices, subæquales: alæ limpidae, mediocres; squamulæ piceæ; nervi fulvi; nervus subcostalis alæ basi emissus nervulum in discum rejiciens et spatio brevi ante costæ medium in stigma subfurcatum decedens: nervus quoque spurius alæ basi emissus in discum excurrens et nervo subcostali nervuloque triangulum fingens. (Corp. long. lin.  $\frac{1}{2}$ ; alar. lin. 1.)

Romilius (n. g. \*) Zotale, Fem. *Ater, antennæ nigræ basi fulvæ, pedes fulvi, alæ limpidae.*

Corpus longum, angustum, sublineare, atrum, vix convexum, obscurum, pilis canis pubescens, subtilissime et confertissime punctatum: caput transversum, breve, subrotundum, thorace vix latius; vertex latus; frons convexa, non impressa: oculi parvi, non extantes: antennæ nigræ, graciles, subclavatae, prope os insertæ, thorace non breviores; articulus 1<sup>us</sup> longus, subfusiformis, fulvus; 2<sup>us</sup> longicyathiformis; 3<sup>us</sup> et 4<sup>us</sup> longi, lineares; 5<sup>us</sup> et sequentes ad 10<sup>um</sup> breves, approximati, clavam fingentes longifusiformem: thorax longiovatus: prothorax brevissimus, postice excavatus: mesothoracis scutum magnum, trisulcatum, longitudine vix latius; sulci laterales postice approximati; scutellum parvum, semicirculum fingens: metathorax mediocris, obconicus: petiolus brevissimus: abdomen longifusiforme, subtus convexum, apice acuminatum, thorace multo longius; segmentum 1<sup>um</sup> breve; 2<sup>um</sup> et 3<sup>um</sup> magna; 4<sup>um</sup> et 5<sup>um</sup> paullo breviora; 6<sup>um</sup> adhuc brevius: pedes fulvi, longi, graciles, simplices, subæquales; tarsis articulus 1<sup>us</sup> longus, 2<sup>us</sup> multo brevior, 3<sup>us</sup> adhuc brevior, 4<sup>us</sup> 3<sup>o</sup> brevior, 5<sup>us</sup> 4<sup>o</sup> paullo longior: alæ mediocres, limpidae, abdominis apicem dum quietem agunt non attingentes; squamulæ fulvæ; nervi fulvi; nervus subcostalis alæ basi emissus ad costæ medium eam attingens et fere ad alæ apicem percurrens; nervus 2<sup>us</sup> quoque alæ basi emissus in discum excurrens ibique furcatus, furca antica nervo subcostali triangulum fingens, furca postica ad alæ marginem posticum decedens; nervus cubitalis rectus, sat longus, nervo subcostali ubi costam attingit emissus, stigmatem terminatus minuto. (Corp. long. lin.  $1\frac{1}{4}$ ; alar. lin.  $2\frac{3}{4}$ .)

[To be continued.]

XL.—*The Crustacea of Ireland. Order Decapoda.* By WM. THOMPSON, Esq., Vice-Pres. Nat. Hist. Society of Belfast.

## CRUSTACEA. Order DECAPODA.

### DECAPODA BRACHYURI.

*Macropodia phalangium*, Leach, Mal. pl. 23. f. 6; Desmar. p. 155, pl. 23. f. 3.

*Stenorhyncus phalangium*, *Edw. Crust.* tome i. p. 279.

*Cancer phalangium*, *Penn. Brit. Zool.* vol. iv. p. 11. pl. 9. f. 3, edition 1812.

This species has already been recorded by Templeton as "not uncommon on the Irish coast," and by Mr. J. V. Thompson as "very abundant in the deep water of the harbour of Cove." *Ent. Mag.* vol. iii. p. 371.

It has occurred very commonly to my scientific friends and myself when dredging in the loughs of Strangford and Belfast; and to Mr.

\* *Scelio Duris* (Monogr. Chalcid., ii. 61.) also belongs to this genus.

R. Ball at the South Islands of Arran\*, as well as at Youghal and Dublin. The motions of this crab are slow, though its light body borne on such long legs would be popularly believed to indicate considerable powers of locomotion. The editor of the octavo edition of Pennant's 'British Zoology' (1812) remarks, that this crab "invests itself occasionally in leaves of *fuci* to ensnare its prey;" and Dr. Leach states that "it has been observed by Dr. Macculloch to be sometimes covered by fragments of a species of the Linnæan genus *Fucus*, which are attached to its body and legs." The first statement seems to me fanciful. The presence of fragments of fuci, &c. I should rather attribute to the spinous body, and the bristly arms and legs of great length intercepting adventitious substances, which in floating through the water come in contact with them, and (as Mr. R. Ball reminds me) are further retained there by a viscid slime covering the animal. Many marine productions, however, both of a vegetable and animal nature, have their birth, and grow to beauty on the shell of this as well as other species of our native Crustacea—corallines, sponges, zoophytes, algæ, &c. may thus be found. *Balani* occasionally cover the entire upper surface of the body of the crab.

Aug. 22, 1840.—On opening a thornback (*Raia clavata*), about 20 inches in length, caught in Belfast bay, I found its stomach entirely filled with *Macropodia phalangium*.

*Acheus Cranchii*, Leach, Mal. pl. 22 c; Edw. Crust. t. i. p. 281.

In the collection of Crustacea formed by Mr. J. V. Thompson, and now in the possession of the Royal College of Surgeons, Dublin, is a native specimen of this crab, which we may presume was obtained on the southern coast.

*Inachus Dorsettensis*, Leach, Mal. pl. 22. f. 1—6; Desm. p. 52. pl. 24. f. 1.

I. scorpio, Edw. Crust. t. i. p. 288.

Cancer Dorsettensis, Penn. vol. iv. p. 12. pl. 10. f. 1.

This species is stated by Mr. J. V. Thompson to be common in the harbour of Cove. Ent. Mag. vol. iii. p. 371. It is pretty commonly brought up from deep water in the dredge in the loughs of Strangford and Belfast, but in much smaller quantity than *Macropodia phalangium*. Under similar circumstances it has been procured by us on the western coast. Mr. R. Ball finds it in Dublin bay. All the examples of this crab which I have taken were invested with sponge, which generally covers over the body, arms, and legs; algæ and zoophytes likewise spring from it. In this extraneous matter some of the smaller crustacea find shelter, and, together with the other objects, render the capture of the *Inachus Dorsettensis* interesting far beyond the acquisition of itself.

Capt. Beechey, R.N. of H.M.S. Lucifer, brought up a specimen of this *Inachus* alive in the dredge from a depth of about 140 fathoms off the Mull of Galloway. See 'Annals' for Sept. last, p. 21.

\* On different parts of the western coast it was dredged by us in 1810.



*Inachus leptochirus*, Leach, Mal. pl. 22 B ; Edw. Crust. t. i. p. 289.

In the 7th vol. of the 'Annals,' I noticed an example of this species having been dredged in Clifden bay, Connemara, during a natural-history tour made to that quarter by Mr. R. Ball, Mr. E. Forbes, Mr. Hyndman, and myself; and that about the same time a specimen was procured by Mr. R. Patterson in Belfast bay. Subsequently, I have seen specimens from the latter locality in the Ordnance collection.

*Inachus dorynchus*, Leach, Mal. pl. 22. f. 7. & 8; Edw. Crust. t. i. p. 288.

Among a number of Crustacea dredged in Belfast bay in the summer of 1838 by my friend Dr. J. L. Drummond, and kindly sent to me, was an example of this species. Specimens from the same locality are in the Ordnance collection.

*Pisa tetraodon*, Leach, Mal. pl. 20; Edw. Crust. t. i. p. 305; Desm. pl. 22. f. 1.

In the collection of Mr. R. Ball are two examples of this species which were obtained at Roundstone, Connemara.

In August 1841, I found several of the *P. tetraodon* thrown ashore at Compton, Isle of Wight.

*Hyas aranea*, Leach, Mal. pl. 21 A; Edw. Crust. t. i. p. 312.

*Cancer aranea*, Penn. vol. iv. p. 11. pl. 9. f. 1.\*

Mr. Templeton has noticed this species as taken at Carrickfergus; and native specimens are in Mr. J. V. Thompson's collection. It has been obtained at Youghal and Dublin by Mr. R. Ball. We take it by dredging in the loughs of Strangford and Belfast, where too it is commonly thrown ashore. In the estuary at little more than half a mile from Belfast, a number of large specimens of this crab were captured in the month of October 1839, on the hooks attached to hand-lines, much to the surprise of the fishermen, who had never met with them so near the town before, or in brackish water. The lug-worm (*Lumbricus marinus*) was the bait attacked in this instance by the crabs. *Hyas aranea* was taken in the dredge at Bundoran, on the western coast, by our party in July 1840, and very small living specimens were found under stones between tide-marks at Lahinch, on the coast of Clare. In Mr. Hyndman's cabinet are two crabs of this species with oysters attached to their backs. The oyster (*Ostrea edulis*) on the larger crab is 3 inches in length, and five or six years old, and is covered with many large *Balani*. The "shell" or carapace of the crab is but  $2\frac{1}{4}$  inches in length, and hence it must, Atlas-like, have borne a world of weight upon its shoulders. The presence of this oyster affords interesting evidence that the *Hyas* lived several years after attaining its full growth. Both crabs and oysters, though dead, were brought to Mr. Hyndman in a fresh state. The hairs on the body and legs of specimens in my collection are longer in the small than in the large individuals. On the north-east

\* This bad figure is not referred to by Leach.

coast of Ireland the *H. aranea* is very much preyed on by the cod-fish.

In January 1840, I saw specimens of this crab of very large size on the coast near Edinburgh: the carapace of one which I measured was 3 inches in length, and the extent from the extremities of the first pair of legs, 11 inches.

*Hyas coarctata*, Leach, Mal. pl. 21 v; Edw. Crust. t. i. p. 312.

This species is set down as Irish in Mr. J. V. Thompson's catalogue, his specimens being most probably from the southern coast. In Mr. Ball's collection are examples from Youghal, and some dredged by him in Dalkey Sound near Dublin. In the loughs of Belfast and Strangford we take it very commonly with the dredge. I have seen an example from the Giant's Causeway—thus from the north to the south of Ireland the species prevails.

Dr. J. L. Drummond has found numbers of these crabs in the stomachs of cod-fish brought to Belfast market. The largest example I have seen was found in the mouth of a haddock taken at Killylough, county Down. Its carapace is 2 inches 2 lines in length; each arm from base to point of claw 3 inches  $7\frac{1}{2}$  lines. The body, legs and arms of my specimens of *H. coarctata* are very much invested with zoophytes, sponges, and algæ.

Examples of this crab have been sent me from Portpatrick by Capt. Fayrer, R.N.; and I have myself obtained it on the opposite or eastern coast, at Newhaven near Edinburgh. Captain Beechey, R.N., brought up four examples of this species alive in the dredge from a depth of about 140 fathoms off the Mull of Galloway. See p. 21 of the present volume.

*Maia squinado*, Latr. Leach, Mal. pl. 18; Edw. Crust. t. i. p. 327; Desm. pl. 21.

*Cancer spinosus*, Penn.

Inhabits the southern coast. Native specimens of this crab are in Mr. J. V. Thompson's collection. Mr. R. Ball informs me that it is taken not unfrequently with lobsters about Youghal, where it is called horrid-crab; it is not brought to market, but is sometimes eaten by the fishermen—the carapace of a specimen from that locality in this gentleman's collection is 7 inches in length, and others are little inferior to it.

One of these crabs was brought to me at Ventnor, Isle of Wight, where it was taken in a crab-pot at the same time with a *Galathea strigosa*.

*Eurynome aspera*, Leach, Mal. pl. 17; Edw. Crust. t. i. p. 351; Desm. pl. 20. f. 2.

*Cancer asper*, Penn. vol. iv. p. 13. pl. 10. f. 3.

Marked as Irish in Mr. J. V. Thompson's collection. It is rather a rare species, and an inhabitant of deep water. In Strangford lough a single specimen was taken in the dredge by Mr. Hyndman and myself in Oct. 1834, and on a subsequent occasion we obtained several individuals in the same locality. It has been dredged in Bel-

fast bay by Dr. J. L. Drummond. Mr. R. Ball once found this species cast ashore on the Dublin coast after a great storm; and in his collection are fine specimens from Roundstone, on the western coast.

Capt. Beechey, R.N., brought up a crab of this species alive in the dredge from a depth of 50 fathoms off the Mull of Galloway. See p. 21 of the present volume.

*Xantho floridus*, Leach, Mal. pl. 11; Edw. Crust. t. i. p. 394; Desm. pl. 8. f. 2.

Seems to be a local species. It is recorded as Irish in Mr. J. V. Thompson's catalogue. In the Ordnance collection are specimens from three localities on the Antrim coast—Carnlough, Larne and Carrickfergus; and in Mr. R. Ball's cabinet there is an example from Dublin bay. In July 1840, this species was found commonly by Mr. E. Forbes and myself under stones between tide-marks at Lahinch, county Clare:—the entire claws of these specimens (all under half adult size) are of a pale brown colour, but very different in shade from any part of the body of the animal: in Leach's 'Malacostraca' the claws are described and figured as black, but a variety stated to be rare is said to have "the tops of the claws of the same colour with the other parts of the animal."

*Xantho rivulosus*, Risso. Edw. Crust. t. i. p. 394.

A fine example of a crab so named, and which is an addition to the British fauna, is in the Ordnance collection—it was taken at Portrush, county of Antrim, in July 1839. Capt. Portlock informs me that having been at once identified as the *X. rivulosus*, more specimens were assiduously sought for in the locality, but in vain. I fully agree with him in considering it the *X. rivulosus* as described by M. Edwards. It seems to me a well-marked species. It is said to inhabit the Mediterranean and the western coast of France.

*Cancer pagurus*, Leach, Mal. pl. 10; Penn. vol. iv. p. 7. pl. 3; Desm. p. 103. pl. 8. f. 1.

*Platycarcinus* [*Latr.*] *pagurus*, Edw. Crust. t. i. p. 413.

This, the common edible crab, is taken on all quarters of the Irish coast, and is held in good estimation for the table. It is the only species brought on sale to Belfast market. In January 1836, a specimen weighing  $9\frac{1}{2}$  lbs. was taken in Strangford lough, and in Aug. 1841, one of 9 lbs. was obtained in Belfast bay: these were of extraordinary magnitude for the north of Ireland to produce, although not larger than what are commonly to be seen in the London market. M. Edwards mentions this species as sometimes exceeding 5 lbs. in weight on the coast of France, t. i. p. 414. The ordinary method of taking these crabs on the coast of Ireland is the same as that resorted to in England—"wicker-baskets in the form of a wire mouse-trap." But Mr. Hyndman has seen them sought after and captured at Donaghadee by persons thrusting a piece of iron hooked at the end into the crevices of rocks, the ordinary retreat of the crabs at low-water: a similar practice, according to Mr. Ball, is pursued in the south. In spring and summer they are considered to be



in season at Belfast and Dublin\*—between Christmas and Easter is the period mentioned by Leach. As this is not a littoral species it may be worth remarking, that several very small individuals (their carapace an inch in breadth) were found by Mr. E. Forbes and myself in the month of July, frequenting the shore at Lahinch between tide-marks.

*Pilumnus hirtellus*, Leach, Mal. pl. 12; Edw. Crust. t. i. p. 417; Desm. p. 111. pl. 2. f. 1.

*Cancer hirtellus*, Penn. vol. iv. p. 9. pl. 6. f. 1.

This appears to be a widely distributed species, occurring in small numbers where found. It is enumerated among the native Crustacea in Mr. J. V. Thompson's catalogue; and in the first vol. of the Ordnance Survey is noticed as obtained at Carnlough, county of Antrim. In the course of a day's dredging in the loughs of Strangford and Belfast, one or two individuals of this species have generally been procured by us. Mr. R. Ball has taken it on the Dublin coast by dredging, and has likewise found it inhabiting the beach between tide-marks at Portmarnock—by Mr. E. Forbes and myself it was similarly found at Lahinch. Specimens from Youghal are in Mr. Ball's collection, and from Courtmasherry harbour—also in the county of Cork in Mr. G. J. Allman's. The figures of this species given by Leach and Pennant are good and characteristic: Desmarest's figure (Consid. Crust. pl. 11. f. 1.) is not so.

*Pirimela denticulata*, Leach, Mal. pl. 3; Edw. Crust. t. i. p. 424; Desm. p. 106. pl. 9. f. 1.

Of this small and handsomely sculptured crab I have seen but two Irish examples. The first was found amongst a number of species of various kinds collected on the coast of Antrim and Down by Dr. J. L. Drummond, and kindly submitted to my investigation. The other was obtained alive by Mr. E. Forbes and myself between tide-marks at Lahinch on the coast of Clare.

In August 1841, I found three specimens washed ashore at Compton, Isle of Wight.

*Carcinus mænas*, Leach, Mal. pl. 5; Edw. Crust. t. i. p. 434.

*Cancer mænas*, Penn. vol. iv. p. 6. pl. 2. f. 1.

This species is common around the coast of Ireland, and is popularly known by the name of *parten* in the north, the *crab*, par excellence, being the *Cancer pagurus* †. On gravelly, sandy, and muddy

\* Ruddy, writing seventy years ago, remarks—"The greatest quantity of crabs and lobsters supplying Dublin comes from the Isle of Man; but the best are those from Lambay, Howth and Skerries; for the former by longer carriage and agitation fret and waste themselves, and thereby become much worse food. They are also brought from the Saltee Islands, about 80 miles from Dublin, by the fishermen of Bullock, Dunleary and Howth."—Nat. Hist. Dublin, vol. i. p. 374.

† This species being distinguished as *the crab*, I should hope with Mr. T. Bell (Zool. Trans.) that it were considered the type of the genus *Cancer*.

shores I have remarked this species to be about equally common. Mr. R. Ball states that it inhabits holes in the hard mud, but whether made by itself he cannot say. The *Gonoplax bispinosa* is said by Mr. Cranch "to live in excavations formed in the hardened mud, and that their habitations, at the extremities of which they live, are open at each end." Leach, Mal. Pod. Brit. In the ordinary rejectamenta of the tide it occurs much more frequently than any other species, and generally in a young state. The carapace of the largest example in my collection, from Belfast bay, is  $3\frac{1}{4}$  inches in breadth and  $2\frac{1}{2}$  in length. Pennant and Leach state that this crab is sent in quantities to London, where it is eaten by the poor; and M. Edwards observes that it is used in like manner in Paris. In other large towns also I have remarked it on sale, but in Belfast, the *Cancer pagurus*, as has been already remarked, is the only species of crab used as an article of food. The *Carcinus mænas* is much in request by juvenile anglers and fishermen for bait. I have seen it so used by persons fishing for flounders (*Platessa flesus*) in the river Bann, near Portstewart: by Dr. J. L. Drummond I am informed that its liver is the chief bait used by boys at Larne in fishing for the young of the *Merlangus carbonarius*, called there *pickcock*: Mr. R. Ball states that when these crabs are about to change their shells or have recently done so, they are sought for under the sea-weeds at low-tide by the fishermen at Youghal, chiefly as bait for flat-fish, and are superior to anything that can be used—in this soft state they are here called *pil-crabs* (qu. peeled-crabs). At the quays of Youghal, these crabs are caught in great numbers simply with fish-entrails tied to a string. They prove such an annoyance to boys fishing at Belfast quay by consuming their bait, that all of them caught in the act are instantly trampled to death, and hence may have arisen the proverb of "crab's allowance." Mr. Ball was once witness to the body of a person drowned when bathing at Youghal, being taken out of the water an hour and a half after his disappearance, when several of these crabs were engaged eating the eyes of the corpse.

M. Edwards remarks that the name of "Crâbes enragés" is applied to this species on the coast of Normandy; and it is sufficiently appropriate, for when arrested in their rapid progress over the beach, and well (as remarked by that author) they can run, they instantly throw up their claws in anger to attack the intruder, and if not guarded against, will give him *feeling* evidence of their displeasure. M. Edwards too observes, that they have been kept alive for a long time out of the water, but he would perhaps hardly be prepared to expect that they are so tenacious of life, as shown in the following instance, communicated by Mr. R. Patterson:—"I remember above twenty years ago spending one of my school vacations at Holywood, Belfast bay, and on one occasion was so annoyed by the common crabs (*C. mænas*) eating the bait from my fishing hook, that at length I took a number of the crabs and by way of retaliation buried them alive in the garden. Some time after, but how long I cannot now remember, I was tempted to dig them up to

see what kind of a state they were then in, when to my surprise they were not only living, but able to move about as actively as ever. Wishing to verify the remembrance of this boyish prank, I took some of the crabs in the summer of 1837, threw a piece of sea-weed on them and buried them to the depth of twelve or fourteen inches, the soil above them being closely beaten down. When leaving the country seventeen days afterwards I found them living, and one individual was so brisk that he caught the spade in his claws. I have had no opportunity of ascertaining what is the limit of the time they would live under such circumstances."

When at the Isle of Wight in the summer of 1841, I remarked this to be the most common crab on all parts of the coast. At Ventnor it was flung from the crab-pots as useless.

I don't know whether the *C. manas* be found in the Adriatic Sea, but a crab which I saw under one of the bridges at Venice seemed to be this species. I remarked several crab-pots set at the sea or eastern entrance of one of the canals here where the bottom is oozy.

*Portumnus variegatus*, Leach, Mal. pl. 4 ; Desm. pl. 4. f. 2.

*Platyonichus latipes*, Edw. Crust. t. i. p. 436.

*Cancer latipes*, Penn. vol. iv. p. 5. pl. 1. f. 4.

Is occasionally found thrown ashore on extensive sandy beaches. I have seen examples from Macgilligan and Portrush on the northern, and Portmarnock on the eastern coast. Leach mentions this as "the most common species of the Malacostracous animals that inhabit our coasts," and that "it is found thrown on all the sandy shores of Great Britain in great abundance, especially during storms." On the Irish coast it is quite a local species. In the course of dredging in the open sea off Down, in the loughs of Strangford and Belfast a single example only of this species has occurred either to my friends or to myself. In dredging on the Connaught coast, and about Dublin bay on the opposite side of the island I never saw this species brought up—some of the localities dredged over were sandy and off extensive beaches of the same nature. After severe storms chiefly, we find it cast ashore upon the sand. *Corystes cassivelaunus* is much more generally distributed on the sandy coasts of Ireland than *Portumnus variegatus*.

*Portunus puber*, Leach, Mal. pl. 6 ; Edw. Crust. t. i. p. 441 ; Desm. p. 93. pl. 5. f. 1.

*Cancer velutinus*, Penn. vol. iv. p. 8. pl. 4. f. 1.

Of this species, the velvet crab of British authors—noticed by Templeton and J. V. Thompson as Irish—I have seen examples from all quarters of the coast. Dr. J. L. Drummond informs me that it is taken commonly at Bangor (co. Down) by boys, who find it lurking under large stones in rocky pools at low water. Between tide-marks we found it common at Lahinch. Mr. R. Ball states that at Youghal, where the species grows to a large size, and is known by the name of Kerry Witch, it is caught along with *Carcinus manas* with fish-guts used as bait.



*Portunus depurator*, Leach, Mal. pl. 9. f. 1 & 2.

*P. plicatus*, Edw. Crust. t. i. p. 442.

*Cancer depurator*, var.\* Penn. vol. iv. p. 6. pl. 4. f. 2.

From Templeton noting this crab merely as "found on the sands at Dunfanaghy, co. Donegal, July 13, 1815," and from the specimen named *P. depurator* in Mr. J. V. Thompson's collection (now in the College of Surgeons, Dublin,) being in reality *P. lividus*, it might be supposed that the species is not common. We have however dredged it in Strangford lough, in the open sea off Down, and on the Connaught coast. During some weeks spent at Bangor, near the entrance of Belfast bay, in the autumn of 1835, I found this to be the most common species of crab thrown by the waves upon the beach—*Carc. mænas* being the common one found *alive* between tide-marks. Mr. R. Ball mentions that the *P. depurator* is local, but abundant where it does occur about Youghal.

Leach describes this species—"P. testa subcomplanata lineis elevatis et transversis abbreviatis e granulis compositis," and Pennant attributes to it (his "*Cancer depurator*, var.") a tuberculated surface. What is just quoted from Leach applies admirably to all my specimens, small and large—his figure shows the appearance tolerably well. This author remarks, that it "is by far the most common species [of *Portunus*] that inhabits the British coast†."

*Portunus lividus*, Leach, Mal. pl. 9. f. 3 & 4.

*P. holsatus*, Edw. Crust. t. i. p. 443.

Is not common. Templeton mentions it as found by him "on the shore at Dunfanaghy." We have dredged it on more than one occasion in Belfast bay, and have obtained it on the beach at Carnlough, county of Antrim. In Mr. R. Ball's collection are several specimens which were dredged in Dublin bay. Leach mentions his having seen but two examples of this species.

*Portunus corrugatus*, Leach, Mal. pl. 7. f. 1 & 2; Edw. Crust. t. i. p. 443.

The only specimens of this species which I have seen are some fine examples from Larne and Carrickfergus in the Ordnance collection, and a single specimen obtained on the Dublin coast by Mr. R. Ball. Mr. J. V. Thompson notices *P. corrugatus* as inhabiting the harbour of Cove, but those so named in his collection are the wrinkled variety of *P. depurator*.

\* M. Edwards refers to Pennant's other figure of *C. depurator* with doubt, as identical with *P. marmoreus*, Leach.

† *Portunus marmoreus*, Leach, Mal. pl. 8; Edw. Crust. t. i. p. 442.

Mr. J. V. Thompson observes that, "several species of *Portunus* inhabit the harbour of Cove, as *depurator*, *arcuatus*, *corrugatus* and *marmoratus*, of which the last is perhaps the most common." Ent. Mag. vol. iii. p. 278. On examining the specimens from Cork in that gentleman's collection, labelled as *P. marmoratus*, I find that they are the *P. pusillus* of Leach. Of *P. marmoreus* I have not yet seen any Irish examples.

*Portunus pusillus*, Leach, Mal. pl. 9. f. 5—8; Edw. Crust. t. i. p. 444.

Generally inhabits deep water. It is ordinarily taken by us when dredging in the loughs of Strangford and Belfast; at the Killeries in Connemara it has similarly occurred as well as in Dublin bay. In the south too, it has been taken by Mr. J. V. Thompson in the harbour of Cove—see note on *P. marmoreus*, p. 282. I have several times found it in the stomachs of fishes, in one instance in a *Trigla Gurnardus*, taken in the open sea off Down.

At Compton, in the Isle of Wight, I procured several of this species thrown by the waves upon the beach.

*Portunus arcuatus*, Leach, Mal. pl. 7. f. 5 & 6.

*P. Rondeletii*, Edw. Crust. t. i. p. 444.

Has been taken occasionally by us when dredging in deep water in the loughs of Strangford and Belfast; and has been found cast ashore at Portmarnock by Mr. R. Ball. It was procured by our party in the summer of 1840 when dredging in Killery and Roundstone bays on the western coast. Specimens are in Mr. J. V. Thompson's collection, and it may be presumed, from Cork. All the examples of this species which have occurred to myself were taken in the dredge excepting on one occasion (Oct. 1) at Killinchy, on the shore of Strangford lough, when looking to the refuse in a number of small boats which had been employed the night before in herring fishing, I found in every one of them several of these crabs which had been brought up in the nets, and not one of any other species.

Leach remarks that "*P. arcuatus* differs from *P. emarginatus* only in the form of the anterior part of the shell, and may be no more than a variety of that species." M. Edwards considers them the same. All the specimens preserved (about thirty) from the different localities mentioned,—and there is about an equal number of both sexes ranging from a very small size up to that of Leach's figure of *P. emarginatus*,—have the anterior part of the shell corresponding to that of *P. arcuatus*, or in other words, arched:—"fronte arcuato integro" is Leach's description of it.

*Pinnotheres pisum*, Leach, Mal. pl. 14. f. 1—3, female; Desm. p. 118. pl. 11. f. 3.

*P. varians*, Leach, Mal. pl. 14. f. 9—11, male.

*P. Latreillii*, Leach, Mal. pl. 14. f. 7 & 8, young female\*.

*P. pisum*, Edw. Crust. t. ii. p. 31.

*Cancer pisum*, Penn. vol. iv. p. 3. pl. 1. f. 1, female.

*C. minutus*, Penn. vol. iv. p. 5. pl. 1. f. 2, male.

Templeton has noticed this species as "dredged up in Belfast

\* These synonyms are brought together agreeably to the views of M. Edwards, who further observes that *P. Cranchii*, Leach, seems not specifically different from *P. pisum*, and that *P. Montagu*, Leach, is perhaps a variety of the same. With M. Edwards I agree in the opinion that *P. Cranchii* is not distinct from *P. pisum*; but *P. Montagu* as described and figured by Leach rather seems to me a different species. About twenty male speci-

lough." It is commonly found in *Modiolus vulgaris* on the Irish coast, where it is of much more frequent occurrence than in the locality in which Dr. Leach endeavoured to ascertain the number found in a certain quantity of mussels. In the article Crustaceology (Edin. Ency.) it is remarked that—"in one hundred of *Mytilus modiolus*, Dr. Leach found three of this species." On opening eighteen specimens of the *Modiolus vulgaris* of various size—the produce of dredging off Bangor (co. Down) in October 1835—I found fourteen individuals of *P. pisum*, all females: in one shell only two of the crabs occurred. I have subsequently opened quantities of these *Modioli* with similar results as to the number of the *Pinnotheres*, but in all other instances more crabs were obtained from a like number of shells in consequence of more of the *Modioli* producing two of them.

The smallest *Pinnotheres* I have seen was found by Mr. Hyndman in a living *Cardium exiguum* dredged by us in Strangford lough in Oct. 1834. It is a male: the carapace is under a line in length; the entire breadth of the crab from the extremities of the outstretched legs is 3 lines\*. The *Cardium* is under 3 lines in length, and barely exceeds that admeasurement in breadth, so that the crab when in the position just mentioned must have on both sides touched the walls of its chosen prison. The *Pinnotheres* likewise inhabits the *Cardium edule*. Before me is one of these crabs, of which the carapace is 2 lines in breadth, obtained by Mr. Hyndman in a full-grown *C. edule* from Strangford lough; but from the Sligo coast, where this shell attains an extraordinary large size, a crab with a carapace 4 lines in breadth, and with outstretched legs 7 lines across, was once kindly brought to me by Lord Enniskillen. Mr. R. Ball informs me that on two occasions he obtained a great number of the *Pinnotheres*, and which were all males, from the *Cardium edule* taken at Youghal†—about nine out of every ten cockles contained a crab. On opening oysters from Tenby, in Wales, he has likewise procured the *Pinnotheres*. This crab, like the *Pagurus*, occupies different species of shells according to its size, and at every age generally selects such as with outstretched legs it would fill from side to side—this of

mens before me as I write, have all the anterior part of the shell produced as in *P. Latreillii* and *P. varians* of Leach (pl. 14.), and consequently unlike the two-lobed anterior part of *P. Montagu* and *P. veterum* of the same author. All of my specimens but one have the large hands of *P. varians*—the exception has them no larger than in *P. Latreillii*: surely this species, as represented by Leach, is a male—M. Edwards notes it as a young female.

\* In the 'Entomological Magazine,' vol. iii., the *Zoea* of this *Pinnotheres* is described and figured by Mr. J. V. Thompson.

† With respect to another part of the coast of Cork, Mr. J. V. Thompson observes—"Let any person take a sweep with a dredge on any bank of old mussels, *modioli* or *pinnæ*, where the *Pinnotheres* have been before observed, and almost every shell will be found to contain one full-grown female, some two, and others three, independent of young ones and males, which occasionally occur in common with the females. \* \* \* As the fishermen at Cove often have recourse to those shell-fish for bait, I have had a pint and upwards of the pea-crab brought to me out of the mussels obtained in a few hauls of the dredge."—Ent. Mag. vol. iii. p. 86.



course will not apply to the allied species *P. pinnae*. On one occasion I found a female *Pinnotheres*, of adult size, alive in a *Modiolus vulgaris* six days after it had been taken from the sea—the shell-fish died on the fourth day.

“*Pinnotheres pinnae*.”

In the collection of Mr. J. V. Thompson there is a specimen so named and marked as Irish. It is imperfect, but appears to be the *P. veterum* of Leach, made synonymous by this author with *P. pinnae*. Writing on *Pinnotheres* in the ‘Entomological Magazine’ (vol. iii. p. 89) Mr. J. V. Thompson remarks—“On this part [Cork] of the Irish coast but two species have been hitherto observed, viz. *P. pium* and *P. pinnae*, the latter being found in *Pinnae* and *Modioli*.”

*Gonoplax angulata*, Edw. Crust. t. ii. p. 61.

*G. bispinosa*, Leach, Mal. pl. 13.

Mr. J. V. Thompson’s collection contains an Irish specimen of this crab, marked “rare.” Mr. R. Ball has found the species in the stomachs of cod-fish, purchased in the markets of Youghal and Dublin, and commonly in those brought to the former place—four of these crabs is the greatest number he has obtained from the stomach of a single fish. In the Ordnance collection is a fine example of *G. angulata*, labelled as procured at “Bangor [co. Down], January 1839.”

On examination of several specimens of *Gonoplax* preserved by Mr. Ball, I cannot—judging from Leach’s figure of the one and Desmarest’s of the other—see any grounds for considering *G. angulata* and *G. rhomboidalis* as distinct species. My specimens accord better with the latter, but may at the same time be considered intermediate: instead of the second spine on each side is the little knob or protuberance characteristic of *G. rhomboidalis*. From the descriptions of the two species there appears to be little more of difference than the relative length of spine—and this certainly is most trivial—on each side of the carapace.

*Ebalia Bryerii*, Leach, Mal. pl. 25. f. 12; Edw. Crust. t. ii. p. 129.

The first native example of this species which came under my observation was obtained in the autumn of 1838 by Mr. Hyndman, when dredging in deep water in Belfast bay. In the Ordnance collection are two specimens similarly obtained from the same locality in the following year.

Capt. Beechey, R.N., brought up two examples of this species alive in the dredge from 50 fathoms water off the Mull of Galloway. See p. 21 of the present vol.

*Ebalia Cranchii*, Leach, Mal. pl. 25. f. 7—11; Edw. Crust. t. ii. p. 129.

A single specimen was dredged from deep water in Roundstone bay, Connemara, by our party in July 1840. Mr. R. Ball subsequently found several on the beach at Portmarnock after a storm.

Captain Portlock informs me that this species was taken by deep dredging in Belfast bay in the course of the Ordnance Survey.

*Ebalia Pennantii*, Leach, Mal. pl. 25. f. 1—6; Edw. Crust. t. ii. p. 129; Desm. pl. 7. f. 1.

*Cancer tuberosus*, Penn. vol. iv. p. 12. pl. 10. f. 2.

Although this species must be considered rare, it is less so than the two already noticed—*E. Bryerii* and *E. Cranchii*. A specimen (from Cork?) is in Mr. J. V. Thompson's collection. In Sept. 1836, one was dredged up from deep water in Belfast bay by Mr. Hyndman, and, subsequently, another was similarly obtained there by Dr. Drummond. Several were procured in the same locality by the collectors attached to the Ordnance Survey, who likewise dredged a specimen in Larne lough. To Mr. G. J. Allman I am indebted for one which he found in Dublin bay.

Three examples of the *E. Pennantii* were brought up alive in the dredge from a depth of 50 fathoms off the Mull of Galloway by Capt. Beechey, R.N. See p. 21 of the present vol.

*Atelecyclus heterodon*, Leach, Mal. pl. 2; Edw. Crust. t. ii. p. 143. *A. septemdentatus*, Desm. p. 8. pl. 4. f. 1.

Mr. Templeton notices a crab of this species as found by him "in the stomach of a cod-fish Jan. 17, 1817." In Mr. J. V. Thompson's collection is an Irish specimen probably from Cork. In Jan. 1839, I obtained a perfect adult male from the stomach of a brill (*Pleuronectes rhombus*) taken at Ardglass, county Down; it somewhat exceeds in size that figured by Leach, which again is larger than Montagu represents the species; the hairs are not confined to the arms and legs, the carapace being likewise covered with them. The circumstance of this species being found in the stomachs of the cod and brill would indicate—were we not otherwise informed—its being an inhabitant of deep water. In the Ordnance collection are examples of this crab from Moville (co. Donegal), Portrush, near the Giant's Causeway, and Carrickfergus. Mr. R. Ball has twice obtained it on the Dublin coast: on one occasion many specimens were found by him on the beach at Portmarnock after a great storm. Montagu remarks that several of the *A. heterodon* which he procured were all males, and Dr. Leach mentions females as extremely rare. The several Irish examples I looked to with reference to their sex, were likewise males. It may be remarked, that in this species the females might, from the very narrow form of the abdomen, be without due attention regarded as males.

In the month of September 1835, I obtained several small living specimens of *Atelecyclus* (carapace about 2 lines in length) in rock-pools accessible at low-water at Bangor, county Down. They differ a little in the contour of the shell (which is not so round) and in the form of the teeth between the orbits from the adult *A. heterodon*, but on account of their diminutive size, and in the absence of specimens of all ages for comparison, it would I conceive be rash to consider them otherwise than this species.

*Corystes cassivelaunus*, Leach, Mal. pl. 1.

*C. dentatus*, *Edw. Crust.* t. ii. p. 148; *Desm.* p. 86. pl. 3. f. 2.

*Cancer cassivelaunus*, *Penn.* vol. iv. p. 9. pl. 7.

"Found on the shore at Cushendall bay," Templeton. Marked as "Irish" in Mr. J. V. Thompson's collection. This species is commonly found after storms on the sandy shores of the north and east of Ireland. In the month of August 1836, a number of very small specimens were dredged from a sandy bottom in the open sea off Dundrum, co. Down, by Mr. Hyndman and myself. The smaller individuals of this species, the antennæ are the longer in proportion to the size of the body: some of these with the shell or carapace 3 lines in length have the antennæ 6 lines long—on this account the young present a very singular and grotesque appearance: none of those taken on this occasion had the carapace more than 6 lines in length. In the stomach of a smooth dog-fish (*Mustelus levis*) captured in Belfast bay, I found a perfect adult specimen of this crab.

Dr. J. L. Drummond informs me that he has frequently taken this species at Bangor at neap-tides, when he detected it by the antennæ (which were always in contact with each other) being protruded above the surface of the sand for nearly their whole length. Mr. R. Ball, who has found these crabs in abundance at Youghal and Dublin, has seen them shake themselves down in the sand so as to conceal all but the antennæ as described. He is of opinion that the antennæ are not thus protruded for any special object, but simply that the animal feels itself sufficiently concealed when the body is covered.

[To be continued.]

XLI.—*A Catalogue of Sicilian Plants; with some remarks on the Geography, Geology, and Vegetation of Sicily.* By JOHN HOGG, Esq., M.A., F.L.S., F.C.P.S., &c.

IN this Catalogue, in addition to those plants which I observed myself during the few weeks I remained in Sicily, many others, that I could learn from good authority to be indigenous, or naturalized in the island, will be found. I have followed the arrangement and the genera adopted by Persoon in his 'Synopsis Plantarum' (edit. 1805-7), as that is by far the most convenient and portable manual for a traveller, and have also referred to the works of other authors for the descriptions of such species as are new, and are not given in Persoon's two volumes.

The orders which contain the most numerous species are, *Ranunculaceæ*, *Cruciferae*, *Caryophylleæ*, *Leguminosæ*, *Umbelliferae*, *Compositæ*, *Labiatae* and *Gramineæ*.

There are twenty-five plants whose specific name, *Siculus*, is taken from the island; viz. one for each of the following genera, *Valeriana*, *Poa*, *Festuca*, *Scabiosa*, *Convolvulus*, *Athamanta*, *Sium*, *Linum*, *Allium*, *Erica*, *Saponaria*, *Dianthus*, *Si-*



*lene, Rosa, Rubus, Ranunculus, Orontium, Barbarea, Erysimum, Cheiranthus, Ononis, Astragalus, Carlina, Erigeron, Centaurea*; seven to which Mount Etna has given a name (*Ætnensis*), *Viola, Berberis, Scleranthus, Spartium, Crepis, Seriola, Anthemis*; six are called from the Nebrodes, now the Monte di Madonia, *Viola, Arabis, Alyssum, Sisymbrium, Senecio, Cineraria*; two from Messina, *Convolvulus* and *Melilotus*; and one from Agrigentum, *Ervum*.

Little is yet known of the Sicilian Cryptogamia. The Mosses, Hepaticæ, Algæ, Lichens, and Fungi have not been much examined. Of the Ferns, I only noticed *Adiantum capillus Veneris, Aspidium filix mas, Asplenium Adiantum nigrum, Asplenium Ceterach, Polypodium vulgare, and Pteris aquilina*, and these are likewise common to Britain. Those Phanerogamous species which are natives of Britain, I have appended in a separate and alphabetical catalogue.

I lament that I have not been able to make any observations on the geographical\* distribution of the plants in the island, or to trace the several species which vary the most, or which remain nearly fixed in similar situations; but will only mention, that from the great variety of strata, minerals and soils, as well as from the considerable altitudes to which some of the mountains attain, and particularly from its natural position, Sicily itself may be regarded as a connecting link (at least in a botanical view) between Europe and Africa; that the subject is of all others the most inviting, and the most certain to grant a rich harvest to any botanist who may make the tour of Sicily, and may have time to prosecute such researches. I have given a short introductory account of the island, with respect to its geography, geology, mineralogy and vegetation, in the third volume of Loudon's Magazine of Nat. Hist. pp. 105—116; and likewise, some "Observations on the Classical Plants of Sicily," in Dr. Hooker's Journal of Botany, pp. 98—203. My object, therefore, in the following Catalogue, is to endeavour to afford to those travellers who are admirers of the elegant science of botany, some tolerably accurate idea of

\* I must refer those who are desirous of ascertaining the localities of many of the Sicilian plants in other districts of the Mediterranean to the following useful papers: "Enumeratio Plantarum quas in Insulis Balearibus collegit J. Cambessedes, earumque circa Mare Mediterraneum distributio Geographica," given in the Mémoires du Muséum d'Histoire Naturelle, tome xiv. Paris, 1827; and "Essai d'une Flore de l'Île de Zante," par H. Margot et F. G. Reuter, published in tome viii. p. 249, and tome ix. p. 1, of the Mémoires de la Société de Physique et d'Histoire Naturelle de Genève, Gen. 1839-41. This latter paper contains a great many Romaic, or modern-Greek, names of the plants of Zante. I may also add, for a list of the like names, the Appendix to the tenth volume of Dr. Sibthorp's splendid Flora Græca may be examined.

the many beautiful and highly interesting species, which constitute a great portion of the flora of an island, situated almost at the southern extremity of Europe, and so partaking, in no small degree, of the plants of the countries naturally adjacent to it.

LIST OF THE PRINCIPAL AUTHORS ON SICILIAN PLANTS,  
REFERRED TO IN THE FOLLOWING CATALOGUE.

*Bivona-Bernardi* (*Antonin*). *Sicularum Plantarum Centuria 1 & 2.* 8vo. Panormi, 1806.

*Stirpium Rariorum minusque cognitarum in Sicilia spontè provenientium descriptiones* (1, 2.). 4to. Panormi, 1813.

*Monografia delle Tolpidi*, 1 fasc. Fol. Palermo, 1809.

*Boccone* (*Paolo*). *Icones et Descriptiones rariorum Plantarum Siciliae, Melitae, Galliae, et Italiae.* 4to. Londini, 1674.

*Gussone* (*Joannes*). *Index Seminum, Anni 1825, quæ ab Horto Regio in Bocca di Falco pro mutuâ commutatione exhibentur.* 4to. 1825.

*Floræ Siculæ Prodomus.* Vol. I. 8vo. Neapoli, 1827.

*Lagusi* (*Vincenzo*). *Erbuario Italo-Siciliano.* 4to. Palermo, 1743.

*Presl* (*C. B.*). *Flora Sicula, exhibens Plantas vasculosas in Sicilia aut spontè crescentes, aut frequentissimè cultas.* Tomus primus. 8vo. Pragæ, 1826.

*Tineo* (*Vinc.*). *Pugillus Plantarum Siciliae rariorum.* 8vo. Panormi, 1817.

*Tineo* (*Gius.*). *Synopsis Plantarum Horti Acad. Panormitani.* Panormi, 1802—1807.

*Ucria* (*Bernard*). *Hortus Regius Panormitanus.* 4to. Panormi, 1819.

\* Species which are not described in *Persoon's Synopsis Plantarum*, edit. 1805-7.

† Plants which are marked in *Gussone's Index Seminum* as indigenous in Sicily.

‡ Plants which *J. H.* observed in the Botanical Gardens at Palermo and Bocca di Falco, and there marked indigenous.

CATALOGUE OF SICILIAN PLANTS.

Γῆ σίτου καὶ οἴνου καὶ ἄρτου καὶ ἀμπελώνων, γῆ ἐλαίας ἐλαίου καὶ μέλιτος.  
Βασιλ. Δ'. κ. 18, 32. *Ex Septuaginta.*

MONANDRIA DIGYNIA.

*Corispermum hyssopifolium*; *Sibth. Fl. Græc. vol. i. tab. 1.* On the sand-hills between Catania and Augusta.

DIANDRIA MONOGYNIA.

*Phillyrea media*; a common and very variable species.

*P. latifolia*; *Fl. Gr. i. tab. 2.* Not unfrequent in the woods of Sicily.

*Olea Europæa*; *Fl. Gr. i. tab. 3.* The olive grows best on limestone.

It affords to the Sicilians great commerce, both for its fruit and oil; hence many varieties are cultivated, and oil is exported from Palermo, Olivieri, Cefalu and Melazzo.

*Ann. & Mag. N. Hist. Vol. x.*

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- Olea Europæa*, var.  $\beta$ . *sylvestris*. This tree is common in the calcareous districts of Sicily, and is called *Uleastru*.
- Ornus Europæa*, Pers.; *Fraxinus ornus*, Lin.; Fl. Gr. i. tab. 4. It is cultivated in the vicinity of Gibilmanna, Castelbuono, Tusa, Cinisi and Geraci, for the sake of procuring manna.
- Veronica serpyllifolia*;\* var.  $\beta$ . *Italica*; Presl; Fl. Sic. i. p. 34. præf.
- Rosmarinus officinalis*; Fl. Gr. i. tab. 14. Hilly places, and in dry beds of rivulets.
- Salvia triloba*. Dry mountains near Syracuse.
- S. viridis*; † Fl. Gr. i. tab. 19.
- S. clandestina*; † Fl. Gr. i. tab. 24.
- S. Canariensis*. †
- S. Sclarea*; Fl. Gr. i. tab. 25. Between Florida and Palazzolo.
- S. ceratophylloides*. †
- S. multifida*;\* † Fl. Gr. i. tab. 23.

## DIANDRIA DIGYNIA.

- Anthoxanthum gracile*;\* Biv. Stirp. Rar. Man. I. tab. 1. fig. 1. Mountains about Palermo; the root smells like *Anthoxanthum odoratum*.

## TRIANDRIA MONOGYNIA.

- Valeriana Calcitrapa*; Fl. Gr. i. tab. 30. Mount Etna, Bivona.
- V. tuberosa*.
- V. cornucopiæ*; Fl. Gr. i. tab. 32. In Siciliæ arvis et locis arenosis, Pers.
- V. puberula*,\* † Bert.
- V. dentata*, † Pers.; *V. dasycarpa*, Bbrst. ?
- V. eriocarpa*,\* † Lois.
- V. Sicula*,\* Guss.; affinis *V. coronatæ*, à quâ differt, coronæ dentibus lanceolatis erectis, internè densè villosis, Guss. Ind. Sem. p. 5.
- Cneorum tricoccon*. †
- Loeflingia Hispanica*. In arvis arenosis Victoriæ, Guss.
- Crocus odoratus*,\* Biv. In pascuis Siciliæ; Spreng. Syst. Veg. i. p. 146.
- Gladiolus Byzantinus*,\* † Mill.; Curt. Bot. Mag. xxii. tab. 874.
- G. segetum*, † Ait.; B. Mag. xix. tab. 719.
- Ixia Bulbocodium*, Pers.; *I. purpurascens*, Ten. ? Fl. Gr. i. tab. 36; B. Mag. viii. tab. 265. Frequent in pastures.
- I. parviflora*,\* † Guss. This plant, though probably only a variety of the preceding, is marked in Gussone's Ind. Sem. as a distinct species.
- Iris pumila*; B. Mag. i. tab. 9. Catania, nella contrada di S. Gregorio, Biv.
- I. scorpioides*. †
- I. sisyrinchium*, Pers.; *Moræa sisyrinchium*, Curt.; Fl. Gr. i. tab. 42; B. Mag. xxxiv. tab. 1407. Common near Catania, Palermo, &c.
- I. tuberosa*; Fl. Gr. i. tab. 41; B. Mag. xv. tab. 531. Fields about Mount Etna, Biv.; near Messina.
- Schænus mucronatus*; Fl. Gr. i. tab. 43. Palermo, alla tonnara di Capaci, Biv.
- Cyperus distachyos*, Pers.; *C. mucronatus*, Sibth.; Fl. Gr. i. tab. 49.
- C. fuscus*; † Fl. Gr. i. tab. 48.
- C. monandrus*. †



*Cyperus Badius*.†

*C. pallescens*. In Siciliâ, secundùm Sprengel.

*C. Papyrus*, Pers.; *Papyrus antiquorum*, Spr. The Papyrus, *Pappéru* in Sicilian, has long been naturalized, and flourishes on the banks of the rivulet which rises in the clear fountain of Cyane, now *Ciane* or *La Pisma*, and joins the Anapus near where it flows into the Porto Grande, to the S.W. of Syracuse; I have not seen it growing naturally in any other spot in Sicily.

*C. pictus*,\*† Ten.

*Scirpus Romanus*.‡

*S. Savii*,\*† S. et M.; Syst. Veg. i. p. 207.

*Lygeum Spartum*. In montosis propè Agrigentum.

*Sesleria nitida*,\*† Ten.; Syst. Veg. i. p. 329.

*Nardus aristata*. Barren places near Messina, D'Arrosto, Biv.

#### TRIANDRIA DIGYNIA.

*Milium vernale*,\*† Bbrst.; Syst. Veg. i. p. 250. Seen in the woods of Etna. The Sicilians, at present, pay no attention to the cultivation of artificial grasses.

*M. muticum*,\* Gasparrini; *Gastridium muticum*, Spreng.; *G. scabrum*, Presl. In Siciliæ agris; Syst. Veg. i. p. 250.

*Agrostis pungens*. Palermo, dopo Mustazzola, Biv.

*A. nitens*,\*† Guss.; Ind. Sem. p. 1.

*A. glaucescens*,\* Syst. Veg. i. p. 258.

*Aira agrostidea*,\*† Lois.; Syst. Veg. i. p. 276.

*Melica ciliata*,† Fl. Gr. i. tab. 70.

*M. pyramidalis*.†

*M. setacea*,‡ Pers.; *M. Bauhini*, All.

*Phalaris alpina*. In pascuis elatioribus Montis Etnæ, Biv.

*P. paradoxa*;† Fl. Gr. i. tab. 58. *Αληπουιουρα*, Græc. hodiern. Sibth. Common in Sicily.

*P. cærulescens*,\*† Desf. Fl. Atlan. i. p. 56.

*Crypsis aculeata*.†

*C. alopecuroides*,\* Guss.; *Vilfa brachystachys*, Presl. In pascuis ad Syracusas; Fl. Sic. p. 44. præf.

*Phleum asperum*.†

*P. felinum*,\*† Sibth.; Prod. Fl. Gr. i. p. 42.

*Polypogon maritimum*.†

*Chrysurus cynosuroides*, Pers.; *Cynosurus aureus*, Lin.; Fl. Gr. i. tab. 79. Frequent in dry rocky ground.

*Panicum glaucum*.‡

*P. repens*;† Fl. Gr. i. tab. 61.

*P. miliaceum*. Little millet (*migliu*) is grown in Sicily.

*P. compressum*,\*† Biv. Propè Panormum; Syst. Veg. i. p. 319.

*P. zonale*,\*† Guss. *P. foliis maculatis zonatis, flosculis glabriusculis muticis, et habitû à P. crus galli et colono diversum*; Ind. Sem. p. 9.

*Eleusine Egyptia*.†

*Poa pilosa*.

*P. megastachya*.†

*P. Sicula*, Pers.; *Triticum unioloïdes*, Ait. In maritimis arenosis.

*Briza maxima.*

*Festuca ciliata*.†

*F. poæformis*.†

*F. divaricata.* Places near the sea about Catania, Biv.

*F. cæspitosa*; \*† Fl. Atl. i. p. 91. t. 24. f. 1.

*F. sicula*, \*† Presl.

*F. bulbosa*, \* Biv.; Syst. Veg. i. p. 353.

*F. exaltata*; \* Fl. Sic. i. p. 45. præf.

*Bromus lanceolatus*.†

*B. alopecurus*,† Pers.; *B. contortus*, Desf.

*B. tectorum.* Common on Mount Etna, Biv.

*B. ligusticus*, \* Biv.; *B. rubens*, Spr.; Biv. Sic. Cent. i. p. 21. In grassy places at La Grazia, near Palermo.

*Kæleria phleoides*, Pers.; *Festuca phleoides*, Biv.

*K. villosa*.†

*Trisetum Hispanicum*,† Pers.; *Avena panicea*, Lam.

*T. parviflorum.* Observed amongst corn.

*T. splendens*, \*† Presl.

*Stipa tortilis*, Desf.; Pers.; *S. paleacea*, Sibth.; Fl. Gr. i. tab. 86. Mount Etna; Palermo, Biv.: also in other parts of Sicily. The floscules are troublesome by sticking to one's clothes.

*S. aristella*; Fl. Gr. i. tab. 87.

*S. Lagascæ*, \*† R. and S.

*Avena sativa.* Oats are not grown in any great quantities in Sicily.

*A. sempervirens*.†

*A. puberula*; \*† Ind. Sem. p. 3. Planta annua.

*Sorghum Halepense*.†

*Arundo Donax.* The stems of this reed are used for many domestic purposes in Italy and Sicily; *inter alia*, for fences in gardens, in vineyards, for props for vines, for making pipes, distaffs, fishing-rods, &c.

*A. Mauritanica.* A most frequent species throughout Sicily.

*A. festucoides*, Pers.; *A. ampelodesmos*, Cyr. Cyrillo has given the specific name *Ampelodesmos* to this plant, on account of its being so suitable for the support of vines, &c.

*Saccharum Teneriffæ*; Fl. Gr. i. tab. 53. In montibus propè Mesaniam Siciliæ, nec in Græciâ, legit D. Sibthorpius (p. 39).

*S. officinarum.* In Sicilian, *La Cannamele*. It was some years since much grown in the neighbourhood of Syracuse, and near Melelli. but of late it has been neglected.

*S. Ravennæ*; Fl. Gr. i. tab. 52. The rustic pipe of the Sicilian shepherds, which is still cut after the ancient form, is, I understand, mostly made of the *Arundo Donax*: sometimes, however, this cane is substituted. The word *canna* is promiscuously bestowed on every kind of reed in Sicily. Sea-shore near Catania.

*S. cylindricum*; † Fl. Gr. i. tab. 54.

*Andropogon distachyon*; Fl. Gr. i. tab. 69. In collibus Siciliæ, Bocc.; Pers.

*A. hirtum.* Palermo, sotto Santu Spiritu, Biv.

*A. angustifolium*, \*† Sibth.; *A. Ischæmum*, Pers.? Prod. Fl. Gr. i. p. 47.

- Hordeum strictum*, Pers.; *H. bulbosum*, Sibth.; Fl. Gr. i. tab. 98.  
Grassy places on Mount Etna, Biv.; also in other spots.
- H. vulgare*. In Sicilian, *L'orzu*. The variety  $\beta$ . *cæleste* of Persoon.  
Circà Mergamen in Siciliâ; Pers. Syn. i. p. 108.
- Secale Cereale*. Rye, *Il irmanu*, is cultivated on Etna.
- S. montanum*; \*† Ind. Sem. p. 11. In sylvis Etnæis.
- Triticum æstivum*, Granoforte.
- T.* ——— \* var. In Sicilian, *Tumminia*. *T. spicis angustis et longis, aristis albis aut nigris*.
- T. hybernum*. Majorca or Roccella. Wheat is carried to certain places called *caricatori*, and warehoused for exportation; of these the chief are Sciacca, Girgenti, Alicata and Termini.
- T. spelta*. Cultivated: it is called *farru*, and is much used in cooking, like rice; it forms a good and wholesome food.
- T. Hispanicum*. Sandy hills of Mount Etna, near S. Niccolo dell' Arena, Biv.
- T. maritimum*.†
- Lolium multiflorum*.†

## TETRANDRIA MONOGYNIA.

- Globularia Alypum*.‡
- Dipsacus laciniatus*.‡
- Scabiosa Sicula*.
- S. rutæfolia*. In maritimis Siciliæ, Bocc.
- S. maritima*. In Siciliâ, Pers.
- S. atropurpurea*; B. Mag. vii. tab. 247. I observed this plant growing in several places in Sicily, on bare calcareous soil; its flowers were less than those of our garden specimens, but of the same velvety dark purple colour.
- S. Cretica*. Plentiful on Mount Pellegrino, near Palermo.
- S. limonifolia*.† In Siciliâ, Pers.
- S. crenata*,\*† Cyr.; *S. coronopifolia*, var. *hirsuta*, Sibth.
- S. parviflora*, Pers.; *S. dichotoma*, Ucr. Girgenti, among corn.
- Asperula hexaphylla*.†
- A. Calabrica*, Linn.; *Ernodea montana*, Sibth.; *Sherardia foetida*, Lam.; Fl. Gr. ii. tab. 143. Now called *ἀλεπουπούρδι* in Greece, Sibth. On the generic character, see Persoon, Syn. Pl. i. p. 524.
- A. nitida*;\*† Fl. Gr. ii. tab. 124. p. 19.
- Galium lucidum*.†
- G. microcarpum*.†
- Valantia muralis*; Fl. Gr. ii. tab. 137. Not unfrequent on old walls.
- Crucianella maritima*.‡
- Rubia angustifolia*.†
- R. Bocconi*,\*† Petagn.; Syst. Veg. i. p. 396.
- Plantago albicans*; Fl. Gr. ii. t. 145.
- P. Bellardi*;† Fl. Gr. ii. tab. 146.
- P. macrorrhiza*.†
- P. serraria*.†
- P. subulata*, Lin.
- P. Afra*. In Siciliâ, Pers.
- Camphorosma Monspeliaca*.‡



## TETRANDRIA DIGYNIA.

*Hypocoum procumbens*; Fl. Gr. ii. tab. 155. Sandy fields at Ficarazzi, and Trabia, not far from Palermo, Presl.

## PENTANDRIA MONOGYNIA.

*Heliotropium Europæum*. There is a variety with smaller flowers, which is the *H. parviflorum* of Gussone. Very abundant in dry waste places.

*H. supinum*; † Fl. Gr. ii. tab. 157.

*H. Bocconi*; \*† Ind. Sem. p. 6. Flores magni odori.

*Lithospermum fruticosum*, Pers.; *L. rosmarinifolium*, Ten.

*Anchusa undulata*; Fl. Gr. ii. tab. 165; B. Mag. xlvii. tab. 2119.

In the lower region of Mount Etna, Biv.

*A. tinctoria*; † Fl. Gr. ii. tab. 166.

*A. Italica*, Pers.; *A. paniculata*, Sibth.; Fl. Gr. ii. tab. 163; B.

Mag. xlviii. t. 2197. Common in Sicily and the South of Europe.

*A. aggregata*, \*† Lehm.; *A. parviflora*, Pers.? Syst. Veg. i. p. 561.

*Cynoglossum pictum*; B. Mag. xlvii. tab. 2134.

*C. clandestinum*. †

*C. cheirifolium*. †

*C. Apenninum*. †

*C. Columnæ*, \* Ten.; Syst. Veg. i. p. 566. In Monte Cuccio propè Panormum reperit Bivona.

*Cerithe aspera*; Fl. Gr. ii. tab. 170. Abundant in corn-fields.

*C. maculata*, \* All.; Linn. Spec. edit. 1. p. 137. Foliis maculatis glaucis; in regione Pedemontanâ Montis Etnæ solum vidi.

*Onosma montana*, \*† Sibth. *Μελίχορρον* hodie; Prod. Fl. Gr. i. p. 121.

*Lycopsis vesicaria*.

*L. ciliata*. †

*Echium maritimum*. Common on the sea-shore.

*E. Italicum*.

*E. pustulatum*, \* Sibth.; Fl. Gr. ii. tab. 180. In Siciliâ tantùm legit Cl. Sibthorp.

*E. arenarium*; \*† Ind. Sem. p. 5.

*Androsace elongata*. †

*Primula acaulis*, Pers.; *P. bicolor*, Raf. In Siciliâ, Presl.

*Cyclamen hederæfolium*; B. Mag. xxv. tab. 1001. Hedges and shady situations.

*C. Neapolitanum*, \*† Ten.; Syst. Veg. i. p. 573.

*Coris Monspeliensis*; B. Mag. xlvii. tab. 2131. Palermo, sopra S. Maria di Gesu, Biv.

*Anagallis Monelli*; B. Mag. ix. tab. 319.

*Plumbago Europæa*; Fl. Gr. ii. tab. 191; B. Mag. xlvii. tab. 2139.

Now named *Λεπιδόχορρον*, according to Sibthorp.

*Convolvulus althæoides*; Fl. Gr. ii. tab. 194.

*C. tenuissimus*, \* Sibth.; *C. althæoides*, var.  $\beta$ . Willd.; *C. althæoides*, B. Mag. t. 359; Fl. Gr. ii. t. 195. p. 79. Common in Calabria and Sicily, and is found with the preceding in dry hedges, on walls, &c., but it is a much less, and more delicate species. I

- first noticed the plant near Messina, and supposing it to be undescribed, I named it *C. Messanensis*.
- Convolvulus Siculus*; Fl. Gr. ii. tab. 196.
- C. pentapetaloides*; † Fl. Gr. ii. tab. 197.
- C. lineatus*; Fl. Gr. ii. tab. 199. In montosis Siciliae, Pers.
- C. evoluloides*; † Fl. Gr. ii. tab. 198.
- C. cncorum*; † Fl. Gr. ii. tab. 200; B. Mag. xiii. tab. 459.
- C. Cantabrica*. Hæc species quoque variat, 'corollâ profundè 5-fidâ,' Presl.
- C. tricolor*; B. Mag. i. tab. 27. Abundant amongst corn on the south coast of Sicily.
- Ipomœa sagittata*. †
- Campanula graminifolia*; Fl. Gr. iii. tab. 206.
- C. mollis*; † B. Mag. xii. tab. 404.
- C. dichotoma*; † Fl. Gr. iii. tab. 211.
- C. trichocalycina*,\* Ten.; Syst. Veg. i. p. 727.
- C. falcata*,\* R. and S.; *Prismatocarpus falcatus*, Ten.; Syst. Veg. i. p. 737.
- Trachelium cœruleum*. In shady places not unfrequent.
- Thesium humile*. †
- Lonicera Etrusca*,\* † Sav.; Syst. Veg. i. p. 757.
- Verbascum sinuatum*; Fl. Gr. iii. tab. 227.
- V. rotundifolium*, † Ten.; *V. Boerhaavii*, Pers. ?
- Datura Metel*; B. Mag. xxxv. tab. 1440. Ad Messanam frequens.
- Hyoſcyamus aureus*; † Fl. Gr. iii. tab. 231; B. Mag. iii. tab. 87.
- H. albus*; Fl. Gr. iii. tab. 250. Abundant on waste ground.
- Nicotiana Tubacum*. In Sicilian, *Tabaccu*; cultivated, and much exported.
- Atropa Mandragora*; Fl. Gr. iii. tab. 232. It is called in Sicily, *La Mandragola*.
- Physalis somnifera*; Fl. Gr. iii. t. 233.
- P. Alkekengi*; Fl. Gr. iii. tab. 234. In shady places, but rarer than the preceding species.
- Solanum Sodomœum*; Fl. Gr. iii. tab. 235. Common on wastes in Sicily and Calabria; I observed it especially at Messina and Reggio.
- Lycium Europœum*; Fl. Gr. iii. tab. 236.
- L. lanceolatum*. These two species are seen in hedges, but more commonly in the south of the island.
- Rhamnus oleoides*. †
- R. Alaternus*.
- R. Lotus*, † Pers.; *Zizyphus Lotus*, Lam. Palermo, on Monte Pellegrino, but scarcely indigenous, Biv.
- R. Zizyphus*, Pers.; *Zizyphus vulgaris*, Lam.; Fl. Gr. iii. tab. 241. The cultivated kind bears an oblong, sweet fruit, nearly the size of a plum. Originally introduced from Syria, &c.
- R. Paliurus*, Pers.; *Paliurus aculeatus*, Lam.; Fl. Gr. iii. tab. 240. This thorny plant, with its membranaceous winged seed-vessels, is not uncommon in hedges.
- Hedera chrysocarpa*,\* Pliny. This species is found at Caronia, Ficuzza and Francavilla, Guss.

- Vitis vinifera*; Fl. Gr. iii. tab. 242. Dr. Presl enumerates forty-four varieties of the vine (*la vigna*) which are cultivated in Sicily. Of these many sorts produce excellent wines.
- V.* ———, var. *sylvestris*. Common in uncultivated and wild places, climbing up trees and hedges.
- Viola Nebrodensis*,\* Presl. In pascuis graminosis; nella curma di Monte Madonia, nelle fosse di S. Gondolfo. Affinis *V. calcaratæ*, Linn.; Fl. Sic. i. p. 133. An species satis distincta? J. H.
- V. gracilis*,\* Biv.; *V. calcarata*, var. *ε. Æthnensis*, DeC.; Fl. Gr. iii. tab. 222. In Monte Etnâ, DeC. Prod. Syst. i. p. 302.
- V. parvula*,\* Tin.; *V. tricolor*, var. *ο. bellidioides*, DeC. In Nebrodibus; Prod. Syst. i. p. 304.
- V. micrantha*,\* Presl. In arenis vulcanicis regionis Alpinæ M. Etnæ; (Speciei priori proxima, J. H.;) Fl. Sic. i. p. 134.
- Achyranthes argentea*; Fl. Gr. iii. tab. 244. In Siciliâ, Pers.
- Illecebrum echinatum*.
- I. niveum*.†
- Hagea polycarpoides*,\* Biv. In Monte Gallo Panormum propè reperit D. Swainson; Stirp. Rar. Man. 2.
- Nerium Oleander*; Fl. Gr. iii. tab. 248. This most beautiful plant is abundant on the banks and in the dry beds of rivers throughout Sicily, and is named *Laurirosa*; but I did not meet with it in the lava district of Mount Etna. Var. *β. floribus albis* apud Cupanium.
- Periploca angustifolia*.†
- Cynanchum acutum*; Fl. Gr. iii. tab. 250. In Siciliâ, Pers.
- Erythræa spicata*.‡
- E. grandiflora*, Biv. High pastures on Mount Hybla, and near Palazzolo.

## PENTANDRIA DIGYNIA.

- Celtis australis*. This tree I saw in some gardens, or orchards, on the base of Mount Etna; it is also called in Sicily *Lotu*.
- Atriplex Halimus*; † Fl. Gr. x. tab. 962.
- Chenopodium multifidum*.†
- C. Botrys*. In locis arenosis frequens.
- Salsola Soda*. Cultivated on the south coast, in particular near Terra Nova, for the purpose of making soda, and thence exported in considerable quantities.
- S. polyclonos*. In Siciliæ maritimis, Pers.
- S. oppositifolia*.†
- Eryngium triquetrum*. This beautiful blue, or amethystine-coloured plant I first observed in corn-fields between Catania and Syracuse. When growing thick together it makes an elegant appearance.
- E. dichotomum*.‡
- E. tricuspidatum*. Common about Palermo.
- E. dilatatum*.‡
- Echinophora tenuifolia*; † Fl. Gr. iii. tab. 266.
- Bupleurum semicompositum*; ‡ Fl. Gr. iii. tab. 261.
- B. fruticosum*; Fl. Gr. iii. tab. 263. In dry stony places not unfrequent.



*Caucalis maritima.*

*C. platycarpus.*†

*Daucus lucidus.*‡

*D. aureus.*

*D. muricatus.*

*D. hispidus.*†

*Ammi Visnaga.*†

*A. majus.* Abundant in vineyards and gardens.

*Bunium petracum,*\*† Ten.; *Ligusticum alpinum,* Spr.; Syst. Veg. i. p. 908.

*Selinum sylvestre,*‡ Ucr. This plant, I was told, still grows near the colossal ruins of Selinunte.

*Athamanta Sicula.*

*Cachrys panacisfolia,*† Pers.; *Athamanta panacisfolia,* Spr.

*C. Libanotis.* In Siciliâ, Pers.

*C. Sicula;* Fl. Gr. iii. tab. 278. Common amongst sand near the coast.

*C. dichotoma,*† Spr.; *Conium dichotomum,* Pers.

*Ferula glauca.*

*F. Ferulago.*

*F. nudicaulis,*\*† Spr.; Syst. Veg. i. p. 914.

*Laserpitium Siler.*†

*L. meoides.* Hills about Syracuse, Catania and Palermo.

*Tordylium Apulum.*†

*T. humile.* Mount Pellegrino, near Palermo, Biv. An var. *T. Apuli?*

*Heracleum Panaces.*‡

*H. cordatum,*\*† Presl; Syst. Veg. i. p. 912. Moist woods, chiefly in the north of Sicily.

*Ligusticum cicutæfolium.*‡

*Physospermum angelicæfolium,*\*† Guss.; Ind. Sem. p. 9. In Monte Pizzuta, Guss.

*Sium Siculum.*

*Bubon rigidus.* In Siciliâ, Pers.

*Cenanthe prolifera.*‡

*C. globulosa.*†

*Scandix Australis.*

*S. brachycarpa,*\*† Guss.; Ind. Sem. p. 10. In montibus Nebrodensibus.

*Anthriscus nodosa.* In Siciliâ, Pers.

*A. nemorosa,*\*† Spr.; Syst. Veg. i. p. 904.

*Seseli tortuosum.*‡

*S. Bocconi,*\*† Guss.; Syst. Veg. i. p. 885. Limestone mountains.

*S. verticillatum,*\*† Desf.; Fl. Atl. i. p. 260. A very common plant in barren spots.

*Thapsia Asclepium;*† Fl. Gr. iii. tab. 286.

*T. Garganica;* Fl. Gr. iii. tab. 287. Observed in the south district, near Sciacca, &c.

*Pastinaca Opopanax,*† Pers.; *Ferula Opopanax,* Spr.

*Smyrnium perfoliatum,*† Pers.

*Anethum piperatum*,\*† Ucr.

*Pimpinella anisoides*,† Guss. Catania, Marsala, Palermo, &c., Guss.

PENTANDRIA TRIGYNIA.

*Rhus Coriaria*; Fl. Gr. iii. tab. 290. In Sicilian, *Il Sommaccu*; it is cultivated at Alcamo, Monreale, Castell'amare and Palermo, from whence much is exported.

*R. Thezera*.†

*R. Cotinus*.

*R. zizyphina*,\* Tin.; *Rhamnus tripartita*, Ucr. In montosis Siciliae; DeC. Prod. Syst. ii. p. 72.

*Viburnum Tinus*; B. Mag. ii. tab. 38.

*Sambucus racemosa*.†

*Tamarix Gallica*; Fl. Gr. iii. tab. 291. Banks of rivers; not very abundant.

*T. Africana*, Much more common than the preceding.

PENTANDRIA PENTAGYNIA.

*Statice oleæfolia*.†

*S. globulariæfolia*;† Fl. Gr. iii. tab. 296.

*S. monopetala*. Along the coast near the port of Girgenti.

*S. ferulacea*.†

*S. sinuata*; Fl. Gr. iv. tab. 301; B. Mag. ii. tab. 71. I first found this species at Syracuse, and afterwards in several places along the south coast.

*S. Bellidifolia*,\*† Sibth.; Fl. Gr. iii. tab. 295. p. 90.

*Linum decumbens*,† Desf. Persoon considers this only a variety of *L. angustifolium*.

*L. Gallicum*; Fl. Gr. iv. tab. 303.

*L. strictum*; Fl. Gr. iv. tab. 304. Dry fields near Palermo; a variable species.

*L. inæquale*,\* Presl. In arvis et pascuis, ad Panormum; præcedenti maximè affine, et forsan varietas, J. H.; Fl. Sic. i. p. 170.

*L. piligerum*,\* Presl. Propè Kephaloëdim in pascuis apricis; affine *L. viscoso*; Fl. Sic. i. p. 170.

*L. rubrum*,\* Raf. Propè Agrigentum (Girgenti), et Drepanum (Trapani), Raf. Flores rosei, affine *L. usitatissimo*, Prod. Syst. i. p. 426.

*L. Siculum*,\* Presl.; *L. arvense*, Cup. In collibus herbidis ad S. Mariam di Gesu propè Panormum; affine præcedenti et *L. angustifolio*; Fl. Sic. i. p. 171.

*L. punctatum*,\* Presl. In Nebrodibus, in apricis M. Scalune; Fl. Sic. i. p. 172.

PENTANDRIA POLYGYNIA.

*Ceratocephalus falcatus*. Common in corn-fields.

HEXANDRIA MONOGYNIA.

*Leucojum autumnale*;† B. Mag. xxiv. tab. 960.

- Narcissus Tazzetta*; Fl. Gr. iv. tab. 308; B. Mag. xxiv. tab. 925.  
In pastures very frequent.
- N. serotinus*.†
- Pancratium maritimum*; Fl. Gr. iv. tab. 309. In sand near the sea-coast.
- P. Illyricum*; B. Mag. xix. tab. 718.
- Amaryllis lutea*; Fl. Gr. iv. t. 310; B. Mag. ix. tab. 290. In sylvaticis, Catania, Etna, &c.
- Allium subhirsutum*; Fl. Gr. iv. tab. 313. On the mountain called S. Maria di Gesu, near Palermo, Biv. *Λύκορδα*, hodiè secundùm Sibthorpium.
- A. roseum*;† Fl. Gr. iv. tab. 314; B. Mag. xxv. tab. 978.
- A. sativum*.
- A. flavum*;† B. Mag. xxxiii. tab. 1330.
- A. nigrum*,† Pers.; *A. magicum*, Curt.; Fl. Gr. iv. tab. 323; B. Mag. xxix. tab. 1148. In corn-fields common.
- A. triquetrum*; Fl. Gr. iv. tab. 324; B. Mag. xxii. tab. 869. Palermo, alla Grazia, Biv.
- A. chamæmoly*; B. Mag. xxx. tab. 1203. At Palermo, without the Porta Reale, Biv. Et alibi in campis.
- A. lacteum*,\* Sibth.; *A. album*, Biv.; *A. Neapolitanum*, Cyr.; Fl. Gr. iv. tab. 325. p. 21. Fields about Palermo, Biv.
- A. Siculum*,\*† Ucr.; Syst. Veg. ii. p. 36.
- A. arvense*,\*† Guss. Habitus et summa affinitas cum *A. sphærocephalo*; sed flores alidi, capitula ovato-subrotunda laxiora, stamina petalis subæqualia; Ind. Sem. p. 1.
- A. Tinei*,\* Presl. An sequentis mera varietas? (J. H.) Syst. Veg. ii. p. 38.
- A. ambiguum*,\* Sibth.; *A. roseum*, var. β, Biv.; *A. carneum*, Ten.; Fl. Gr. iv. tab. 327. p. 23. Mountains of St. Martin, near Palermo, Biv.
- A. Cupani*,\*† Raf.; Syst. Veg. ii. p. 40.
- A. tenuiflorum*,\*† Ten.; *A. moschatum*, Spr.; Syst. Veg. ii. p. 40. In dry hilly spots in the north of Sicily.
- A. pusillum*,\* Cyr.; *A. obtusiflorum*, Poir.; *A. maritimum*, Raf.; Syst. Veg. ii. p. 39.
- Ornithogalum Narbonense*;† B. Mag. li. tab. 2510.
- O. Arabicum*; B. Mag. xix. tab. 728.
- O. nanum*,\*† Sibth.; Fl. Gr. iv. tab. 333. p. 28.
- O. collinum*,\*† Guss. Omnino simile *O. nano*, sed folia ad margines ciliata; Ind. Sem. p. 8.
- Scilla maritima*; B. Mag. xxxiii. tab. 918. I noticed the large bulbs of this species in dry and sandy spots in Sicily, but in greater abundance on the coast.
- S. parviflora*.†
- S. intermedia*,\*† Guss. Flores *S. autumnalis*, folia ferè *S. parvifloræ*, capsula obcordata; Ind. Sem. p. 10. Plentiful in the west of Sicily.
- S. Cupani*,\*† Guss. Est *Ornithogalum cæruleum*, Raf., sed genere huc spectat, Guss.



*Asphodelus luteus*; B. Mag. xx. tab. 773. The plant is frequent on Mount Etna, in the woody region.

*A. ramosus*; Fl. Gr. iv. tab. 334; B. Mag. xxi. tab. 799. Abundant in pastures and in the uncultivated parts of Sicily.

*A. albus*. † Said by Cupani to be a native of the island.

*A. fistulosus*; Fl. Gr. iv. tab. 335; B. Mag. xxv. tab. 984. Abundant ad vias, &c.

*Asparagus albus*.

*A. acutifolius*; Fl. Gr. iv. tab. 337. The heads of this and of the preceding species are cut from wild plants, and are brought to table in Sicily; they are bitter and stringy, and form a poor dish in lieu of the garden asparagus.

*A. horridus*; Fl. Gr. iv. tab. 339. Sandy shore between Taormina and Giarre, Biv.; Syracuse, Catania, &c.

*A. aphyllus*; Fl. Gr. iv. tab. 338. In Siciliâ ad littora maris, Pers. *Hyacinthus Romanus*; Fl. Gr. iv. tab. 340; B. Mag. xxiv. tab. 939.

*H. maritimus*. † In maritimis Siciliæ meridionalis.

*H. comosus*; B. Mag. iv. tab. 133.

*H. botryoides*; † B. Mag. v. tab. 157. Mount Etna.

*H. parviflorus*,\* † Pers; *Muscari autumnale*, Guss.; Ind. Sem. p. 8.

*H. dubius*,\* † Guss. Sprengel (Syst. Veg. ii. p. 65) gives this a synonym to *H. Romanus*, but Gussone (Ind. Sem. p. 6) has made them two distinct species; whether correctly I leave to others to say.

*Agave Americana*. This plant has now become naturalized in Sicily, and is abundant everywhere. It forms a strong fence, and is often planted with the Indian fig for that purpose. The largest and finest specimens that I remember to have seen were in the hedges, on a sandy soil, between Gran Michele and Calatagirone; the greater part had a huge mast-like flowering-stem, about fifteen feet high. The common people make artificial flowers for decorating churches and madonnas of the inner leaves of this aloe. The leaves are beat out and dried; they are then white, and will receive a dye of any colour. A thread, called *Zambarone*, is sometimes made from them, and handkerchiefs woven with it, but they are stiff and very coarse. It flowers abundantly about the end of June.

*Berberis Ætensis*,\* Presl. Mera varietas *B. vulgaris*, à quâ racemis ac spinis paulum diversa mihi videtur; Preslio autem species est nova. In summâ Montis Ætne regione sterili ultimis frutex, à 5000 ad 7500 pedes Parisienses suprâ mare sese extendit (Schouw).

*Frankenia hirsuta*; Fl. Gr. iv. tab. 343. Beach at Syracuse.

*F. canescens*,\* Presl. In maritimis ad Panormum, Mondello, Sphæracavallo; affinis *F. pulverulentæ*; Fl. Sic. i. p. 140. An bona species? J. H.

#### HEXANDRIA DIGYNIA.

*Oryza sativa*. The only rice-grounds I noticed were between the river Platani and Sciacca. In Sicilian it is named *Il Risu*.

## HEXANDRIA TRIGYNIA.

- Rumex patientia*. †  
*R. divaricatus*. †  
*R. bucephalophorus*; Fl. Gr. iv. tab. 345. Palermo, nel Piano della consolazione, Biv.; et alibi, J. H.  
*R. scutatus*. Mount Etna, Biv. *Var. foliis pubescentibus et glaucis.*  
*R. spinosus*; † Fl. Gr. iv. tab. 347.  
*R. multifidus*; Fl. Gr. iv. tab. 349. In Nebrodibus, Ætnâ, &c.  
*Triglochin Barrelieri*, \*† Lois.; Deslong.; Fl. Gall. p. 725. In marine marshes on the east coast of Sicily.  
*T. laxiflorum*, \*† Guss.; Ind. Sem. p. 12. In hilly pastures not unfrequent.  
*Colchicum montanum*, \* Guss.; *C. Cupani*, Guss. This species varies in size, and with either broad or narrow leaves. In pascuis ubique obvia.  
*C. Bivonæ*, \* Guss.; Fl. Gr. iv. tab. 350. Mountains of St. Martin, near Palermo, Biv. Apud Gussoneum est *C. variegatum* (Sibthorpii), at non Linnæi.  
*Chamærops humilis*; B. Mag. xlvii. tab. 2152. The ground palm, called in Sicilian *Palmetta*, *Giummara*, and *Curina*, abundantly clothes the uncultivated land and hills, as the common furze does in England; but it is chiefly seen in the south of the island.

## OCTANDRIA MONOGYNIA.

- Epilobium obscurum*. †  
*Acer Platanoides*. In hedges about Palermo, &c., Presl; but only naturalized, J. H.  
*A. Monspessulanum*. In Nebrodibus; in Monte Madoniâ, arbores maximas constituens, Presl.  
*A. Creticum*. †  
*A. Neapolitanum*, \* Ten. In sylvis Caroniæ et Ætnæ; Fl. Sic. i. p. 195.  
*A. villosum*, \* Presl. In sylvis Nebrodûm. *A. Pseudoplatano* proximum; Fl. Sic. i. p. 194.  
*Chlora trichocalycina*, \* Gaspar. Hæc species à *Chlorâ perfoliatâ* differt, laciniis calycinis capillaceis longis apicibus subulatis. Discovered by Sig. Gasparrini, to whom I am indebted for my specimen.  
*Erica arborea*; Fl. Gr. iv. tab. 351. Woods near Messina.  
*E. multiflora*. In ericetis S. Martini, Biv.; et alibi, in collibus et locis aridis.  
*E. Sicula*, \*† Guss.; Syst. Veg. ii. p. 197. Limestone rocks on the coast; not common.  
*Daphne Gnidium*; Fl. Gr. iv. tab. 356. Sandy shore near Sciacca.  
*Stellera passerina*. In agris Siciliæ haud infrequens.  
*Passerina hirsuta*; Fl. Gr. iv. tab. 360; B. Mag. xlv. tab. 1949. In Romaic Ἀγριοθερόκαλλο, and κολλάρουσα, according to Sibthorp. Sea-beach between Catania and Augusta: Ray found it in a small island near Cape Passero.

## OCTANDRIA DIGYNIA.

*Moehringia muscosa.* In sylvis humidis, Biv.

## OCTANDRIA TRIGYNIA.

*Polygonum maritimum.*

*P. flagellare*,\*† Bert.; Syst. Veg. ii. p. 255.

*P. Monspeliense*.‡ Corn-fields.

*P. tenuiflorum*,\*† Presl; Syst. Veg. ii. p. 253. Damp places near Syracuse.

## ENNEANDRIA MONOGYNIA.

*Laurus nobilis*; Fl. Gr. iv. tab. 365. The bay-tree, *Il Lauru*, grows abundantly throughout the island. It is one of the domestic species, and flowers usually about the end of February.

## DECANDRIA MONOGYNIA.

*Anagyris foetida*; Fl. Gr. iv. tab. 366. Truly indigenous on the limestone.

*Cercis Siliquastrum*; Fl. Gr. iv. tab. 367; B. Mag. xxviii. tab. 1138. This beautiful plant seldom exceeds a dwarfish shrub in its wild state, and is indigenous throughout the south of Europe, chiefly in calcareous soil.

*Fagonia Cretica*; B. Mag. vii. cap. 241. Ficuzza, nel Bosco del Cappidderi, Biv.

*Tribulus terrestris*; Fl. Gr. iv. tab. 372. Sandy fields near the sea, Presl.

*Dictamnus fraxinella.* This plant varies with purple or white flowers. Grassy banks and high pastures, Presl.

*Ruta montana*.‡

*R. Chalepensis*;‡ Fl. Gr. iv. tab. 368. Now called 'Απήγανος, Sibth.

*R. bracteosa*,\* DeC. Circà Panormum, Moris; sotto il Monte Pellegriano, ad Baidam, Presl; DeC. Syst. i. p. 710.

## DECANDRIA DIGYNIA.

*Saxifraga longifolia*,† Pers.; *S. lingulata*, Bellardi.

*S. bulbifera.* Monte Cuccio, near Palermo, Biv.

*S. parviflora*,\* Biv. In montibus Siciliæ; Syst. Veg. ii. p. 364.

*Scleranthus Ætnæus*,\* mihi; *S. marginatus*, Guss.? *S. foliis mucronulatis glaucis imbricatis; floribus terminalibus fasciculatis.* Hæc species à *S. hirsuto*, Preslii (Vide Spr. Syst. Veg. ii. p. 382), antheris glabris et radice perenni, satis differt. I found this new *Scleranthus* on Mount Etna, growing in tufts upon the lava and volcanic sand on the edge of the snow, a little below the *Casa Inglese*, at an elevation of about 9000 feet above the sea. It was the last phænogamous plant which I observed on that mountain, May 24, 1826.

*Gypsophila paniculata.* In sabulosis Siciliæ, DeC.

*G. parviflora*,\* Presl; *G. dichotoma*, Raf.? In arvis glareosis, ad Arimenam, Caltaveteram, &c. Affinis præcedenti; Fl. Sic. i. p. 143.



- Saponaria Illyrica*, Pers.; *Gypsophila Illyrica*, Smith; Fl. Gr. iv. tab. 386. About Palermo, on walls, hedges, and barren hilly places.
- S. depressa*,\* Biv.; *S. Sicula*, Raf. In collibus arenosis regionis alpinæ M. Ætnæ, Biv.; Flores magni terminales rosei, DeC. Syst. i. p. 366.
- Dianthus ochroleucus*.‡
- D. plumarius*.‡
- D. Saxifragus*, Biv.; *Gypsophila rigida*? Pers. In aridis maritimis Siciliæ, Presl.
- D. rupicola*,\* Biv.; *D. Bisignani*, Ten. In fissuris rupium, ad Panormum; ad *S. Croce* propè Termini, Presl. Flores rosei, vel albi, fragrantés; DeC. Syst. i. p. 357.
- D. suffruticosus*,\*‡ Wild. Corolla magna; DeC. Syst. i. p. 357.
- D. velutinus*,\*‡ Guss. In the Monti Madonie, Ind. Sem. p. 5.
- D. Siculus*,\* Presl. In collibus ad Caltaveturam propè Himeram, et in Monte Cuccio propè Panormum; Fl. Sic. i. p. 146.
- D. sylvestris*, Pers.; *D. Arrostii*, Presl. In Nebrodibus: in Monte Cuozzo di Predicatore; Fl. Sic. i. p. 146.
- D. graminifolius*,\* Presl. In pascuis apricis Montis Cuccii ad Panormum; Fl. Sic. i. p. 147.

## DECANDRIA TRIGYNIA.

- Cucubalus maritimus*.‡
- C. fabarius*, Pers.; *Silene fabaria*, Sibth.; Fl. Gr. v. tab. 415. In saxosis Siciliæ, Bocc.
- Silene nocturna*;‡ Fl. Gr. v. tab. 408.
- S. hispida*, Pers.; *S. hirsuta*, Poir. Sandy places on Mount Etna, Biv.; about Palermo, Presl.
- S. fruticosa*; Fl. Gr. v. tab. 428. Walls and rocks about Girgenti, Palermo, &c.
- S. glutinosa*. In Siciliâ, Pers.
- S. Italica*; Fl. Gr. v. tab. 429. In collibus propè M. Cuccio, et in apricis Nebrodûm, Presl.
- S. Nicaensis*. In arenis maritimis ad Panormum, Himeram, Kephaloëdim, Presl; et propè Catanam, Messanam, ac Carenim, Biv. Variat etiam foliis subglabris.
- S. vespertina*; Fl. Gr. v. tab. 409; B. Mag. xviii. tab. 677. Sandy places about Trapani, Presl.
- S. pendula*; B. Mag. iv. tab. 114. In Siciliâ, Pers. In Valle Demonâ, Presl.
- S. sedoides*; Fl. Gr. v. tab. 425. Catania, al Ognina, ed a lu Signuri Asciatu, Biv.
- S. pseudo-atocion*. Very common in dry fields.
- S. saxifraga*.‡ In Nebrodûm rupium fissuris, Guss.
- S. decumbens*,\* Biv. Propè Panormum, ad *S. Martinum*, Presl. Flores aliquandò albi; DeC. Syst. i. p. 573.
- S. matutina*,\* Presl. In arvis arenosis ad Panormum, Himeram, et Kephaloëdim. Affinis *S. nocturnæ*; Fl. Sic. i. p. 150.

- Silene arenicola*,\* Presl. In arenis maritimis ad Mondello propè Panormum. Similis *S. Nicaensi*; Fl. Sic. i. p. 153.
- S. fimbriata*,\* DeC.; B. Mag. xxiii. tab. 908. In Siciliâ; DeC. Syst. i. p. 367.
- S. Sicula*,\* Presl.; *S. montana*? Guss. In apricis herbis Nebrodùm. Affinis *S. Italicæ*; Fl. Sic. i. p. 155.
- S. calycina*,\* Presl. In apricis collibus ad Caltavetoram; Fl. Sic. i. p. 155.
- Spergularia radicans*,\* Presl; *Arenaria radicans*, Guss. Inter arenas vulcanicas M. Ætnæ. Quoad inflorescentiam *A. rubræ* similis; Fl. Sic. i. p. 161.
- Arenaria procumbens*, Pers.; *A. geniculata*, Biv. Hedges about Catania, Biv.; and elsewhere, near the sea-shore.
- A. grandiflora*,† *A. abietina*, Presl.
- A. condensata*,\* Presl. In Monte Cuozzo del Predicatore Nebrodùm, Presl; Syst. Veg. ii. p. 403.
- A. subulifolia*,\* Presl. In Monte Cuccio propè Panormum; Fl. Sic. i. p. 162.
- A. arvatica*,\* Presl. Cum præcedenti, cui simillima; Fl. Sic. i. p. 163.
- A. Bartolotti*,\* Tin.; *A. herniariæfolia*, Desf. In maritimis propè Gelam, Tin. *A. procumbentis* varietas tantùm videtur; DeC. Syst. i. p. 413.
- A. Salzmanni*,\* Presl. Rarissimè in saxosis ad Drepanum; Fl. Sic. i. p. 163.
- Garidella Nigellastrum*; Fl. Gr. v. tab. 443. Cultivated ground near Trapani, Presl.

## DECANDRIA PENTAGYNIA.

- Sedum tetraphyllum*,\* Sibth.; *S. galioides*? Pers.; Fl. Gr. v. tab. 448. In Siciliâ legit D. Sibthorp.
- S. altissimum*. Frequent on the lava and bare rocks.
- S. cæruleum*; B. Mag. xlviii. tab. 2224. Common on walls and the roofs of houses at Catania, as well as in other places in Sicily. The whole plant when old changes red.
- S. rufescens*,\*† Ten.; *S. anopetalum*, DeC.; Syst. Veg. ii. p. 435. Varietas *S. altissimi* tantùm mihi videtur, J. H.
- Agrostemma cælirosa*; Fl. Gr. v. tab. 453; B. Mag. ix. tab. 295. Abundant in the corn-fields of Sicily. Its charming red or rose-coloured flowers have obtained for it the poetical name, "Rose of Heaven." It is an annual, and blossoms in May and June.
- Cerastium tomentosum*, Lam.; *C. Columnæ*, Ten.; Fl. Gr. v. tab. 455. In Nebrodibus, et Monte Ætnâ, Presl. Quoad situm variat formâ et magnitudine. Confer Obs. Pers. Syn. Plant. i. p. 522.
- C. album*,\* Presl. In Nebrodibus; in pascuis M. Filo dei Scribenti. Priori simile; an distincta species? Fl. Sic. i. p. 167.

## DECANDRIA DECAGYNIA.

- Phytolacca decandra*; B. Mag. xxiv. tab. 931. In hedges and waysides: Syracuse, Messina, &c. Its berries afford a beautiful purple

juice, which is sometimes used to colour wine. Is this plant really a native of both the Old and New Worlds, or was it originally imported from the latter into the former?

## DODECANDRIA MONOGYNIA.

- Lythrum Thymifolium*. Moist places on the base of Mount Etna; near the river Cantara.  
*L. Preslii*,\* Guss. In paludibus ad Panormum, Augustam, &c., Guss.; Fl. Sic. Prod. i. p. 533.

## DODECANDRIA TRIGYNIA.

- Reseda fruticulosa*, Pers.; *R. fruticosa*, Guss. Abundant in dry places.  
*R. undata*. Fields about Palermo, Presl.  
*R. Phyteuma*. Fields in the south of Sicily, Presl.  
*Euphorbia dendroides*; Fl. Gr. v. tab. 470. Mountains near Palermo.  
*E. chamæsyce*; Fl. Gr. v. tab. 461. Uncultivated places.  
*E. Terracina*. Cultivated region of Mount Etna, and near Carini, Biv.  
*E. pinea*. In calcariis maritimis propè Sciacca, Panormum, &c., Guss.  
*E. coralloides*. In Siciliâ, Pers.  
*E. Myrsinites*; ‡ Fl. Gr. v. tab. 471.  
*E. fruticosa*,\* Biv. Monte Pellegrino, near Palermo, Sic. Plant. Cent. i. p. 35. Somewhat resembles *E. dendroides*. I learnt from Sig. Gasparrini that Sicily produces many species of *Euphorbia*.

## DODECANDRIA PENTAGYNIA.

- Glinus lotoides*; † Fl. Gr. v. tab. 472. Ditches near Catania, Guss.

## DODECANDRIA DODECAGYNIA.

- Sempervivum tenuifolium*, Sibth. Limestone mountains near Catania, Palermo, &c., Guss. (Vide Fl. Gr. i. p. 335.)

## ICOSANDRIA MONOGYNIA.

- Cactus Opuntia*; B. Mag. l. tab. 2393. The Indian fig, *Ficu d'India*, although so long naturalized in Sicily, most likely was introduced from Africa. It flourishes in barren ground and even on the pure lava at Catania, where are the largest plants I noticed in Sicily. I think the *C. maximus*, Salm., is only a large variety of this species, having its thorns larger and stronger, and its fruit less in size and very poor.  
*Myrtus communis*; Fl. Gr. v. tab. 475. The myrtle (*Mirtu*) is a common wild plant in Sicily; it varies greatly in its leaves, and is seen now and then with white berries.  
*Punica Granatum*; Fl. Gr. v. tab. 476; B. Mag. xliii. tab. 1832 A. & B. The pomegranate (*Melagrânu*) will grow on the pure lava; it chiefly is at home in the limestone districts. Several kinds are cultivated in the island.
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*Amygdalus Persica.* In Sicilian the peach-tree is named *Persicu*, and the fruit, *Pérsica* or *Pésca*. It is only a cultivated tree.

*A. communis.* This tree (*Mándorlu*) is clearly indigenous in Sicily: both the bitter almond fruit (*La Mandorla amara*) and the sweet (*La Mandorla dolce*) are much used. Pomegranate, peach, almond, apricot, and various other fruit-trees are cultivated in extreme luxuriance in the lower or fertile region of Mount Etna.

*Armeniaca vulgaris*, Pers.; *Prunus Armeniaca*, Linn. In Sicilian the tree is named *Albicoccu*, and the fruit *Albicocca*. Although the apricot-tree was originally imported from the East, it is now nearly naturalized in Sicily.

#### ICOSANDRIA DIGYNIA.

*Cratægus monogyna*, Pers.; *Mespilus monogyna*, Spr. Woods and hedges.

*C. Azarolus*.† The fruit is called *Lazzeruola* or *Azzeruola*.

#### ICOSANDRIA PENTAGYNIA.

*Mespilus laciniata*,\* Ucr.; *Cratægus laciniata*, DeC. In montibus Madonie dictis; DeC. Syst. ii. p. 629.

*Aronia rotundifolia*, Pers.; *Pyrus Amelanchier*, Wild.; B. Mag. l. tab. 2430. Observed in mountainous situations in Sicily.

*Cydonia vulgaris*, mihi; *Pyrus cydonia*, Linn. In Sicily the quince-tree is named *Cotognu*, and the apple, *Mela Cotogna*. Observed in hedges.

*Mesembryanthemum crystallinum*; Fl. Gr. v. tab. 481. Called by the common people "*Cristallinu*," and is indigenous at Terra Nova, Sciacca, &c., growing on the marly cliffs near the sea. It is cultivated in some places, and used for making soda.

*M. nodiflorum*; Fl. Gr. v. tab. 480. First noticed it near Syracuse; also a sea-shore plant. I often remarked many plants flourishing near the sea in Sicily, which in a colder and less genial climate would not do so.

#### ICOSANDRIA POLYGYNIA.

*Rosa Gallica.* Hæc in Sicilia tantùm culta videtur.

*R. moschata*.† The people of Tunis distil a delightful essential oil from the flowers of this rose, Desf.

*R. glutinosa*,\*† Sibth.; Fl. Gr. v. tab. 482. In montibus calcariis indigena.

*R. Heckeliana*,\* Tratt. Species alpina in summis jugis Nebrodùm invenitur; DeC. Syst. ii. p. 624.

*R. Sicula*,\* Tratt. In Nebrodibus. Affinis priori; DeC. Syst. ii. p. 624.

*Rubus tomentosus*.‡

*R. Siculus*,\* Presl; Fl. Sic. i. p. 24. præf.

*Potentilla hirta*.†

*P. caulescens*.† In rupibus elatioribus Montis Scalone, Guss.

## POLYANDRIA MONOGYNIA.

- Capparis spinosa*; Fl. Gr. v. tab. 486. The caper-bush (*Capperu*) adorns rocks and stony places with its beautiful white flowers.
- C. ovata*, Pers.; *C. Fontanesii*, DeC. In Val Demonâ propè Paterno, Molumentis, &c., Presl.
- C. peduncularis*,\* Presl; *C. rupestris*, Sibth.? In rupium calcariarum, et murorum, fissuris; ad Panormum, &c.; Fl. Sic. i. p. 111.
- Papaver Roubicai*,\* Presl. In arenosis propè Drepanum (Trapani). Flores *P. Rhœadis*, filamenta violacea; Fl. Sic. i. p. 32.
- Citrus medica*. Presl describes four varieties of citron (*Citru*, o *Cedru*) which are cultivated in Sicily.
- C. Limonium*, DeC.; *C. medica*, var.  $\beta$ . Linn. In Sicilian *Lumiuni* or *Lumincella*. There are several kinds of lemons and limes, both with a sweet and sour juice.
- C. Aurantium*. According to Dr. Presl, no fewer than fourteen varieties of the orange are cultivated in the island.
- Cistus villosus*. Not uncommon on sunny banks.
- C. Monspeliensis*; Fl. Gr. v. tab. 493. Frequent in the Val di Noto, near Cefalu, Castellbuono, &c., Presl.
- C. salvifolius*; Fl. Gr. v. tab. 497. The most common *Cistus* in Sicily, and varies sometimes with yellow flowers.
- C. incanus*; Fl. Gr. v. tab. 494. Near Trapani and Cefalu, Presl.
- C. albidus*. In collibus herbidis ad Drepanum, Presl.
- C. Creticus*. Hills about Girgenti.
- C. crispus*. In apricis Siciliae meridionalioris, Presl.
- C. Sideritis*,\* Presl. In ericetis et collibus ad Cefalu. Affinis *C. salvifolio*; ac illius potiùs varietas; Fl. Sic. i. p. 116.
- C. Cupanianus*,\* Presl. In collibus ad S. Martinum, Alcamo, Drepanum, &c. Petala ochroleuca obcordata; Fl. Sic. i. p. 117.
- Helianthemum halimifolium*. Rocky places near the sea at Trapani, Presl.
- H. umbellatum*,\* Presl; *Cistus fastigiatus*, Guss. Ad Victoriam Siciliae meridionalis, Guss.
- H. lævipes*; B. Mag. xliiii. tab. 1782. On Monte Cuccio, towards S. Martino, Presl.
- H. Fumana*. Dry hills in Sicily, Presl.
- H. Tuberaria*. Rough hilly ground about Girgenti, Presl.
- H. salicifolium*; Fl. Gr. v. tab. 499. Sandy fields near Giuliana, Presl; also at Terra Nova, Guss.
- H. intermedium*. Common in barren fields at Palermo, Presl. Persoon makes this only a variety of the preceding species (see Syn. Plant. ii. p. 78), and I think very justly so, J. H.
- H. denticulatum*. Found in sandy fields with *H. intermedium*, Presl.
- H. niloticum*. Palermo, sotto il Monte Pellegrino, Presl; Castellvetrano, &c.
- H. Ægyptiacum*.†
- H. sessiliflorum*.† In collibus aridis ad Victoriam, Guss.
- H. glaucum*. Nebrodensian Mountains; in Monte Scalune, Cozzo di Predicatore, Cozzo de' Suarenti, Scalamaddaggio, Presl.

- Helianthemum glutinosum.* Hills about S. Martino, Presl.  
*H. croceum.* Pastures in the Monte di Madonie with *H. glaucum*, Presl.  
*H. pulverulentum.* In collibus ad Mare Tyrrhenicum propè Messanam, Presl.  
*H. Apenninum.* Hills near Messina, Presl.  
*H. Arabicum*; Fl. Gr. vi. tab. 503. In collibus ad Siaccam, et in Valle di Noto, Guss.  
*H. Barrelieri*,\*† Ten.; B. Mag. l. tab. 2371. In collinis aridis ad Bocca di Falco, S. Martinum, Presl; et ad Ficuzza, Alcamo, &c.; DeC. Syst. i. p. 276.  
*H. viride*,\*† Ten. In Siciliae collibus propè Castellamare, Marsala, &c., Guss.; DeC. Syst. i. p. 275.  
*H. bicolor*,\* Presl. In Nebrodibus; in pascuis Montis Scalamadaggio; Fl. Sic. i. p. 128.  
*H. arcuatum*,\* Presl. In Monte Cozzo di Predicatore Nebrodùm. Præcedenti proximum; Fl. Sic. i. p. 129.  
*H. paniculatum*,\* Dunal.; *H. rubellum*, Presl. In Monte Scalune, et M. Pizzuta Planitie Græcorum imminente, Presl; DeC. Syst. i. p. 278.

## POLYANDRIA DIGYNIA.

- Pæonia flavescens*,\*† Presl. In asperis Montis Cozzo del Pino Nebrodùm. Affinis *P. corallinae*; flos pallidè ochroleucus; Fl. Sic. i. p. 27.  
*P. Russi*,\* Biv. In montibus l'Occhio et Pitrusu ad S. Martinum, Presl. Similis *P. humili*. Petala chermesina, seu purpurea. Radix fusiformis; DeC. Syst. i. p. 66.

## POLYANDRIA TRIGYNIA.

- Delphinium peregrinum*; Fl. Gr. vi. tab. 506. A common species in the Sicilian corn-fields.  
*D. Staphysagria*; Fl. Gr. vi. t. 508. Uncultivated places near Catania, and Terra Nova.  
*D. pubescens*, DeC.; *D. consolida*, var. Smith; Fl. Gr. vi. tab. 504.  
*D. halteratum*,\* Sibth.; Fl. Gr. vi. tab. 507. In Sicilia legit Sibthorp. In segetibus ad Panormum.  
*D. emarginatum*,\* Presl. Panormi suprâ S. Maria di Gesu, ad Himeram Novam, et ad Maris Castellum; Fl. Sic. i. p. 25.

## POLYANDRIA PENTAGYNIA.

- Nigella Damascena*; Fl. Gr. vi. tab. 509; B. Mag. i. tab. 22. In modern Greece it is called *μαβροκόκκο* and *πορδόχορτο*, from the crackling of the scariose capsules, Sibth.  
*N. arvensis*; Fl. Gr. vi. tab. 512. These two species are common in corn-fields throughout Sicily.  
*Reaumuria vermiculata.* In Siciliae littoribus, Pers. Propè Agrigentum, Guss.  
*Hypericum hircinum*; Fl. Gr. viii. tab. 773. Rivulets near Bocca di Falco, Presl.



*Hypericum crispum*; Fl. Gr. viii. tab. 776. Ἀγροθούρα in Græc. hodiern. secundum Sibth. Near Taormina, Presl.

*H. ciliatum*. Hills about Palermo, Presl.

*H. tomentosum*. Sandy fields at Palermo, Presl.

*H. dentatum*,\*† Lois.; Deslong. Fl. Gall. p. 499.

## POLYANDRIA POLYGYNIA.

*Anemone hepatica*; Fl. Gr. vi. tab. 513. Shady places at S. Martino; in the Monte di Madonia, &c., Presl.

*A. coronaria*; Fl. Gr. vi. tab. 514.

*A. hortensis*, Lin.; *A. stellata*, Lam.; Fl. Gr. vi. tab. 515; B. Mag. iv. tab. 123. Frequent in meadows and hedges in Sicily.

*Atragene cirrhosa*, Pers.; *Clematis cirrosa*, Sibth.; Fl. Gr. vi. tab. 517; B. Mag. xxvii. tab. 1070. South of Sicily, creeping up trees and hedges.

*Clematis flammula*. Hedges and thickets, Presl.

*Thalictrum Calabricum*,\* Spr. In Calabria et Sicilia, DeC. Panormi in Monte Pellegrino, ad S. Martinum, &c., Presl; DeC. Syst. i. p. 13.

*Adonis æstivalis*. Inter segetes vulgò invenitur.

*A. flammea*. Noticed by Presl in corn-fields.

*Ranunculus nodiflorus*; B. Mag. xlvii. tab. 2171. In Sicilia, Pers.

*R. ophioglossifolius*,† Vill.; *R. ophioglossoides*, Pers.?

*R. bullatus*. Sunny banks near Palermo alla Grazia, Biv.

*R. spicatus*. La Piana delli Greci, and in moist places della Pizzuta (P. Russo), Biv.

*R. flabellatus*, Pers.; *R. chærophyllus*, var. *α*, Presl; Fl. Gr. vi. tab. 520. Sopra S. Maria di Gesu, near Palermo, Biv.

*R. chærophyllus*, Linn.; *R. chærophyllus*, var. *γ*, Presl. Plentifully near Palermo, in Monte Cuccio, Presl.

*R. millefoliatus*; Fl. Gr. vi. tab. 521. Abundant on Monte Pellegrino, Presl.

*R. tripartitus*,\* DeC.; *Batrachium tripartitum*, Presl. In fossis Siciliae; Fl. Sic. i. p. 10.

*R. heterophyllum*. In aquis stagnantibus, inter Himeram et Kephaloëdim, Presl.

*R. capillaceus*.

*R. peltatus*,\* Mœnch.; *Batrachium peltatum*, Presl. Hæc et præcedens species, quæ *R. aquatilis* tantum varietates secundum De Candolle, habitant in aquis lentè fluentibus aut stagnantibus Siciliae; Fl. Sic. i. p. 10.

*R. muricatus*; Fl. Gr. vi. tab. 522. Wet places and rivulets, near Palermo, Cephaloëdi, &c., Presl.

*R. trilobus*. Fields near the sea at Himera, Presl.

*R. scaber*,\* Presl. In arvis ad Himeram. *R. millefoliato* similis; Fl. Sic. i. p. 14.

*R. leptaleus*,\* DeC. In herbis, ad Panormum. *R. millefoliato* similis ex foliis, *R. orientali* ex carpellis; Fl. Sic. i. p. 14. Annon hæc et præcedens tantum varietates *R. millefoliato*? Guss.

- Ranunculus hederæfolius*,\* Presl. In Monte Cuccio propè Panormum; Fl. Sic. i. p. 15.
- R. lateriflorus*,\* DeC. In arvis humidis maritimis propè Himeram veterem, Presl; et alibi in inundatis montosis, Guss. *R. nodifloro* affinis; DeC. Syst. Nat. i. 251.
- R. fontanus*,\* Presl. Ad rivulos Nebrodùm, præcipuè in M. Cozzo del Pino. Similis *R. ophioglossifolio*; Fl. Sic. i. p. 15.
- R. angulatus*,\* Presl. In humidis Montis Filo degli Scribenti Nebrodùm; Fl. Sic. i. p. 16.
- R. Siculus*,\* Presl. In pascuis M. Cuccio propè Panormum. *R. acri* maximè affinis; et forsàn varietas? Fl. Sic. i. p. 17.
- R. pratensis*,\* Presl. Panormi copiosè nel piano della Cunsulazioni; Fl. Sic. i. p. 18. An mera varietas *R. hirsuti* (Pers.) invenietur? J. H.

## DIDYNAMIA GYMNOSPERMIA.

*Ajuga orientalis*. ‡

*A. Iva*; † Fl. Gr. vi. tab. 525.

*A. glabra*,\* Presl. In Siciliâ; Fl. Sic. i. p. 36. præf.

*Teucrium campanulatum*. †

*T. fruticans*; Fl. Gr. vi. tab. 527.

————— var.  $\beta$ , *latifolium*; B. Mag. vii. tab. 245. These handsome shrubs are not uncommon. The first time I observed them was between Messina and Taormina.

*T. flavum*; Fl. Gr. vi. tab. 533. Now named *Χαμαϊδρὴ*, according to Sibthorp. Frequent in stony and rough places; on Mount Etna.

*T. montanum*. In Siciliâ secundùm Ucriam.

*T. supinum*. †

*T. aureum*. Rocks and dry hills.

*T. Polium*; Fl. Gr. vi. tab. 535. Limestone hills near Syracuse, and Mount Hybla. The leaves of this species vary exceedingly.

*T. pseudohyssopus*. Dry sunny hills.

*Satureja nervosa*. †

*S. Græca*; † Fl. Gr. vi. tab. 542. 'Υσσόπο η̄ θρούμπι, hodiè, Sibth. In saxosis vulgaris.

*S. filiformis*, Pers.; *S. hirsuta*, Presl. In rupibus et asperis Siciliæ, Presl.

*S. capitata*; Fl. Gr. vi. tab. 544. Limestone hills about Syracuse, &c.

*S. approximata*,\* Biv.; *S. fasciculata*, Raf.; Syst. Veg. ii. p. 719. In rupibus ad Panormum, Guss.

*S. tenuifolia*,\* † Ten.; Syst. Veg. ii. p. 720. In solo calcario ad Termini, &c.

*S. longiflora*,\* Presl. In Siciliâ; Fl. Sic. i. p. 36. præf. Mihi videtur non satis distincta à *S. Græcâ*.

*Nepeta violacea*. ‡

*N. hirsuta*.

*N. lanata*. †

*Lavandula Spica*.

*L. Stœchas*; Fl. Gr. vi. tab. 549. Said to have been first found in the islands called Stœchades, now les Isles d'Hieres, near Toulon, and received its name from them. Hilly ground near Alcamo, &c.

*Sideritis Romana*; † Fl. Gr. vi. tab. 552.

*S. Brutia*,\*† Ten. Sprengel gives the synonyms *S. Taurica*, W., *S. distans*, W., *S. Brutia*, Ten., and *S. Syriaca*, Spr., to the same plant: are they correct? Persoon makes *S. Syriaca*, *S. Taurica*, and *S. distans*, W., three distinct species.

*Lamium rugosum*; Fl. Gr. vi. tab. 553. In woods and thickets not unfrequent.

*L. bifidum*. Propè Messanam in maritimis.

*Stachys Cretica*, Pers.; *S. dasyanthes*, Raf.? Fl. Gr. vi. tab. 558. Palermo and Syracuse.

*S. hirta*.†

*S. arenaria*; B. Mag. xlv. tab. 1959. In collibus arenosis Caltanissettæ.

*S. annua*.†

*Marrubium peregrinum*. In Sicilia siccis, Pers.

*M. Hispanicum*. Common near the sea-shore.

*M. saxatile*,\*† Raf.; *M. Hispanicum*,  $\beta$ , mihi. Bivona, in his account of *M. rupestre*, which Sprengel has referred to *M. Hispanicum* (vol. ii. p. 740), says, "*M. Saxatile* Rafinesquii (Précis des Découvertes Somiolog. p. 38) toto habitû tomentosissimo . . . . . calycis dentibus erectis, corollæque labio superiori bifido distinctum, nec propè Panormum, nec in cæteris locis ab ipsomet Rafinesquio indicatis reperitur." Stirp. Rar. Man. 2.

*Phlomis fruticosa*; B. Mag. xliii. tab. 1843.

*P.* ———, var.  $\beta$ , *latifolia*. These two species of *Phlomis* I noticed in the pass of Sant' Alessio, between Messina and Taormina.

*P. herba Venti*; B. Mag. li. tab. 2449. Hæc species aliquandò variat,—foliis subtus albo-tomentosis ( $\beta$ . *hypoleuca*, Presl). In campis ad basim Montis Ætnæ.

*Moluccella spinosa*; † Fl. Gr. vi. tab. 567.

*Origanum onites*; Fl. Gr. vi. tab. 572. Propè Syracusas, Bocc.

*Thymus acicularis*. In calcariis locis ad castrum Joannis.

*Acynos alpinus*.

*Melissa officinalis*. Hedges near Palermo.

*Scutellaria peregrina*; † Fl. Gr. vi. tab. 582.

*S. Columnæ*. Frequent on Mount Etna, particularly near li Caseddi a lu Milu, Biv.

*Prasium majus*; Fl. Gr. vi. tab. 584.

*P. minus*. In Sicilia secundum Persoonium.

#### DIDYNAMIA ANGIOSPERMIA.

*Vitex agnus castus*; Fl. Gr. vii. tab. 609. Frequent on the banks of rivers throughout the island, and often growing with the Olean-der.

*Euphrasia Bocconi*,\*† Guss.; Syst. Veg. ii. p. 776. In montibus Madonie.

*E. rigidifolia*,\* Biv. Mountains of S. Martino and Alla Grazià, near Palermo; Sic. Plant. Cent. i. p. 36.

*Bartsia Trixago*; † Fl. Gr. vi. tab. 585.



- Rhinanthus elephas.* Moist places in woods on the mountains of the north of Sicily.
- Antirrhinum pilosum*,\* mihi; *Linaria pilosa*, Biv. Mountains of St. Martin, Biv.
- A. triphyllum*; B. Mag. ix. tab. 324. In umbrosis montibus Hyblæis circà Syracusas, Pers.
- A. purpureum*; B. Mag. iii. tab. 99. Observed on Mount Etna.
- A. simplex*.†
- A. pelisserianum*; Fl. Gr. vi. tab. 591. Fields on Mount Etna, Biv.; also near the sea at Terra Nova.
- A. multicaule.* In Siciliâ, Pers.
- A. reflexum*;† Fl. Gr. vi. tab. 593.
- A. strictum*,\*† Sibth.; Fl. Gr. vi. tab. 594. In Siciliâ legit Sibthorpius; Prod. Fl. Gr. i. p. 433.
- A. capitatum*,\*† Presl. Apud Sprengelium, Syst. Veg. ii. p. 798, est varietas angustifolia *A. majoris*.
- Orontium Siculum*, Pers.; *Antirrhinum Siculum*, Ucr. Walls near Catania, and elsewhere.
- O. tortuosum*, Lam. According to Persoon, this is only a variety of the preceding species.
- Scrophularia grandidentata*,\* Ten. Wet places in Boschi di Caronia.
- S. peregrina*; Fl. Gr. vi. tab. 597.
- S. bicolor*,\*† Sibth.; *S. lucida*, Biv.? Fl. Gr. vii. tab. 602.
- S. multifida*,\* W. In Siciliâ; Syst. Veg. ii. p. 786.
- Celsia Cretica*; B. Mag. xxiv. tab. 964. Rocky spots about Palermo, Girgenti, &c.
- Sesamum Indicum*; B. Mag. xli. tab. 1688. Cultivated, and commonly named by the Sicilians *Giuggiolena*.
- Acanthus mollis*; Fl. Gr. vii. tab. 610.
- A. spinosus*; B. Mag. xliii. tab. 1808. This is less frequent in Sicily than the preceding.
- Orobanche foetida*,\* Biv.; *O. Spartii*, Vaugh. On the mountains about Palermo, growing among the roots of the broom, Biv.

## TETRADYNAMIA SILICULOSA.

- Cakile Ægyptiaca.* Sandy beach between Terra Nova and Licata.
- Succovia Balearica.* Circa Panormum, Tineo.
- Rapistrum paniculatum.* Inter segetes, et in arvis, Presl.
- R. orientale*, DeC.; *Myagrurn orientale*, Pers.; Fl. Gr. vii. tab. 612. In arvis ad Panormum, Presl.
- R. rugosum*, DeC.; *Myagrurn rugosum*, Pers. In agris, cultisque arenosis, passim.
- Cochlearia lyrata*,\* Sibth.; Fl. Gr. vii. tab. 619. In Siciliâ. Species non satis nota; DeC. Syst. ii. p. 372.
- Iberis semperflorens.* Rocks about Palermo; Monte Pellegrino and Mariduci, Guss.; at Isnelli, Castelbuono, Cephaloëdi, &c., Presl.
- I. humilis*,\*† Presl. In rupibus Montis Scalune Nebrodûm; altitud. 5000 ped. suprâ mare. Præcedenti simillima; Fl. Sic. i. p. 67: et ejus mera varietas mihi videtur, J. H.

- Iberis saxatilis*. In Siciliâ, Ucr.; in saxosis Siciliæ meridionalioris, Presl.
- I. umbellata*; B. Mag. iii. tab. 106. In asperis et sterilibus Siciliæ occidentalis et meridionalis, Presl.
- I. tenuifolia*,\* Presl. Sandy fields at Taormina; Fl. Sic. i. p. 64.
- I. pinnatu*. Corn-fields at Segesta and Trapani, Presl.
- I. Pruiti*,\*† Tin.; *I. cepeæfolia*, Guss. In montibus Nebrodensibus, Tineo; DeC. Syst. ii. p. 404.
- I. Tenoreana*,\* DeC.; B. Mag. liv. tab. 2783. In Nebrodibus, nunc Monti di Madonia dictis; DeC. Syst. ii. p. 404. An à priori verè diversa species? J. H.
- Lepidium procumbens*. Walls and waste places about Palermo, Presl.
- L. graminifolium*; Fl. Gr. vii. tab. 618. In arvis cultis Panormi, Presl. Permultisque aliis locis.
- L. lanceolatum*,\* Presl. In collibus incultis Panormi; Fl. Sic. i. p. 82. Affinis priori, et forsàn non satis distincta, J. H.
- Thlaspi saxatile*. In rupibus calcariis M. Scalune, Presl.
- T. montanum*. In Siciliâ, Ucr.
- T. luteum*,\* Biv.; *Bivonœa lutea*, DeC. In montosis siccis Panormi suprâ Sanctam Mariam di Gesu dictam, Biv.; loco dicto il Caputo; et Cameratæ in Valle Demonâ, Guss.; DeC. Syst. i. p. 208.
- T. pubescens*,\* Guss.; *Lepia Bonanniana*, Presl. In pascuis apricis Nebrodensibus; nelle fosse di S. Gandolfo, Cozzo de' Suarenti, &c., Presl; Ind. Sem. p. 12.
- T. rivale*,\*† Presl. Ad nives deliquescentes nella Curma grande Montis Madoniæ Nebrodûm; Fl. Sic. i. p. 62.
- Draba præcox*,\* Stev.; *Erophila præcox*, DeC. Walls at Palermo. Much like *D. verna*, and is occasionally found with it; Fl. Sic. i. p. 61.
- Alyssum incanum*. Sandy places near the sea at Catania, Messina, Palermo, Taormina, &c., Presl.
- A. obliquum*,\* Sibth.; *Berteroa obliqua*, DeC.; Fl. Gr. vii. tab. 626. In Siciliâ, Sibth.; DeC. Syst. ii. p. 292. In apricis sterilibus arvis non procul Castrogiovanni; in maritimis arenosis ad Panormum et Messanam, Presl.
- A. calycinum*. Woody region of Mount Etna, Biv.; Monti di Madonia, Presl.
- A. campestre*; Fl. Gr. vii. tab. 622. Sandy fields in the more southern parts of Sicily, Presl.
- A. clypeatum*. In saxosis Montis Maronis, Ucr.
- A. Creticum*.†
- A. deltoideum*; B. Mag. iv. tab. 126. In Nebrodibus, Guss.; propè Panormum, Schouw; in fissuris rupium ad S. Martinum; in Monte Roccazzo di Marrapuleggio 5500 ped. alt., Presl.
- A. Nebrodense*,\* Tin. In Nebrodensibus, Tin.; in Monte Scalune, Presl; pulchra species, flores flavi; DeC. Syst. ii. p. 307.
- A. arenarium*,\* Presl; *A. halimifolium*, Curt.? B. Mag. iii. tab. 101? In arenosis maritimis, copiosè Panormi. Simile *A. maritimo*, Pers., et forsàn idem; Fl. Sic. i. p. 58.

*Clypeola Ionthlaspi.* In Siciliâ vulgaris, Ucr.; in muris vetustis ad civitatem Pollizzi Val di Noto (2500 ped.), et in sabulosis Montis Cozzo de' Suarenti (5000 ped.) Nebrodùm, Presl.

*Biscutella auriculata.* In arvis cultis Siciliæ, Ucr.

*B. Apula.* In Siciliâ, Ucr.; in arvis arenosis Panormi, Presl.

*B. lyrata.* Palermo tra la Guadagna e Santu Spiritu, Biv.

*B. raphanifolia.* Palermo nel Piano della Cunsulazione, Biv.; alla Favorita, &c., Presl.

*B. maritima*,\*† Ten. An mera varietas *B. lyratæ*? DeC. Syst. ii. p. 410.

*B. laxiflora*,\* Presl. In pascuis arvisque Panormitanis; Fl. Sic. i. p. 69. *B. raphanifoliæ* simillima; an eadem species? J. H.

#### TETRADYNAMIA SILIQUOSA.

*Cardamine Thalictroides.* In the higher region of Mount Etna, Biv. *C. Græca*; Fl. Gr. vii. tab. 631. In montibus di Madonia; ac in regione alpinâ M. Ætnæ, Presl.

*C. glauca*,\* DeC. In asperis humidiusculis ad Messanam; Fl. Sic. i. p. 53.

*Sisymbrium amplexicaule.* In collibus asperis; Portella della S. Anna ad S. Martinum, Presl.

*S. polyceratium.* In Siciliâ, Schouw; in ruderatis Panormi nel Piano della Cunsulazione, Presl. Passimque ad vias.

*S. bursifolium.* In Siciliâ, Linn.; in agris vineisque Montis Maronis, Presl.

*S. vimineum.* Mountains of S. Martin, all' occhio among the vineyards, Biv.; also near Girgenti, Bocc.; in Monte Marone, Presl.

*S. Nebrodense*,\* Poir.; *Nasturtium Nebrodense*, DeC. In montibus Nebrodensibus. Species non satis nota; DeC. Syst. ii. p. 201.

*Barbarea Sicula*,\* Presl. In humidis umbrosis Nebrodùm; Fl. Sic. i. p. 45. Obs. *Barbarea* est genus à Cel. Brown constitutum, et species quasdam Sisymbrii atque Erysimi (Pers.) complectens.

*B. humilis*,\* Presl. In humidiusculis ad Cephaloëdim; Fl. Sic. i. p. 45.

*Erysimum Cheiranthus.* In Siciliâ, secundùm Schouw.

*E. Bocconi*.‡

*E. Siculum*,\* Spreng.; DeC. Syst. i. p. 196.

*E. glabrum*,\* Presl. In arvis maritimis Messanensibus; Fl. Sic. i. p. 76.

*E. crassistylum*,\* Presl. In siccis collibus propè Messanam versùs Tauromenium; Fl. Sic. i. p. 77.

*E. Bonannianum*,\* Presl. In apricis saxosis Nebrodùm; Fl. Sic. i. p. 78.

*Cheiranthus fenestralis.* Sand-links between Catania and Punto di S. Calogero.

*C. littoreus.* Coast of the Mediterranean; at Augusta, &c., Presl.

*C. tristis*; B. Mag. xix. tab. 729. In Siciliâ, Bocc.; propè Panormum, Schouw; in arenosis maritimis ad Sfaera Cavallo, et ad Promontorium Zaffarana, Presl.

*C. tricuspidatus*; Fl. Gr. vii. tab. 639. In arenosis maritimis copiosè, Presl.



- Cheiranthus coronopifolius*,\*† Sibth. ; *Matthiola coronopifolia*, DeC. ; Fl. Gr. vii. tab. 637. Rocky places at the Monastery del Parco, near Palermo, Bocc. ; DeC. Syst. ii. p. 173.
- C. Siculus*,\* Hort. ; *Matthiola patens*, Presl. In arenosis maritimis ad Patti et Milazzo. *C. sinuato* valdè affinis ; Fl. Sic. i. p. 40.
- Hesperis tristis* ; B. Mag. xix. tab. 730. In dumosis montanis Siciliæ, Guss.
- H. Africana*. In Siciliâ, Bocc. ; non procul Drepanum rara, Presl.
- H. ramosissima*. Sandy beach near Catania, Biv.
- H. verna* ; Fl. Gr. vii. tab. 641. Mountains of Saint Martin, Biv.
- H. parviflora*,\* DeC. Sea-shore at Messina, Presl ; DeC. Syst. ii. p. 442.
- H. crucigera*,\* mihi ; *Matthiola crucigera*, DeC. Inter saxa in Montibus di Madonia, et di Castelbuono dictis, Bocc. ; DeC. Syst. ii. p. 177.
- H. rupestris*,\* Raf. ; *Matthiola rupestris*, DeC. In rupibus montosis Siciliæ ; DeC. Syst. ii. p. 714.
- H. fasciculata*,\* Raf. ; *Matthiola fasciculata*, DeC. In maritimis propè Messanam. An *H. crucigera*? Hæc tres species non satis notæ ; DeC. Syst. ii. p. 714.
- Arabis alpina* ; B. Mag. vii. tab. 226. Near Carini, upon the Muntagna lunga, Biv. ; also on the Monti di Madonia, Presl.
- A. albida*,\* Stev. Fissures of rocks on Mount Etna, Biv. ; Monti Madonie, towards Isnelli, Presl. Much like the preceding, but altogether larger ; DeC. Syst. ii. p. 217.
- A. Madonia*,\* Presl. Rocky places on the summit of Mon Scalamadaggiu, at an elevation of 5000 feet above the sea ; Fl. Sic. i. p. 49.
- A. longisiliqua*,\* Presl. In saxosis Montium Cuccii et Caputi, et in rupium fissuris ad S. Martinum propè Panormum. Affinis *A. collinæ*, Ten. ; Fl. Sic. i. p. 50.
- A. purpurascens*,\* Presl. In rupibus ad S. Martinum. Affinis speciei priori, an reverà diversa? J. H. ; Fl. Sic. i. p. 50.
- A. collina*,\* Ten. ; B. Mag. lvii. tab. 3021. Mountains at the Monastery of St. Martin, Guss. ; DeC. Syst. ii. p. 241.
- Turritis planisiliqua*, Pers. ; *Arabis sagittata*, DeC. Dry hilly places about Palermo, Presl.
- Brassica Austriaca*. Only a variety of *B. orientalis*, according to Persoon. Fields and amongst corn, Presl.
- B. arvensis* ; Fl. Gr. vii. tab. 644. Road-sides at Paterno, Centorbi, &c., Biv. ; in Siciliâ Australi, ad Castrogiovanni, ad Fundacu Nuovu retrò Himeram, et ad Tauromenium, Presl.
- B. suffruticosa*, Pers. ; *Moricandia arvensis*, var.  $\beta$ . Presl. In aridis collibus Siciliæ meridionalis, Presl. Secundùm Preslium, hæc antecedensque species, nisi caule herbaceo et suffruticoso, haud differunt.
- B. Balearica*. Rocky places at Palermo sopra S. Maria di Gesu, Presl.
- B. Cretica* ; † Fl. Gr. vii. tab. 645.
- B. Eruca* ; Fl. Gr. vii. tab. 646 and 647. Species polymorpha, flo-

- ribus albis aut flavis, fructibus glabris, pilosisve, variat. In agris arvisque, ad vias Panormi copiosè, Presl.
- Brassica incana*,\* Ten. In Siciliæ rupibus altioribus juxta mare; DeC. Syst. ii. p. 596.
- B. macrocarpa*,\* Guss. Habitus et folia *B. Balearicæ*, sed siliqua crassissima diametro digiti minoris à reliquis distincta. Siciliæ indigena; Ind. Sem. p. 3.
- B. Tournefortii*,\*† Goua. In collibus aridis Victoriae, Terræ Novæ, &c.; DeC. Syst. ii. p. 602.
- B. hispida*,\* Ten. In arvis ad Augustam. *B. Erucæ* similis, sed minor; Fl. Sic. i. p. 105.
- B. montana*,\* Raf. In montibus Nebrodensibus; DeC. Syst. ii. p. 714. An *B. Balearicæ* mera varietas? J. H.
- B. crispa*,\* Raf. In Nebrodibus. Species hæc et præcedens non satis notæ; DeC. Syst. ii. p. 714.
- Sinapis pubescens*. In Siciliæ Monte Bussambarensi, Pers.; Panormi, alla Guadagna, Biv.
- S. erucoides*. In Siciliæ agris, arvis, et secùs vias, Presl.
- incana*. In Siciliâ, Ucr.; ad Segestam, Castrogiovanni, Cataniam, Presl.
- S. radicata*, Pers.; *Brassica fruticulosa*, Cyr.; Fl. Gr. vii. tab. 648. Near Messina, Cup.; Palermo, Raf. Common also elsewhere.
- S. dissecta*,\*† Lag. Amongst corn-fields at Trapani, towards Marsala, Presl; DeC. Syst. ii. p. 621.
- S. inflexa*,\* mihi; *Hirschfeldia inflexa*, Presl. In arvis sterilibus, Panormi nel Piano della Cunsulazione, ad pedem Montis Peregrini, &c.; Fl. Sic. i. p. 97.
- S. integrifolia*,\* mihi; *Hirschfeldia integrifolia*, Presl. In arvis et ruderatis Panormi. Sotto il Monte Pellegrino, Fl. Sic. i. p. 98.
- S. crassifolia*,\* Raf.; *Diploaxis crassifolia*, DeC. In Siciliæ gypsaceis, Schouw; circa S. Cataldo et Delia, Raf.: DeC. Syst. ii. p. 629.
- S. oleracea*,\* mihi; *Erucastrum oleraceum*, Presl. In ruderatis murisque ad Cefalu. *S. radicatæ* proxima. Folia juniora à Siculis Cauluzzi nominata, acetario mediocri inserviunt; Fl. Sic. i. p. 93.
- S. virgata*,\* mihi; *Erucastrum virgatum*, Presl. In arvis cultis Messanæ; Fl. Sic. i. p. 94.
- Raphanus fugax*,\* Presl. In arvis et marginibus agrorum; Fl. Sic. i. p. 109.
- R. albiflorus*,\* Presl. In maritimis arenosis ad Fondachelli, Trabiam, &c.; Fl. Sic. i. p. 109.

## MONADELPHIA PENTANDRIA.

- Lobelia tenella*,\* Biv.; *L. laurentia*, var.  $\beta$ .? Linn. Ad margines fluminis Oreti, et alibi, ad rivulos, aquæductus, &c.; Sic. Plant. Cent. i. p. 53.
- Erodium Ciconium*. Catania, in Villa Rascosa, Biv.; in pastures at Palermo, Presl.
- E. Romanum*; B. Mag. xi. tab. 377. Monte Pellegrino, near Palermo, Presl.

- Erodium hispidum*,\* Presl; *E. laciniatum*, Biv. In arenosis maritimis Himeræ Novæ et Veteris, atque ad Catanam. Affine *E. laciniato*, Pers.; et tantùm ab illo pubescentiâ distinctum, J. H.; Fl. Sic. i. p. 208.
- E. Malachoides*; Fl. Gr. vii. tab. 658. In pascuis apricis et rudertatis, communis species.
- E. Gussonii*,\*† Ten.; B. Mag. li. tab. 2445; Fl. Neap.
- E. Malopoides*, Pers.; *Geranium crassifolium*, Cav. Sandy beach at Carini, Presl.
- E. nervulosum*,\* L'Her. In collibus apricis ad Tauromenium, Presl; DeC. Syst. i. p. 648.
- E. Chium*. In arenâ maritimâ Siciliæ meridionalis haud infrequens.

## MONADELPHIA DECANDRIA.

- Geranium tuberosum*; Fl. Gr. vii. tab. 659. Fields at Siculiana and Palermo, Guss.
- G. striatum*; B. Mag. ii. tab. 55. Monti di Madonia, and nel Bosco de' Nucelli, near Polizzi, Presl.
- G. umbrosum*.†
- G. asphodeloides*; Fl. Gr. vii. tab. 661. In pratis sylvaticis, nel bosco di Caronia.

## MONADELPHIA POLYANDRIA.

- Sida Abutilon*. In rudertatis ad Messanam rarissima, Presl.
- Althæa cannabina*.†
- A. hirsuta*. Frequent in fields and hedges.
- A. Ludwigii*. In Siciliâ, Pers.; in arvis incultis Syracusanis, Presl.
- Malva althæoides*; Fl. Gr. vii. tab. 664. In arvis sterilibus Panormi, Presl. Flores albi seu violacei.
- ,\* var. *β. hirsuta*, Ten. Propè Agrigentum; DeC. Syst. i. p. 432.
- M. tomentella*,\* Presl. In arvis ad Drepanum; Fl. Sic. i. p. 174.
- M. Cretica*.†
- M. parviflora*. Hedges and thickets and fields at Catania, Augusta, Syracuse, &c.
- M. Bivoniana*,\* Presl. In arvis ad Panormum et Catanam. An species vera æstimanda? J. H.; Fl. Sic. i. p. 176.
- M. excelsa*,\* Presl. In rudertatis ad S. Mariam di Gesu propè Panormum; Fl. Sic. i. p. 177.
- M. arvensis*,\* Presl; *M. Nicæensis*, Pers.? In arvis aridis incultis Panormi; Fl. Sic. i. p. 176. An *M. Nicæensi* satis distincta? J. H.
- M. racemosa*,\* Presl. In arvis sterilibus ad Panormum; Fl. Sic. i. p. 174.
- M. erecta*,\* Presl. Ad vias et in arvis siccis Panormitanis. Flores violacei *M. sylvestris*; Fl. Sic. i. p. 175.
- M. hirsuta*,\* Presl. In arvis incultis ad Mare Mediterraneum propè Drepanum; Fl. Sic. i. p. 175.
- Lavatera arborea*; Fl. Gr. vii. tab. 665. Near the coast in the south of Sicily, Presl; near Sciacca, J. H.



*Lavatera hispida*; B. Mag. lii. tab. 2541. Hedges near the sea, at Cephaloëdi, Presl.

*L.* ———, † var.  $\beta$ . *Africana*.

*L. Cretica*. Fields in Sicily, according to Presl.

*L. Agrigentina*,\* Tin.; *L. flava*, Pers.? Frequent about Girgenti and Sciacca, Guss.

*L. trimestris*; B. Mag. iv. tab. 109. Abundant on road-sides and in fields throughout the island.

*L. Neapolitana*,\*† Ten. In maritimis et ad sepes; ad veterem urbem Gelam, Presl. Petala obcordata cærulea; DeC. Syst. i. p. 439.

*Malope Malacoides*. Meadows on the hills about Messina, Presl.

*Gossypium herbaceum*. Called *Il Cotone*; almost naturalized, but cultivated principally about Mazzara.

*Hibiscus trionum*; B. Mag. vi. tab. 209. Cultivated ground near Terra Nova.

#### DIADELPHIA HEXANDRIA.

*Corydalis densiflora*,\* Presl. In nemorosis umbrosis in Monte Scalamadaggio Nebrodûm, altit. 5500 pedûm. Radix tuberosa, petala alba odorata; à *C. digitatâ* (Pers.) distinctissima; Fl. Sic. i. p. 36.

*Fumaria enneaphylla* In saxosis Siciliæ, Pers.; in umbrosis humidis Nebrodûm, Bocc.

*F. spicata*. In agris arenosis ad Alicatam.

#### DIADELPHIA OCTANDRIA.

*Polygala rosea*. Pelorian Promontory (Capo Peloro), Presl.

*P. elongata*,\* Presl. Sunny places at Saint Martin's, near Palermo; Fl. Sic. i. p. 136.

*P. flavescens*,\* Ten. In apricis subcollinis ad Panormum; Fl. Sic. i. p. 138.

*P. straminea*,\* Presl. Copiosè in Monte Caputo ad Panormum. Priori valdè affinis; an species (Fl. Sic. i. p. 137) vera habenda? J. H.

#### DIADELPHIA DECANDRIA.

*Spartium junceum*; B. Mag. iii. tab. 85. This elegant plant grows in luxuriance on the lava of Mount Etna. Its Romaic name is Φροκαλιδα, according to Sibthorp.

*S. monospermum*; † B. Mag. xviii. tab. 683.

*S. aspalathoides*. †

*S. villosum*; Fl. Gr. vii. tab. 673. Not unfrequently seen on hills in the south of the island.

*S. Æthnense*,\* Biv.; *S. trispermum*, Smith; B. Mag. liii. tab. 2674; Stirp. Rar. Man. ii. In Ætnæ regione pedemontanâ propè il Milu (Biv.), et in arido solo propè Nicolosi, anno 1826, crescentem vidi. This species is found with *S. junceum*, which it resembles, but is altogether less. The branches are slender and glaucous, the flowers yellow and small.

*S. Gasparrinii*,\* Guss.; Ind. Sem. p. 11. This species was disco-

vered by Sig. Gasparri on the calcareous mountains near Capo di Gallo, not far from Palermo, about the year 1823.

*Genista candicans*.†

*G. sylvestris*.†

*G. Cupani*,\* Guss. In aridis Montium Nebrodensium; DeC. Syst. ii. p. 147.

*Ononis parviflora*,† Pers.; *O. Columnæ*, Allion. In rupibus calcariis circà Panormum.

*O. mitissima*. Propè Catanam, Biv.

*O. alopecuroides*. In Siciliâ, Pers. In solo argilloso ad Agrigentum.

*O. variegata*. Propè Catanam reperit Bivona.

*O. oleæfolia*,\* Gasp. This comes very near the preceding plant (*O. variegata*), and is perhaps only a variety of it. The genus comprises several doubtful species.

*O. pendula*.†

*O. reclinata*.†

*O. viscosa*.†

*O. breviflora*,\* DeC.; *O. viscosa*, var.  $\beta$ . Linn.; Fl. Gr. vii. tab. 678.

In Siciliâ. Arista pedicelli calycem ferè adæquans. Legumen calyce duplò longius; DeC. Syst. ii. p. 160.

*O. polymorpha*,\*† Guss. Affinis *O. viscosæ*: sed odor omninò diversus, pedunculi mutici vel aristati, corollæ calycibus æquales. Species certa haud videtur, J. H.; Ind. Sem. p. 8.

*O. ornithopodioides*; Fl. Gr. vii. tab. 679. In Siciliâ, Pers.

*O. oligophylla*,\* Ten.; *O. Hispanica*? Curt.; B. Mag. li. 2450. Near Palermo, Girgenti, and Catania. Variat foliis pubescentibus; DeC. Syst. ii. p. 164.

*O. ramosissima*. Observed between Catania and Augusta.

*O. diffusa*,\*† Ten.; DeC. Syst. ii. p. 163. In arenâ propè Mare ad Catanam.

*O. Sicula*,\* Guss. Ad rupes volcanicas propè Pelagoniam. Stipulæ lanceolatæ acuminatæ: flores flavi reclinati: semina 7—18; DeC. Syst. ii. p. 160.

*O. Schouvi*,\* DeC. In montibus propè Panormum; DeC. Syst. ii. p. 162.

*Anthyllis tetraphylla*; B. Mag. iii. tab. 108. In Siciliâ, Pers. In locis aridis passim.

*A. Barba Jovis*;† B. Mag. xlv. t. 1927.

*A. Hermannicæ*;† B. Mag. lii. tab. 2576.

*Lupinus albus*. In Sicilian *Lupinu*; though probably a native plant, it is cultivated and used for food.

*L. varius*. Corn-fields at Messina, Pers.

*L. hirsutus*.†

*L. angustifolius*; Fl. Gr. vii. tab. 685. Propè Messanam, Pers.

*L. luteus*; B. Mag. iv. tab. 140. Common in sandy fields.

*L. Bivonii*,\* Presl; *L. prolifer*, Biv., non Desrous? Fl. Sic. i. p. 24. præf. Reperit Bivona propè Capacim in campis.

*Phaseolus vulgaris*. Cultivated, and named *Faggiuolu* in Sicily.

*Orobus vernus*;† B. Mag. xv. tab. 521.

*Orobus atropurpureus*.†

*Lathyrus sativus*; B. Mag. iv. tab. 115. Called by the Sicilians *Cicerchia*.

*L. setifolius*.†

*L. hirtus*.†

*L. odoratus*; B. Mag. ii. tab. 60. Frequent in hedges.

*L. grandiflorus*; \* B. Mag. xlv. tab. 1938. The flowers are handsome, both larger and more brilliant than those of the preceding species. Root perennial. It is less common in Sicily than the *L. odoratus*; I observed it in the lower region of Mount Etna only.

*Ochrus pallida*, Pers.; *Pisum Ochrus*, Linn.; Fl. Gr. vii. tab. 689. Abundant in corn-fields throughout the island.

*Pisum sativum*. Many sorts are grown; called *Pisellu*.

*Vicia atropurpurea*.‡

*V. Pannonica*. Pastures and meadows on Mount Etna, Biv.

*V. Narbonensis*. Cultivated places on Etna, Biv.

*V. leptophylla*,\* Raf. In Siciliâ. Species non satis nota; DeC. Syst. ii. p. 365.

*V. glauca*,\*† Presl.

*V. leucantha*,\* Biv. Pastures about Palermo; Stirp. Rar. Man. i.

*V. spuria*,\* Raf. Palermo, and on Mount Etna; DeC. Syst. ii. p. 363.

*V. ochroleuca*,\*† Ten. In sylvis propè S. Martinum; DeC. Syst. ii. p. 358.

*V. Bivonea*,\* Raf. In pascuis circà Panormum. Flores pallidè rosei, carina apice nigra; DeC. Syst. ii. p. 357.

*V. Faba*. *La Fava*.

*Ervum Lens*. In Sicily it is much eaten, and called *Lenticchia*.

*E. Agrigentinum*,\* Guss. On the south coast, about Terra Nova. DeC. Syst. ii. p. 367.

*E. uniflorum*,\* Ten. Mount Etna and the Madonian range.

*Cicer Arietinum*; B. Mag. xlix. tab. 2274. It is named in Sicily *Ceci*, and is much cultivated and used for food either raw or cooked.

*Cytisus Laburnum*; B. Mag. v. tab. 176.

*C. hirsutus*;‡ Fl. Gr. viii. tab. 706.

*C. capitatus*. In Siciliâ, Pers.

*C. triflorus*.

*C. complicatus*,\* Brot.; *Adenocarpus intermedius*, DeC.; Fl. Gr. viii. tab. 704. In Monte Scuderi; DeC. Syst. ii. p. 158.

*C. Bivonii*,\* mihi; *Adenocarpus Bivonii*, Presl. In Siciliae sylvis Ætnæis; Fl. Sic. i. p. 19. præf.

*Glycyrrhiza echinata*;‡ B. Mag. xlvii. t. 2154.

*Liquiritia officinalis*, Pers.; *Glycyrrhiza glabra*, Linn.; Fl. Gr. viii. tab. 709. This plant is abundant in clayey ground near Catania and Milazzo. The juice of the root, after having been two or three times boiled, cools into a strong black paste, which is rolled up in bay-leaves, and exported to England, Marseilles, Trieste, &c. It is commonly called *Regolizia*.

*Coronilla Emerus*; B. Mag. xiii. tab. 445. Woods in mountainous places throughout the isle.



- Coronilla valentina*; B. Mag. vi. tab. 185. Soprà S. Maria di Gesu, near Palermo, Biv.
- C. glauca*; ‡ Bot. Mag. i. tab. 13.
- Ornithopus compressus*; Fl. Gr. viii. tab. 714.
- O. ebracteatus*. †
- O. repandus*, † Pers.; *O. lotoides*, Viv.
- Hippocrepis unisiliquosa*; † Fl. Gr. viii. tab. 716.
- H. annua*, \* † Lag.; *H. ciliata*, var.  $\beta$ , DeC. In montibus calcariis; DeC. Syst. ii. p. 313. Var.  $\gamma$ , pedunculis 2-floris *H. dicarpa*, Bieb. Species hæc variat magnoperè.
- H. glauca*, \* † Ten. Affinis *H. comosæ*. Calyces pubescentes; DeC. Syst. ii. p. 312. In montibus di Carini.
- Hedysarum pallidam*, Biv.; *H. capitatum*, Pers.? Hills near Catania, Biv.
- H. coronarium*. Indigenous, and cultivated; it is named by the Sicilians *Sudda*.
- H. humile*.
- H. spinosissimum*; † Fl. Gr. viii. tab. 721.
- Onobrychis foveolata*, \* DeC. In collibus aridis Siciliæ, Guss.; propè Segestam reperi, J. H.; DeC. Syst. ii. p. 346.
- Astragalus pentaglottis*. †
- A. hamosus*; Fl. Gr. viii. tab. 728. Common in fields and roadsides.
- A. Bæticus*. In Siciliâ, Pers.; Fr. Gr. viii. tab. 730.
- A. Epiglottis*; † Fl. Gr. viii. tab. 731.
- A. cicer*. †
- A. galegiformis*. †
- A. caprinus*. † Varietas est glabra in quibusdam Siciliæ locis.
- A. Monspezzulanus*; B. Mag. xi. tab. 375. In collibus circà Terram Novam.
- A. Siculus*, \* Raf. *A. echinus*, Guss., non DeC., à quâ specie differt dentibus calycinis linearibus elongatis longè lanatis. In montibus Ætnâ et Nebrodibus. Flores purpurascentes aut albi; Ind. Sem. p. 2.
- Biserrula Pelecinus*; Fl. Gr. viii. tab. 737. Common on Mount Etna, Biv., and elsewhere.
- Psoralea bituminosa*; † Fl. Gr. viii. tab. 738.
- Melilotus Messanensis*; Fl. Gr. viii. tab. 741. Not unfrequent near Syracuse, &c.
- M. sulcata*, † Pers.; *M. Mauritanica*, Schousb.; Fl. Gr. viii. tab. 742.
- M. Neapolitana*, \* † Ten. Species non satis nota; DeC. Syst. ii. p. 189.
- M. longifolia*, \* Ten. In Siciliâ; Syst. Veg. iii. p. 207.
- Trifolium strictum*. †
- T. elegans*. †
- T. Cherleri*; Fl. Gr. viii. tab. 745. In sandy places very common.
- T. lappaceum*; Fl. Gr. viii. tab. 746. Corn-fields near Catania, Messina, &c., Biv.
- T. incarnatum*; B. Mag. x. tab. 328. Among sand on Mount Etna; near S. Niccolo dell' Arena, Biv.

*Trifolium phleoides*.†

*T. spumosum*; Fl. Gr. viii. tab. 753. Common in pastures on Mount Etna, Biv.

*T. vesiculosum*.†

*T. congestum*,\* Guss. Clayey fields near Catania, Augusta, and Caltanissetta; DeC. Syst. ii. p. 198.

*T. Cupani*,\*† Tin.; *T. alatum*, Biv. Propè Panormum; DeC. Syst. ii. p. 203.

*T. speciosum*, Pers.; *T. Gussoni*, Tin.? Fl. Gr. viii. tab. 754. In Siciliæ Nebrodensibus; species est subalpina.

*T. intermedium*,\* Guss. In collibus arenosis Siciliæ; DeC. Syst. ii. p. 190.

*T. variabile*,\*† Guss.; *T. leucanthum*, Bieb. and DeC. Dry mountain pastures; DeC. Syst. ii. p. 197.

*T. obscurum*,\*† Sav.; DeC. Syst. ii. p. 197.

*T. flavescens*,\* Tin. In Nebrodibus, alibique in collibus; DeC. Syst. ii. p. 206.

*Lotus siliquosus*.

*L. tetragonolobus*; B. Mag. v. tab. 151. Palermo, on Mount Pellegrino, Biv.; also in fields elsewhere.

*L. biflorus*. Palermo, soprà S. Maria di Gesu, Biv.

*L. edulis*; Fl. Gr. viii. tab. 756. In Siciliâ, Pers.

*L. ornithopodioides*; Fl. Gr. viii. tab. 757. In Siciliæ apricis.

*L. Creticus*;† Fl. Gr. viii. tab. 758.

*L. rectus*.‡ In damp places not uncommon.

*L. parviflorus*. Messina, all' arcipeschiere (D'Arrosto), Biv.

*L. cytisoides*.†

*L. ciliatus*,\* Ten. In pratis humidis Siciliæ. An potiùs var. *L. diffusi*? DeC. Syst. ii. p. 213.

*Trigonella littoralis*,\* Guss. In lapidosis maritimis Siciliæ; DeC. Syst. ii. p. 182.

*T. prostrata*,\*† DeC. Syst. ii. p. 182.

*Medicago arborea*;‡ Fl. Gr. viii. tab. 767.

*M. circinnata*;† Fl. Gr. viii. tab. 768.

*M. obscura*. Frequent in sand near the south coast.

*M. orbicularis*. Very common in corn-fields.

*M. elegans*. In Siciliâ, Pers.; in collibus Panormitanis, &c.

*M. scutellata*; Fl. Gr. viii. tab. 769. Common in corn-fields.

*M. tuberculata*.† Ad Cataniam, Syracusaque.

*M. Gerardi*.†

*M. sphærocarpa*,\*† Bert.; DeC. Syst. ii. p. 180.

*M. pentacycla*,\*† DeC. Syst. ii. p. 177.

*M. marginata*,\*† Wild. Simillina *M. orbiculari*; et mihi sola varietas ejus—leguminibus utrinque planis—videtur, J. H.

*M. littoralis*,\*† Lois. In arenâ mari finitimâ in Siciliâ orientali; DeC. Syst. ii. p. 177.

*M. muricoleptis*,\* Tin. Circà Panormum; DeC. Syst. ii. p. 179. In Siciliâ, hujus generis aliæ species, ac permultæ varietates, inventigari admodum manent.

## SYNGENESIA ÆQUALIS.

- Geropogon glabrum*; † B. Mag. xiv. tab. 479.  
*Tragopogon crocifolium*; † Fl. Gr. viii. tab. 779.  
*Arnopogon Dalechampii*; B. Mag. xxxix. tab. 1623.  
*Scorzonera Hispanica*. †  
*S. undulata*. †  
*S. deliciosa*, \*† Guss.; Ind. Sem. p. 10.  
*S. hirsuta*.  
*S. calcitrapifolia*; † Fl. Gr. viii. tab. 787.  
*S. Columnæ*, \*† Guss. Differt à *S. hirsutâ*, cui cæterùm similis, seminibus glabris, spinulis sursùm versis asperis; Ind. Sem. p. 10.  
*S. resedifolia*. Sea-shore near Catania, Biv.; also near the sea elsewhere.  
*S. laciniata*; † Fl. Gr. viii. tab. 788.  
*S. octangularis*.  
*Picridium vulgare*; † Fl. Gr. viii. tab. 791.  
*Sonchus maritimus*. †  
*S. chondrilloides*. In arvis arenosis Siciliæ, Pers.  
*Chondrilla juncea*. Dry fields and vineyards.  
*Leontodon obovatum*. †  
*Apargia tuberosa*; Fl. Gr. viii. tab. 797.  
*A. fasciculata*, \* Biv.; *A. cichoracea*, Ten. Woods of Mount Etna, particularly dietro S. Niccolo dell' Arena. This species much resembles *A. Alpina*; Stirp. Rar. Man. ii. tab. 2.  
*Hyoseris radiata*. †  
*H. lucida*. †  
*H. scabra*. In Siciliâ, Pers.  
*Picris aculeata*. †  
*Hieracium crinitum*, \*† Sibth.; DeC. Fl. Gr. ii. p. 134.  
*H. lucidum*, \*† Guss.; Ind. Sem. p. 6.  
*Crepis bursifolia*. Common about Palermo.  
*C. leontodontoides*. Woods and shady hedges on Mount Etna.  
*C. taraxacifolia*. †  
*C. aspera*; Fl. Gr. ix. tab. 804. In Siciliâ, Pers.  
*C. triangula*, \* Presl. In Siciliâ; Syst. Veg. iii. p. 634.  
*C. Æthnensis*, \* Presl; Fl. Sic. i. p. 31. præf. In Monte Ætnâ. An mera varietas *C. leontodontoidei*?  
*C. glandulosa*, \*† Guss.; Ind. Sem. p. 4.  
*C. purpurea*, \*† Biv.  
*C. spathulata*, \*† Guss.  
*C. corymbosa*, \* Ten. In Siciliâ; Syst. Veg. iii. p. 636.  
*Tolpis barbata*, Pers.; *Crepis barbata*, Curt.; B. Mag. i. tab. 35.  
Sandy shore near Messina.  
*T. allissima*. †  
*T. quadriaristata*, \*† Biv.; *T. umbellata*, Bert.; Fl. Gr. ix. tab. 810; Syst. Veg. iii. p. 670.  
*Andryala runcinata*, † Pers.; *A. integrifolia*, Linn. In Siciliâ, Pers.  
*Seriola Æthnensis*. Mount Etna, and other mountains in Sicily.



*Seriola Cretensis.* †*S. albicans*,\* Tin. In Siciliâ; Syst. Veg. iii. p. 661.*S. urens.* In Siciliâ, Pers.*S. Alliatæ*,\* Biv. In Ætnæ sylvis, et ad sepes umbrosas; Sic. Plant. Cent. ii. p. 57. tab. 7.*S. glauca*,\*† Tin. Siciliæ indigena, Guss.; Syst. Veg. iii. p. 661.*S. rubescens*,\* Tin. In Siciliâ; Syst. Veg. iii. p. 661.*S. taraxacoides*,\* Lois.; *S. uniflora*, Biv.; Fl. Gall. p. 530. In acervis arenarum regionis apertæ M. Ætnæ, Biv.*Hypochæris minima*, Sibth.; *H. arachnoides*, Biv.; Fl. Gr. ix. tab. 816. In Monte Ætnâ occurrit, Biv.*Catananche cærulea*; † B. Mag. ix. tab. 293.*C. lutea*; Fl. Gr. ix. tab. 821. Damp situations about Catania, Biv.*Cichorium spinosum*; Fl. Gr. ix. tab. 823. In Siciliæ collibus arenosis maritimis, Pers.*C. glabratum*,\* Presl; Fl. Sic. i. p. 32. præf.*Scolymus Hispanicus*; Fl. Gr. ix. tab. 825. Abundant throughout Sicily.*S. grandiflorus.* †*Carthamus lanatus*; † B. Mag. xlvii. tab. 2142.*C. cæruleus*; B. Mag. xlix. tab. 2293.*C. pinnatus.* †*Carlina lanata*; † Fl. Gr. ix. tab. 836.*C. corymbosa*; Fl. Gr. ix. tab. 837.*C. Sicula*,\*† Ten.; Syst. Veg. iii. p. 378.*Atractylis gummifera*, Pers.; *Acarua gummifera*, Wild.; Fl. Gr. ix. tab. 838.*A. cancellata*; † Fl. Gr. ix. tab. 839.*Onopordum Illyricum.* †*Cynara cardunculus*; Fl. Gr. ix. tab. 834.*C. scolymus.* These two species grow wild, in fields and waste places, throughout the island: the common people gather the heads of both sorts, and eat them when boiled; they call them *Carciofu*, or *Carciofalu*.*C. horrida.* †*C. humilis.* †*Carduus pungens.* †*C. giganteus.* †*C. Syriacus*; † Fl. Gr. ix. tab. 831.*C. argyroa*,\* Biv. Palermo, on road-sides and waste ground; Stirp. Rar. Man. i.*C. corymbosus*,\*† Ten.; Syst. Veg. iii. p. 383.*Serratula Bocconi*,\*† Guss.; Ind. Sem. p. 11.*Santolina chamæcyparissus.**S. tomentosa.* †*S. rosmarinifolia.**S. viridis.* †*Athanasia annua*; † B. Mag. xlix. tab. 2276.

## SYNGENESIA SUPERFLUA.

- Artemisia paniculata*. †  
*A. argentea*. †  
*A. camphorata*. †  
*A. Pontica*. †  
*Xeranthemum annuum*. Observed on the south coast of Sicily.  
*X. erectum*, \*† Presl. Is not this only a var. of preceding species?  
*Gnaphalium stœchas*; Fl. Gr. ix. tab. 857. In sandy places not unfrequent.  
*G. angustifolium*. †  
*G. ambiguum*. †  
*Conyza verbascifolia*; Fl. Gr. ix. tab. 864. In Siciliâ, Pers.  
*C. Ægyptiaca*. In Siciliâ, Pers.  
*C. saxatilis*.  
*C. geminiflora*, \*† Ten.; *Phagnalon Tenorii*, Presl; Fl. Gr. ix. tab. 862. Vide Ten. Fl. Neapol.  
*Erigeron Siculum*, Pers.; *Conyza Sicula*, Wild.  
*Senecio leucanthemifolius*, † Pers.; *S. vernus*, Biv.  
*S. Nebrodensis*. In Siciliâ, Pers.  
*S. chrysanthemifolius*.  
*S. delphinifolius*. †  
*S. erraticus*, \*† Bert.; Syst. Veg. iii. p. 559.  
*S. laciniatus*, \*† Bert.; Syst. Veg. iii. p. 559.  
*Cineraria maritima*; Fl. Gr. ix. tab. 871.  
*C. ambigua*, \*† Biv.  
*C. gibbosa*, \*† Guss.; Syst. Veg. iii. p. 547.  
*C. Nebrodensis*, \*† Guss.; *C. candida*, Presl. Sprengel (Syst. Veg. iii. p. 547) gives *C. ambigua*, Biv., a synonym to this plant; but both Gussone and Presl consider them distinct species.  
*Inula odora*.  
*I. montana*. Both these plants are found in the mountains of San Martino, near Palermo, Biv.  
*I. viscosa*. †  
*Doronicum scorpioides*, † Pers.; *D. Columnæ*, Ten.  
*Tussilago fragrans*; B. Mag. xxxiv. tab. 1388.  
*Bellis sylvestris*; B. Mag. li. tab. 2511.  
*B. annua*; B. Mag. xlvii. tab. 2174.  
*Chrysanthemum coronarium*; Fl. Gr. ix. tab. 877.  
*C. Myconis*. Hæc species etiam radio albo variat, Presl.  
*Anacyclus aureus*. †  
*A. clavatus*. †  
*Anthemis punctata*. †  
*A. tomentosa*; Fl. Gr. ix. tab. 883. Found near Catania.  
*A. fuscata*. Propè Catanam et Misilmerim, Biv.  
*A. Austriaca*, † Pers.; *Chamæmelum Triumphetti*, All.; *Anthemis Triumphetti*, Guss.; Fl. Gr. ix. tab. 881.  
*A. montana*.  
*A. Ætnensis*, \* Spreng. In Ætnâ, Schouw. Radius roseus; Syst. Veg. iii. p. 595.

*Anacyclus secundiramea*,\* Biv.; Fl. Gr. ix. tab. 886. In maritimis propè Catanam, à lu Signuri Asciatu; Sic. Plant. Cent. ii. p. 10. tab. 2.

*A. sphacelata*,\*† Presl; *A. mucronulata*, Bert.; Syst. Veg. iii. p. 594.

*Achillea ageratum*.‡

*A. pubescens*;‡ Fl. Gr. ix. tab. 895.

*A. ligustica*; Fl. Gr. ix. tab. 897.

*A. nobilis*.‡

*Bupthalmum maritimum*.

#### SYNGENESIA FRUSTRANEA.

*Centaurea centaurium*.

*C. paniculata*. Bivona gives its locality on Mount Etna.

*C. cineraria*.‡

*C. cinerea*.

*C. splendens*.†

*C. conifera*,‡ Pers.; *Leucea conifera*, DeC.

*C. sonchifolia*.†

*C. Sicula*.

*C. sphærocephala*; B. Mag. lii. tab. 2551. Propè Catanam, Biv.

*C. napifolia*; Fl. Gr. x. tab. 905. In maritimis circà Catanam, Biv.

*C. Salmantica*. Between Misterbianco and La Motta S. Anastasia, Biv.

*C. cichoracea*.†

*C. Crupina*; Fl. Gr. ix. tab. 900. La Motta S. Anastasia, Biv.

#### SYNGENESIA NECESSARIA.

*Calendula arvensis*;† Fl. Gr. x. tab. 920.

*C. officinalis*.

*C. stellata*.†

*C. maritima*,\* Guss.; Ind. Sem. p. 3. In solo mari finitimo haud infrequens planta.

#### SYNGENESIA SEGREGATA.

*Echinops sphærocephalus*; Fl. Gr. x. tab. 923? Frequent on waste ground.

*E. spinosus*.†

#### GYNANDRIA DIANDRIA.

*Orchis coriophora*.‡

*O. longicornu*;‡ B. Mag. xlv. tab. 1944.

*O. pallens*.‡

*O. variegata*. Etna, and the mountains about Palermo, Biv.

*O. acuminata*; B. Mag. xlv. tab. 1932. In Sicilia, Spr., Ortol., et Raf.

*O. papilionacea*. This very beautiful species is not unfrequent in dry pastures.

*O. Sambucina*. Woods, and higher region of Mount Etna, Biv.

*O. palustris*.

*O. ———*, var.  $\beta$ . *laxiflora*, Biv. Moist places near Catania, Biv.

*O. Robertiana*, Pers.; *O. longibracteata*, Biv. In campestribus suc-



- culentis; Panormi dietro S. Francesco di Paola fra li vicu d' Innia di Cannatedda, Biv.
- Orchis saccata*,\*† Ten.; Syst. Veg. iii. p. 684.
- O. undulatifolia*,\* Biv.; *O. tephrosanthos*, Pers.? Fl. Gr. x. tab. 927. Hills near Catania; nella contrada di Pintudattilu. Flowers sweet-scented, pink, or rose-coloured; Sic. Plant. Cent. ii. p. 44. tab. 6.
- O. Brancifortii*,\* Biv.; *O. quadripunctata*, Ten. In montibus Panormitanis. Flores purpurei; radix testiculata; Stirp. Rar. Man. i. tab. 1.
- Ophrys vespifera*, Pers.; *O. lutea*, Biv. Meadows at Catania, Palermo, and other places.
- O. tenthredinifera*; B. Mag. xlv. tab. 1930. In collibus propè Panormum, Catanam, &c., Biv.
- O. Bombylifera*.†
- O. fusca*;† Fl. Gr. x. tab. 930.
- O. Scolopax*.†
- O. disthoma*,\* Biv.; *O. tabanifera*, Pers.? Dry mountain pastures. Near Palermo, soprà S. Maria di Gesu; Sic. Plant. Cent. i. p. 59.
- O. ciliata*,\* Biv. In pascuis montosis propè Panormum. Flores in spicâ laxâ muscas circumvolantes mirè referunt; Sic. Plant. Cent. i. p. 60.
- O. Speculum*,\* Biv. Found at Palermo, dietro S. Francesco di Paola. Petala rosea dorso viridi; nectarii labium maculâ atrosanguineâ lucidâ (*speculo*) notatum; Sic. Plant. Cent. i. p. 61. tab. 3.
- Helleborine cordigera*;† Fl. Gr. x. tab. 932.
- H. lingua*;† Fl. Gr. x. tab. 931.
- H. longipetala*,\*† Ten.; Fl. Nap.

## GYNANDRIA HEXANDRIA.

- Aristolochia Bætica*. In the latomiæ of the Capuchin convent near Syracuse.
- A. longa*.† Sibthorp says the roots are sent from Zante to Italy for medicinal purposes.
- A. rotunda*.
- A. lutea*,\*† Desf.; Syst. Veg. iii. p. 755.

## MONŒCIA MONANDRIA.

- Cynomorium coccineum*. In Siciliâ, Pers.
- Ambrosinia Bassii*.†
- A. maculata*. In Siciliâ, Pers.

## MONŒCIA TRIANDRIA.

- Zea Mays*. Cultivated, and named in Sicily, *Il Granu d' India*, or *Gran' Turcu*. The ears of maize, when half-ripe, are roasted and eaten by the poor people in Sicily: at Naples, likewise, they are in much esteem with the lazzaroni.
- Carex Linkii*. Mount Etna.
- C. gynobasis*. Mountains of S. Martino, Biv.
- C. hispida*, Pers.; *C. echinata*, Desf. According to Presl, the *C.*

*longearistata* of Bivona is var.  $\beta$ . of this species, having three stigmata.

*Carex nervosa*,\*† Desf.; Fl. Atl. ii. p. 337.

MONŒCIA TETRANDRIA.

*Urtica membranacea*.†

*Morus alba*. Originally from Persia: it is now much cultivated for feeding silk-worms, and called in Sicily, *Moru biancu*. Roger I. king of Sicily introduced the art of making silk to Palermo, from Greece: now the principal silk manufactories are established at Catania.

MONŒCIA PENTANDRIA.

*Ambrosia maritima*. In maritimis Messanensibus et Catanensibus, Biv.

*Amaranthus spicatus*.

MONŒCIA POLYANDRIA.

*Poterium polygamum*.†

*P. spinosum*; Fl. Gr. x. tab. 943. Abundant on the sand-hills between Catania and Augusta.

*Juglans regia*. This tree is cultivated.

*Quercus Ilex*. The ilex (*Ischii*) and the cork are frequent in the natural woods in Sicily.

*Q. suber*.

*Q. coccifera*;† Fl. Gr. x. tab. 944.

*Q. Esculus*.†

*Q. Fontanesii*,† Guss. Hæc est *Q. pseudo-suber*, Desf., quæ à *Q. pseudo-subere*, Santi, omninò differt foliis deciduis non perennantibus; Ind. Sem. p. 10.

*Castanea Vesca*. Chestnuts afford the poorer people their chief food in many parts of Sicily; bread, puddings, and polenta are usually made of the flour.

*Platanus orientalis*; Fl. Gr. x. tab. 945.

*Arum dracunculus*; Fl. Gr. x. tab. 946. "Αρον, Diosc. lib. ii. cap. 197, and Theoph. lib. i. cap. 10, secundum Stackhouse.

*A. arisarum*;† Fl. Gr. x. tab. 948.

*A. tenuifolium*; B. Mag. xlix. t. 2282. Plentiful in the honeycomb-like cavities of the limestone on Mount Pellegrino.

MONŒCIA MONADELPHIA.

*Pinus maritima*; Fl. Gr. x. tab. 949. In Sicily, tar, pitch, resin and turpentine (*Terebintina*) are taken from this species; also from several other sorts of pines.

*P. Pinea*. I conclude the stone pine must originally have been introduced from Greece into Sicily and Italy, as I never saw it in a natural wood in either of those countries.

*Cupressus sempervirens*. In Sicilian *Cipressu*. The stone pine and the cypress are planted in Sicily near villas; also in gardens and cemeteries.

*Croton tinctorium*;† Fl. Gr. x. tab. 950.

*Ricinus communis*; Fl. Gr. x. tab. 952; B. Mag. xlviii. tab. 2209.  
The *Palma Christi*, originally from India, is cultivated and attains a very large size in Sicily. Much oil (*Oliu di Ricinu*) is made from its seeds.

*Momordica Elaterium*; Fl. Gr. x. tab. 939; B. Mag. xlv. tab. 1914.  
This is an abundant plant in clayey soils on the south coast of Sicily, chiefly at Terra Nuova, Alicata, Girgenti, and Sciacca; the elasticity of the capsules is curious.

*Cucurbita lagenaria*. This is a cultivated species, and much used in cooking; it is a well-flavoured gourd when eaten young; it affords a delicious dish if stuffed with forced-meat and fried in oil; a good soup is made with it; indeed, nearly as good as that made with the gourd called *vegetable marrow*.

*C. Pepo*. In Sicilian it is called *Cucumeru*. Every variety of gourd is cultivated.

*C. citrullus*. Cultivated, and named *Cetrivulu*: it is most delicious and refreshing in hot weather.

*Cucumis Melo*. Several kinds are grown with the preceding species.

*C. sativus*.

#### MONŒCIA GYNANDRIA.

*Andrachne Telephioides*; † Fl. Gr. x. tab. 953.

#### DICŒCIA DIANDRIA.

*Salix Babylonica*. This ornamental tree, a native of the East, is cultivated in Sicily; it is doubtless the species alluded to in the 137th Psalm, where it is said, "We hanged our harps upon the *willows* in the midst thereof." It is generally very late in the year before it loses its leaves.

*S. pedicellata*. I have a Sicilian specimen, given me by Sig. Gasparini, which much resembles *S. aquatica*.

#### DICŒCIA TRIANDRIA.

*Osyris alba*; † Fl. Gr. x. tab. 954. It is now called in modern Greece *πλευριτόχορπο*, a decoction of the root being taken in pleurisies, Sibth.

*Ficus Carica*. Many varieties of the fig (*Ficu*) are cultivated in Sicily; the dried fruit is exported. The fig-tree springs up in every soil, but it prefers a somewhat calcareous and rocky ground.

*F. carica*, var. *β. sylvestris*. The wild fig-tree (*Ficu salvaticu*, o *Caprificu*) grows on old walls, in the crevices of rocks, &c. It is evidently quite indigenous.

#### DICŒCIA PENTANDRIA.

*Pistacia trifolia*. In Siciliâ, Pers.

*P. vera*. In Sicilian *Il Pistacchiu*. The nuts are used in confectionary.

*P. Lentiscus*; B. Mag. xlv. tab. 1967. In Sicily this shrub, named *il Lentischiu*, o *Lestincu*, is most abundant on bare hills.

*Cannabis sativa* (*Canape*, Sic.).

*Ceratonia siliqua*. In Sicily a spirit and a syrup are made from its



sweet pods. The caroub-tree is handsome; the largest I noticed were near Augusta, and at Syracuse.

## DICECIA HEXANDRIA.

*Smilax aspera*; Fl. Gr. x. tab. 959.

*S.* ———, var. *β. auriculata*. This is less common than the preceding plant; they are found creeping up hedges, trees, &c., in most parts of the isle.

*Phoenix dactylifera*. Some of the antique Sicilian coins bear a representation of a palm-tree. This tree was formerly abundant in Sicily: it is this, the American aloe, and the Indian fig, which give to the Sicilian scenery so beautiful and singular an effect.

## DICECIA MONADELPHIA.

*Juniperus Sabina*. †

*J. oxycedrus*. †

*J. hemisphærica*,\* Presl. In alpestribus Siciliæ; Syst. Veg. iii. p. 909.

*Ephedra distachya*. †

*E. altissima*. †

*Ruscus hypophyllum*; † B. Mag. xlvi. tab. 2049.

## CATALOGUE OF BRITISH PLANTS GROWING NATURALLY IN SICILY.

*Acer campestre*.

*A. pseudoplatanus*.

*Æsculus hippocastanum*.

*Agrostis alba*. †

*A. stolonifera*.

*Aira cæspitosa*. †

*A. caryophyllea*.

*Alisma Damasonium*. †

*Allium ampeloprasum*. †

*Alyssum sativum*.

*Anemone Apennina*.

*Anethum fœniculum*.

*Angelica sylvestris*. †

*Anthemis arvensis*. †

*A. maritima*. †

*Anthoxanthum odoratum*.

*Anthyllis vulneraria*. †

*Apargia autumnalis*. †

*A. hispida*. †

*Apium graveolens*.

*Aquilegia vulgaris*.

*Arabis thaliana*.

*A. turrita*. †

*Arbutus Unedo*.

*Arenaria marina*.

*A. rubra*.

*Arenaria serpyllifolia*.

*A. verna*.

*Aristolochia clematitis*. †

*Arundo calamagrostis*. †

*A. epigejos*.

*A. phragmites*.

*Asparagus officinalis*.

*Asperula cynanchica*. †

*Asperugo procumbens*.

*Atriplex portulacoides*. †

*Atropa Belladonna*.

*Avena pratensis*. †

*Bartsia viscosa*.

*Bellis perennis*.

*Berberis vulgaris*.

*Beta maritima*.

*Betula alba*.

*Bidens tripartita*. †

*Borago officinalis*.

*Brassica campestris*.

*B. oleracea*.

*Briza minor*.

*Bromus diandrus*.

*B. secalinus*. †

*B. sylvaticus*.

*Bryonia dioica*.

- Bunium bulbocastanum.*  
*Bupleurum odontites.* ‡  
*B. rotundifolium.* †  
*B. tenuissimum.* †  
*Buxus sempervirens.*  
*Caltha palustris.*  
*Campanula hybrida.*  
*C. rotundifolia.*  
*Cardamine amara.* ‡  
*C. hirsuta.*  
*Carduus nutans.* †  
*C. tenuiflorus.* †  
*Carex divisa.*  
*C. divulsa.*  
*C. pendula.*  
*C. præcox.*  
*C. remota.* †  
*C. vulpina.*  
*Centaurea calcitrapa.*  
*C. solstitialis.*  
*Cerastium arvense.*  
*C. vulgatum.*  
*Chærophyllum sylvestre.* †  
*Cheiranthus fruticulosus.*  
*C. incanus.*  
*C. sinuatus.*  
*Chelidonium majus.*  
*Chenopodium Bonus Henricus.*  
*C. maritimum.*  
*C. murale.*  
*Chlora perfoliata.*  
*Chrysanthemum segetum.*  
*Cistus guttatus.* †  
*C. Helianthemum.*  
*Clematis vitalba.*  
*Cochlearia coronopus.*  
*Convolvulus arvensis.*  
*C. sepium.* †  
*C. soldanella.* ‡  
*Corylus avellana.*  
*Cotyledon umbilicus.*  
*Crithmum maritimum.*  
*Crocus sativus.*  
*Cynosurus cristatus.*  
*C. echinatus.*  
*Daphne Laureola.*  
*Datura Stramonium.*  
*Delphinium Consolida.* ‡  
*Dianthus proliifer.*
- Draba aizoides.*  
*D. muralis.*  
*D. verna.*  
*Echinophora spinosa.*  
*Epilobium tetragonum.*  
*Erodium cicutarium.*  
*E. moschatum.*  
*Eryngium maritimum.*  
*Erysimum alliaria.* ‡  
*E. Barbarea.* ‡  
*E. cheiranthoides.*  
*E. officinale.* ‡  
*E. orientale.*  
*Euphorbia Characias.*  
*E. Paralias.*  
*Fagus sylvatica.*  
*Festuca elatior.*  
*F. ovina.* †  
*F. pratensis.*  
*F. uniglumis.*  
*Fragaria vesca.*  
*Frankenia lævis.*  
*F. pulverulenta.*  
*Fritillaria Meleagris.*  
*Fumaria capreolata.*  
*F. officinalis.*  
*F. parviflora.* ‡  
*Galium anglicum.*  
*G. aparine.*  
*G. tricornis.*  
*Geranium lucidum.*  
*G. pyrenaicum.*  
*G. sanguineum.*  
*Glaucium luteum.*  
*G. violaceum.*  
*Gnaphalium germanicum.*  
*G. luteo-album.* †  
*Hedera Helix.*  
*Helleborus viridis.*  
*Herniaria glabra.*  
*Hieracium pilosella.* †  
*Holostium umbellatum.*  
*Hordeum maritimum.* †  
*H. murinum.*  
*Hyoscyamus niger.*  
*Hypericum perforatum.*  
*Hypochæris radicata.* ‡  
*Ilex aquifolium.*  
*Inula crithmoides.*

- Inula Helenium.*†  
*Iris foetidissima.*†  
*I. pseudacorus.*  
*Isatis tinctoria.*‡  
*Jasione montana.*†  
*Juncus acutus.*  
*J. bufonius.*  
*J. maritimus.*  
*Lathyrus latifolius.*  
*L. Nissolia.*  
*L. pratensis.*  
*L. sylvestris.*  
*Linum usitatissimum.*  
*Lithospermum purpureo-cæruleum.*  
*Lonicera caprifolium.*‡  
*L. xylosteum.*  
*Lychnis dioica.*†  
*Lysimachia nemorum.*  
*Lythrum Salicaria.*  
*Marrubium vulgare.*†  
*Matricaria chamomilla.*  
*Medicago falcata.*†  
*M. lupulina.*†  
*M. maculata.*†  
*M. muricata.*  
*Melittis grandiflora.*  
*Mentha hirsuta.*  
*M. pulegium.*†  
*M. sylvestris.*  
*Mespilus germanica.*  
*Milium lendigerum.*  
*Myosurus minimus.*†  
*Nuphar lutea.*  
*Nymphæa alba.*  
*Œnanthe phellandrium.*†  
*Œnothera biennis.*  
*Onopordum acanthium.*  
*Ophrys apifera.*  
*O. aranifera.*  
*O. spiralis.*  
*Ornithogalum nutans.*  
*O. umbellatum.*‡  
*Orchis maculata.*  
*O. pyramidalis.*  
*Orobanche major.*  
*O. minor.*  
*O. ramosa.*  
*Oxalis corniculata.*  
*Panicum crus galli.*†  
*P. dactylon.*  
*Papaver argemone.*  
*P. hybridum.*  
*P. Rhæas.*  
*P. somniferum.*  
*Parietaria officinalis.*  
*Pastinaca sativa.*  
*Phalaris Canariensis.*  
*Plantago coronopus.*  
*P. major.*  
*P. maritima.*†  
*Poa alpina.*†  
*P. bulbosa.*  
*P. distans.*†  
*P. fluitans.*  
*P. trivialis.*  
*Polygala vulgaris.*  
*Polygonum aviculare.*  
*P. Convolvulus.*  
*Potentilla Fragariastrum.*  
*P. reptans.*  
*Poterium Sanguisorba.*  
*Prunus domestica.*  
*P. spinosa.*  
*Pyrus communis.*  
*P. domestica.*  
*P. Malus.*  
*Quercus Robur.*  
*Ranunculus acris.*  
*R. aquatilis.*  
*R. arvensis.*  
*R. bulbosus.*†  
*R. ficaria.*  
*R. hederaceus.*  
*R. repens.*  
*R. sceleratus.*  
*Reseda lutea.*  
*R. luteola.*  
*Rhamnus catharticus.*†  
*Rosa canina.*†  
*R. rubiginosa.*†  
*Ruscus aculeatus.*  
*Sagina procumbens.*  
*S. erecta.*  
*Salicornia herbacea.*  
*S. fruticosa.*  
*Salix aquatica.*  
*Santolina maritima.*†



Satyrrium hircinum.	Thlaspi Bursa-pastoris.
Saxifraga tridactylites.	T. campestre.
Scilla autumnalis.†	T. perfoliatum.†
S. bifolia.†	Thymus Acynos.
Scirpus lacustris.	T. Nepeta.
S. maritimus.	T. Serpyllum.
Scleranthus annuus.†	Tillæa muscosa.
Sedum album.†	Tordylium maximum.†
S. acre.	Trifolium fragiferum.
S. reflexum.	T. glomeratum.‡
Senecio viscosus.	T. maritimum.†
S. vulgaris	T. ochroleucum.†
Silene conica.	T. procumbens.
Sinapis alba.†	T. repens.
S. arvensis.†	T. scabrum.
S. nigra.	T. suffocatum.†
Sison amomum.†	Turritis glabra.‡
S. inundatum.	Urtica pilulifera.
Sisymbrium Irio.†	U. urens.
S. Nasturtium.‡	U. dioica.
S. Sophia.	Utricularia vulgaris.
Smyrniium Olusatrum.	Valeriana rubra.
Solanum Dulcamara.	Vella annua.†
S. nigrum.	Verbena officinalis.
Spergula arvensis.	Veronica anagallis.
S. subulata.	V. arvensis.
Staphylea pinnata.	V. Beccabunga.
Statice Limonium.	V. hederifolia.
Stellaria media.	Vicia lathyroides.†
Stipa pennata.†	Vinca major.
Symphytum officinale.	V. minor.
Tamus communis.	Viola hirta.
Tanacetum vulgare.	V. odorata.
Teucrium Chamædrys.†	V. tricolor.
T. Scorodonia.	Viscum album.
Thlaspi arvense.	

*Postscript.*—Since the preceding Catalogue was written, a very interesting notice—"On the Vegetation of Etna"—has appeared in the first volume of Sir W. J. Hooker's 'Companion to the Botanical Magazine,' pp. 49 and 90, and which is extracted from 'Ueber die Vegetation am Ätna, von Dr. R. A. Philippi,' published in the 'Linnæa,' vol. vii. p. 727. From this notice, I was glad to find that Dr. Philippi strongly confirms my accounts in most particulars, and that he gives nearly the same description of the Sicilian vegetation as I have more briefly done. But it may be as well, in this place, to make the following remarks on some of the observations therein contained:—

*First.* Etna is "situated in lat. 37° 44', and reaching to a height of 10,212 *Paris* feet, according to the measurement of Dr. Philippi,"

—whereas Captain Smyth, in his late survey of Sicily, which I am induced to consider the more accurate of the two, places the summit of that mountain in N. lat.  $37^{\circ} 43' 31''$  exactly, and he gives as its total height, 10,874 *English* feet.

*Secondly.* It is stated, that, at “an elevation of 3500 (I conclude *Paris*) feet, the cultivation of the vine ceases.” This elevation is clearly much too high. The vine on Etna, I should say, was *not* cultivated above 2600 *English* feet. And whether even a few poor vineyards do occur at *that* altitude, I am very doubtful; for the last vineyards I observed in ascending the mountain were near San Nicolo dell' Arena, a convent distant about 13 miles from Catania, on the S.E. side, and at an elevation of 2449 *English* feet above the sea, according to Captain Smyth's survey. Indeed Dr. Presl did not notice this fact; because he says of the vine in Sicily, “ubique ab oris maris usque ad 2000 pedes culta.” (*Vide Fl. Sic. i. p. 204.*)

*Thirdly.* “The limits of corn” are given at 1500 (*Paris?*) feet “higher up on Etna than on the Alps,” and which is thus comparatively stated (*Comp. Bot. Mag. p. 94*):—

	S. side of the Alps.	Etna.	Difference.
Corn . . . . .	600 . . . . .	1900 . . . . .	1300

But this, on consideration, will be found to be erroneous, and which the following instance (among many others) will suffice to prove. At Courmayeur in the valley of Entrèves in Piedmont, at the *south* base of Mont Blanc, different sorts of corn are cultivated; indeed I noticed corn growing in August, several years ago, two or three hundred feet at least upon the sides of mountains above Courmayeur. Now, according to M. Ebel, that town itself stands 3750 (*Paris?*) feet above the Mediterranean; consequently, on the *south* side of the Alps corn is cultivated, at all events, at 4000 feet. Again, it appears that the above error has arisen from not assuming some line of elevation for the *mean base* of the Alps above the sea; whereas the altitude of 1900 feet upon Etna evidently includes the height from the *level* of the Mediterranean, since that mountain rises immediately from the sea; and, the Alps being far inland, their different bases in the numerous valleys vary greatly, though these bases are all considerably elevated above the sea. Corn, then, is cultivated on the *south* side of the Alps, at full *double* the height at which it is upon Etna; yet there is no doubt but it could be cultivated at a very much higher point than 1900 feet on that more southern mountain, if there was only a sufficient and proper soil, instead of the sand, lava, and volcanic ashes, which now there so greatly limit the culture of corn.

*Fourthly.* At page 95 of the ‘Companion’ the extract says, “Between the plants of the foot of *Etna* and that of the Alps there is no resemblance; a greater similarity exists between it and the Canary Islands; as, out of the 186 plants which Von Buch\* found on

\* See on the Flora of the Canaries, ‘*Déscrip. Phys. des Iles Canaries,*

the lower region of Teneriffe, 54 are natives of *Sicily*" [*sed quære, is not Etna only here meant?*] "also. This proportionably large resemblance is owing to the circumstance that many of the plants now found growing wild on the Canary Islands have been introduced from Europe by *cultivation*." Yet I should refer this resemblance to the *like* kinds of *soils* and *strata*, rather than to any introduction by cultivation, as its true cause; because, Etna and Teneriffe being both *volcanic* mountains, it is therefore most natural that many species of plants should be *common* to both those mountains, and should be equally *indigenous* in both those localities, which almost entirely consist of lava and volcanic beds. For a full and a comparative account of the plants of the Canary Isles, I will refer the reader to the 'Phytographia Canariensis,' by MM. Barker Webb and Sabin Berthelot.

*Fifthly.* From Dr. Philippi's memoir it is observed, at page 52 'Comp.,' "not a single *Sempervivum* grows in Sicily." On the contrary, the *Sempervivum tenuifolium* of Smith (in Sibthorp's Fl. Gr. Prod.) is, according to Dr. Gussone, not uncommon near Palermo, Catania, and elsewhere in the island.

*Sixthly.* "At Palermo" (continues that extract at p. 49) "the mean temperature is  $63\frac{1}{2}^{\circ}$  of Fahr.\*, or  $14^{\circ}$  of Reaumur. The greatest degree of heat during twenty years was  $101\frac{3}{4}^{\circ}$  Fahr. ( $31^{\circ}$  Reaumur), and the extreme cold during the same period,  $33\frac{5}{8}^{\circ}$  Fahr. nearly, or  $+0.9^{\circ}$  of Reaumur." But it appears more correctly, from the statements of Prof. Scina in his 'Topografia di Palermo,' that the mean annual temperature (in Palermo) was  $14.4^{\circ}$  Reaumur =  $64^{\circ}$  Fahr. nearly. The greatest degree of heat during twenty years did not exceed  $33.3^{\circ}$  Reaumur =  $106\frac{1}{2}^{\circ}$  Fahr. nearly; and the extreme cold for the same period,  $+0.2^{\circ}$  Reaumur =  $32\frac{1}{2}^{\circ}$  Fahr. nearly.

The comparative and geographical botanist will find many of the Sicilian plants indigenous in Asia Minor and in the Morea, in the Pyrenees and in Spain, as he will perceive on reference to the late Prof. Don's List of Plants given in Mr. Fellows's 'Account of a Second Expedition in Asia Minor†;' to 'Botanique de l'Expéd. Scien. de Morée,' par MM. Bory et Chaubard, tome iii.; to Mr. G. Bentham's 'Catalogue des Plantes Indigènes des Pyrénées;' to Mr. P. B. Webb's 'Iter Hispaniense,' Paris, 1838, and 'Otia Hispanica,' now in the course of publication: also M. Agardh's 'Algæ of the Mediterranean,' published this year, will render considerable assistance to the algologist in the south of Europe.

par L. von Buch, traduite par C. Boulanger,' p. 116, Paris, 1836; and likewise Von Buch's original Essay, with lists of the Plants, in 'Abhandlungen der Königl. Akadem. in Berlin,' 1817.—J. H.

\* The corresponding degrees on Fahrenheit's scale are not exactly computed in the Comp. Bot. Mag. i. p. 49.

† And also inserted in vol. vii. of this Journal, p. 454.—ED.

London, June 16, 1842.



XLII.—*Observations on a new Group, Genus and Subgenus, of Freshwater Confervæ, with descriptions of Species mostly new.* By ARTHUR HILL HASSALL, Esq., M.R.C.S.L., Corresponding Member of the Dublin Natural History Society.

[Continued from p. 47.]

VESICULASPERMÆ.

CHAR. Filaments simple, slightly tapering, usually attached, not conjugating, in their young condition cylindrical, articulated; extremities lanceolate; spores usually either oval or spherical, each contained in a separate enlarged cell not unfrequently of the same form as the spore.

My first impression with respect to the species contained in this group was, that it would be sufficient to regard them as constituting a new genus; subsequent reflection and examination have however convinced me that they should hold a higher than a generic station, and that it would be more in accordance with strict propriety to consider them as forming a separate group.

In addition to the distinctive characters indicated in the definition given above, viz. the tapering of the filaments, and the production of spores without union of the filaments, which spores are usually contained in inflated cells, the *Vesiculaspermæ* are distinguished by other, though somewhat less obvious not less important characteristics. The filaments are of a firmer texture than other freshwater *Confervæ*, they possess comparatively but little flexibility, are not mucous, and consequently do not exhibit that glossy appearance presented by so many *Confervæ* when removed from the water, and which they retain when dried upon paper, in all which particulars they stand in marked opposition to that numerous and important division of the freshwater *Confervæ*, the *Conjugatæ* of Vaucher, which have been recently denominated by M. Decaisne, *Synsporées*; in all the species of which division the filaments are flexuous, mucous and shining in the highest degree; in these too the filaments never taper, but are always exactly and equally cylindrical, and the spores, with the four exceptions alluded to in the observations already published on the genera *Zygnema* and *Mougeotia*, are invariably formed by the admixture and union of the contents of two cells of different filaments. Moreover the joints differ in the two groups: in the *Vesiculaspermæ* they are strongly marked, and when dried become contracted and dark-coloured; while in the *Synspores* they are faintly indicated, and in dried specimens are often with difficulty discoverable.

On a careful examination, therefore, of the many points of difference here enumerated between the Confervæ which I denominate *Vesiculaspermæ* and the *Conjugatæ*, there are but few, I think, who would be inclined to question the propriety of retaining them in separate groups. The differences are too great to admit of their holding merely a generic rank. The naturalness of the genera *Zygnema*, *Mougeotia* and *Tyndaridea* is now generally admitted, although these pass through certain species one into the other, as already pointed out in a previous paper, and are all allied by family resemblances, such as the extreme mucosity and conjugation of the filaments; but how wide is the interval between any of these and the Confervæ composing the group of Vesiculasperms!

There remains now but one genus of freshwater Confervæ, amongst those with simple unbranched filaments, with which to compare the *Vesiculaspermæ*, and that is the genus *Sphæroplea*. We have here the delicate structure and highly mucous condition of the filaments so obvious in the *Conjugatæ*; but we have likewise the tapering of the filaments equally characteristic of the *Vesiculaspermæ*, and also the formation of spores without union of the filaments. The genus *Sphæroplea* then, of which I shall speak more fully in a future paper, holds in my opinion a station intermediate between the groups *Vesiculaspermæ* and *Synsporæ*.

The spores in the different species of the group *Vesiculaspermæ* I conceive to be produced in the same manner as in the true species of *Zygnema* referred to in the preceding paper as producing spores without union of the filaments, that is, by the intermingling of the contents of two contiguous cells *in the same filament*, the one containing in all probability fertilizing, the other fertilizable material; this commingling being generally and perhaps always accompanied by the inflation of the receiving cell, the primary form of which is invariably more or less ovate, and the giving cell being constantly placed in communication with the narrow end of the ovate inflated cell.

When a number of inflated cells occur in the same filament, it is a rule that the larger ends of these cells should always point in the same direction. [This union of the contents of two separate cells does not generally take place in so far as I have yet been able to observe in the branched species, although I have ascertained beyond doubt that it does so in one instance, viz. in *Bulbochæte setigera*, the union being followed, as in the other cases, by the inflation of the receiving cell and the formation of a sporaceous mass, whether a true spore or not I am unable to say. Through the genus *Bulbochæte*,

therefore, there is a natural transition from the simple articulated Confervæ to the branched articulated species, as will be hereafter more fully shown. The affinities of this genus have not hitherto been at all understood. M. Decaisne has likewise observed the passage of the contents of one cell to those of a neighbouring cell in *Bulbochæte setigera*, but does not draw the inference from it which I have done.]

The facts in favour of this view of the reproduction of the group are the same as those mentioned in reference to the *Zygnemata* already alluded to, viz. the non-union of the filaments, and the disposition of spores and empty cells, the spores in most of the species of the genus being solitary and lodged in the inflated cells. In some species however inflated cells, amounting to five or six in number, sometimes occur in juxtaposition, and this would appear at first sight opposed to the view adopted; and did each inflated cell contain a perfect spore, this one fact would be altogether irreconcilable with it; but I am of opinion that many do not, which opinion is supported by the circumstance, that in a variety or condition of *Zygnema porticale* which I have recently met with, the filaments of which do not conjugate but still produce seeds, many of the *inflated* cells do not contain spores, as may be plainly seen, owing to the transparency of the filaments.

It is at once apparent that the mode of reproduction just indicated does not differ essentially from that first made known by Vaucher with reference to the *Conjugatæ*, and especially in respect to those most interesting species which I have described as producing true spores without union of the filaments, nor from that of the *Sphæropleæ*. In all these it is virtually the same, and to these groups I believe all the known species of true articulated freshwater Confervæ with simple filaments may be referred, excepting only *Conferva mucosa* and *C. punctata*. They are all perpetuated by means of true spores, these spores being formed in all cases alike, by the union and intermingling of the contents of two distinct cells placed either in the same or different filaments.

This opinion, which, being founded on careful and long-continued observation, I trust will stand the test of innovating time, by which the value of all things must finally be proved, is now for the first time promulgated. It was, of course, known that the spores of the *Conjugatæ* were produced in this way, but it has not, so far as I can learn, been even hinted that the same phænomenon was applicable to all freshwater Confervæ with simple filaments, exclusive of the two species mentioned above.

The discovery of this *identity* in the mode of reproduction



of the classes of Confervæ referred to leads necessarily to some general, and it appears to me not unimportant reflections.

Thus, first, it furnishes evidence amounting to demonstration of the intimate and general connexion which subsists between the greater number of the articulated Confervæ with simple filaments; and second, it throws much light upon the often-canvassed and much-disputed subject of the animality of the conjugating genera. It proves, since in reality a conjugation is necessary to the formation of every true spore, that all the Confervæ stand upon the same footing as regards their animal nature, and that if those species which exhibit the curious phænomena of conjugation are really animal, so are all the other Confervæ mentioned; that if these should ever at any subsequent period be removed from the vegetable kingdom to the animal, so ought as a *sequitur* all the other Confervæ alluded to, the *Vesiculaspermæ* and the *Sphæropleæ*.

But it appears to me that the facts thus disclosed, so far from adding weight to the arguments of those who would regard the *Conjugatæ* as animal productions, rightly interpreted, tend merely to prove the existence of sexes in the Confervæ, as have been proved by Vaucher to exist in the genus *Vaucheria*, a class of productions nearly related to the Confervæ; and that thus an analogy is established between the lower Confervæ and the higher phanerogamic plants, between which and some of the lower animal tribes a further analogy may be traced.

For my own part I trouble myself but little with the disputes about the boundaries of the two great divisions of the organized world, which forcibly remind me of the search carried on by ancient philosophers for days and years after the much-desired but imaginary and poetical philosopher's stone endowed with such all-pervading influence, or the equally fruitless inquiry after perpetual motion, or any of the other wild chimeras to which the minds of men have from time to time been given. It is my belief that no such rigid boundary exists, for in living nature there are no abrupt unsightly chasms; all is uniformity, order, design and transition.

I would now mention one fact which would appear to show that in the composition of the Confervæ there is something of the animal. When a number of Confervæ have been crowded together in a bottle for two or three days, they emit on their removal what appears to my power of smell to be a strongly animal and offensive odour. A similar offensive smell is emitted by some marine sponges in a state of decay, and as I have more than once noticed, by the freshwater sponge.

That the elliptical, spheroidal or ovate bodies here denominated spores are really the organisms by which the species is perpetuated, one filament proceeding from each, there cannot in my estimation be the shadow of a doubt. They resemble those of the *Conjugatæ* in size, colour and organization, each spore being invested with one, and according to Meyen two or three distinct envelopes; and the germination of these has been witnessed in more than one species by Vaucher, whose veracity and acuteness of observation cannot be doubted for a moment.

In the statement advanced by the younger Agardh, of the disintegration of the usually elliptical or spherical bodies regarded as spores by Vaucher into Zoosperms, and the perpetuation of the species by means of these, I must confess my utter want of faith, both as regards the *Conjugatæ* as well as all other freshwater Confervæ with simple unbranched filaments, appearing to me, as it does, opposed alike to strongly supported facts and to reason, independent of observation. M. Agardh thus states his views respecting the reproduction of a *Conjugata* (the species is not indicated), which he applies generally, not merely to the *Conjugatæ* but to all other Confervæ; and this not from an extended examination of many species, but from an investigation of three only, *Conferva ærea*, *C. zonata*, and *C. crispata*.

“ During the conjunction of a *Conjugata* one of the filaments is always giving, the other always receiving. The spires of the giving filament first become confused, and it is not until after the entrance of the matter of that filament that they become irregular in the other, and then the two masses become confounded together to form the elliptical or spheroidal bodies. The globules of which the spires are composed do not clear themselves the one from the other during the slow emanation of the matter from the giving filament, and no trace of other motion is observed amongst them. On the contrary, it is in the elliptical body constituted by the mingled contents of two joints that I believe to have recognized a phenomenon of locomotion analogous to that described previously in reference to *Conferva ærea*. After many fruitless searches, made for the purpose of seeing the elliptical body develop itself into a new filament, as Vaucher has described, I clearly saw them, on the contrary, dissolve into numerous sporules endowed with a very rapid motion. Apart from the phenomenon of union of the filaments which distinguishes the *Conjugatæ* from all other Algæ, the only peculiarity in their propagation is, that the elliptical bodies from which the sporules

proceed remain often many months without any change in them, while *they dissolve IMMEDIATELY in the true Confervæ.*"

I can affirm, without fear of error, that the statement contained in the last paragraph, so far as any species of Freshwater Confervæ with simple filaments is concerned, is wholly destitute of foundation. The elliptical bodies, which I regard as the true spores, remain in all the species of the group *Vesiculaspermæ* as long in a quiescent state as they do in the *Conjugatæ*; and what good reason, may I ask, could be assigned why they should not, seeing that they are organized alike in both?

M. Agardh suggests the questions, what may be the purpose served in the œconomy of the plant by this motion of zoospores? and how is it carried on? Preparatory to requiring the solution of these questions, I should wish to know the exact manner in which the investing membranes of the spores are disposed of, prior to the escape of the numerous zoospores which each of the elliptical or spheroidal bodies are said by the younger Agardh to furnish, by their disintegration.

In a recent memoir on the classification of the Algæ, published in the 'Annales des Sciences Naturelles' for May 1842, M. J. Decaisne, who differs in many points from Agardh, relates an additional fact, which stands opposed to Agardh's observations, on the separation of the elliptical or spheroidal bodies of the *Conjugatæ* into numerous zoospores. "On pressing out," says M. Decaisne, "the contents of one of these when in a mature condition, and examining them, no trace of any bodies can be detected from which it might be supposed that the zoospores proceeded, the entire contents consisting of globules of an oleaginous appearance, and of air, of different volumes, mixed up with a jelly-like turbid fluid." Upon the subject of the motion of the zoospores, M. Decaisne thus expresses himself:—

"I must declare that I have never been so happy as to witness in the freshwater Confervæ either the escape of the corpuscles by the displacement of their fibres, or the production, on the surface of the same plants, of a papilla perforated by means of the reiterated shock of the reproductive bodies. The membrane of the Confervæ, like that of the Algæ in general, has always appeared to me smooth, and destitute, even to a very high power, of all filamentous organization before its disorganization.

"My opinion, therefore, differs from that of Agardh on the subject of the zoospores properly so called. These corpuscles,



when they present a small transparent prolongation, either straight or slightly curved, do not move it at all; but it happens that, following the side by which they present themselves to the eyes of the observer, this prolongation is visible or it is not. It is necessary, in order to perceive it, that the corpuscles be in profile; in that position it is easy to assure oneself that the prolongation or beak does not make any movement."

My own observations, so far as the freshwater *Confervæ* with simple unbranched filaments are concerned, accord entirely with those of M. Decaisne; but in another class of *Confervæ*, upon which I hope shortly to prepare some observations, I have without doubt frequently seen the perforated papilla, as well as, I believe, though not satisfactorily, the remarkable motion of the zoospores.

M. Decaisne, in the memoir already alluded to, likewise combats the opinion entertained by Agardh, of the existence of two forms of reproductive bodies in some of the genera composing the class (now fast losing its former importance) of Zoospores, for the one of which the term zoospore is especially reserved; this being the small rostrated body endowed with a lively motion, of which many, according to Agardh and M. Decaisne, may be contained in a single cell of *Confervæ*; and the other the much larger spheroidal or elliptical body, resulting often, as in the *Conjugatæ*, from a union and concentration of the contents of two distinct cells. "If, as it is advanced," observes M. Decaisne, "the zoospores and the spherical globules develop themselves in the same manner by the production of filaments, by their growth or extension, it is evident that they present, at a determinate period of their life, specific characters perfectly distinct, for the tubes proceeding from the spores should have a calibre much more considerable than those furnished by the zoospores. It appears to me, therefore, impossible that the same plant can give birth by its germination to two beings specifically different, if it is admitted in all cases that the length and diameter of the cells present, for each particular species, characters constant at a given period. Moreover, it is necessary to suppose that the filaments proceeding from the zoospores enjoy a power of development much greater than the others, to attain in one day the same diameter. The physiologists who have admitted this double mode of reproduction are in general contented to say that the zoospores develop themselves into filaments like to the parent plant; but this has not been, that I am aware, represented in any of their works; while, on the contrary, we there find described and figured in detail the series of deve-

lopments of the external corpuscles (spores or seminules) resulting from a concentration of the green matter; and for the purpose of establishing the series of developments of zoo-spores and of spores properly so called, they have represented, it appears to me, these bodies of very different sizes. They have amplified the first and diminished the second in such a manner as to present them of nearly the same volume. I think that I am able, in support of my opinion, to refer to the text and the figures of the *Mémoires* of MM. Agardh and Morren inserted in this work."

"The first of these learned men appears, indeed, to have comprehended the difficulty of explaining the development of two sorts of reproductive bodies, since he admits in certain cases the disintegration of spores into numerous sporules endowed with a very rapid movement, that is to say, into zoo-spores."

To the group *Vesiculaspermæ* are to be referred all the true *Confervæ*; but before admitting any species as such, it is necessary that it should undergo a rigorous examination, for we find placed among the *Confervæ* proper many species having no relation whatever with those near to which they are located, but are referable to some other of the genera, belonging to other groups already established. Thus *Conferva alpina*, *C. purpurascens*, *C. zonata*, *C. ericetorum*, *C. mucosa* and *C. punctata*, are placed by Agardh the elder and Harvey amongst the *Confervæ* properly so called. The first two are nevertheless *Conjugatæ*, belonging to the genus *Mougeotia*; the third a *Sphæroplea*; and the fourth ought, in my estimation, to be referred to the branched species of *Confervæ*; while *C. mucosa* and *C. punctata* form the types of a distinct genus.

I have been so fortunate as to discover the exact characters presented by some of the species when in a state of reproduction, which have been correctly considered as true *Confervæ*; and so different is the appearance of these, when in that state, that considerable difficulty is experienced in recognizing them, by the descriptions of their discoverers, for the species, of which they intended to convey accurate definitions. Nevertheless, the characters furnished by species in a state of reproduction are almost the only ones to be depended upon as of specific importance. These species are, *Prolifera composita* of Vaucher, *C. vesicata* of Müller\*, and *C. bombycina*

\* M. Decaisne appears to have seen the spores in this species, and to have understood the mode of their formation, viz. by the intermingling of the contents of two adjacent cells in the same filament, and hence was induced to place it amongst the *Synspores*, overlooking the many important points no-

(*C. sordida* of Roth). I also refer unhesitatingly to the *Vesiculaspermæ* the following species, with the reproductive characters of which, in detail, I am less fully acquainted, but still sufficiently so to enable me to affirm, without doubt or misgiving, that their proper station is with the group of *Confervæ* which we have been considering; *Conferva fontinalis*, *C. Candollii*, *C. Borissii*, and *C. tumidula* of 'English Botany,' all of which have been erroneously regarded by Harvey as varieties of *Conferva vesicata*. *Conferva tumidula* was first introduced into 'English Botany' under the name of *Conferva inflata*, and with the idea of its being the *Conjugata inflata* of Vaucher; subsequently, on the representation of Mr. Borrer, so well known for the great additions made by him to this and other departments of native botany, the name was altered to *tumidula*, but the species was still supposed to be a member of Vaucher's genus *Conjugata*; which, judging from the figure, I should say that it most certainly is not, and under this impression Sir J. E. Smith has appended to his description some remarks on the *Conjugatæ* in general, which, as it now appears, are somewhat misplaced.

[To be continued.]

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XLIII.—*Observations on the Rodentia.* By G. R. WATERHOUSE, Esq., Curator to the Zoological Society of London.

[Continued from p. 203.]

[With a Plate.]

IT is well known to naturalists that there exists in South America many large groups of animals which are peculiar to that continent or are but feebly represented elsewhere. The New World monkeys all form a large section (*Platyrrhini*), of which there are no representatives in the Old. The *Edentata* may almost be called a New World order of mammals. Speaking of two great divisions of the Iguana tribe of reptiles, or "*Sauriens Eunotes*," of MM. Duméril and Bibron, these authors observe, "les Pleurodontes semblent, pour ainsi dire, appartenir exclusivement au nouveau monde, ou aux Amériques [the authors allude almost entirely to the tropical portions], à l'exception du genre *Brachylople*. D'un autre côté,

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ticed in this paper, in which it, as well as all the true *Confervæ*, differ from the conjugating *Confervæ*.

In admitting the existence of spores in this one species of *Conferva*, M. Decaisne must now discard the notion of zoospores from his mind, in reference to the reproduction of all the true freshwater *Confervæ* with simple unbranched filaments, the same phenomena occurring in them which he has noticed in *Conferva vesicata* (*Vesiculifera Mülleria*).



P'Amérique ne nourrit aucun Acrodonte." I may mention that, according to the 'Histoire Naturelle des Reptiles,' the section *Pleurodontes* contains thirty-one genera and ninety-five species, one of which only is found in the Old World; whilst the section *Acrodontes* contains fifteen genera and fifty species, none of which are found in America. As instances among birds, the *Muscicapidæ* and *Nectariniidæ* may be noticed; in both these groups the New World species are distinguishable from the Old by the structure of the wing\*. Very many similar cases might be recorded.

Having determined upon a classification of the Rodents (founded chiefly upon characters furnished by the skull and lower jaw), I was not a little interested to find in that group another illustration of this class of facts,—to find that a great mass of the South American Rodents belonged to a section which has but few representatives elsewhere,—the

### *Hystricina.*

All the species of this section have four molars on either side of each jaw; in those which are placed at the head of the group the molars are rooted, in the remaining species they are rootless. The skull is broad between the orbits; the ant-orbital opening is always large; the palate is usually contracted, especially between the anterior molars, and deeply emarginated behind. In the highest *Hystricina* (which have rooted molars) the bony palate is less deeply emarginated behind, and sometimes the molars are parallel,—a somewhat uncommon character in the present section; the palatal openings are small, and the bodies of the sphenoids are expanded and well-developed. Descending in the series the palate becomes less and less perfect, and the bodies of the sphenoids are contracted, until in the lowest—especially in the Chinchillas (*Chinchillidæ*)—we find a condition in these parts closely approximating to the hares (*Leporidae*).

Although the number of molar teeth, combined with the large ant-orbital opening to the skull, would *generally* serve to distinguish the *Hystricina* from the *Murina*, there are a few species of the last-mentioned section which exhibit these characters. To define the *Hystricina*, therefore, it was necessary to seek for other points of distinction—these I have found in the conformation of the lower jaw.

The various modifications in the form of the lower jaw in the *Murina* have already been pointed out; and, accompanying the present observations, I have given figures representing

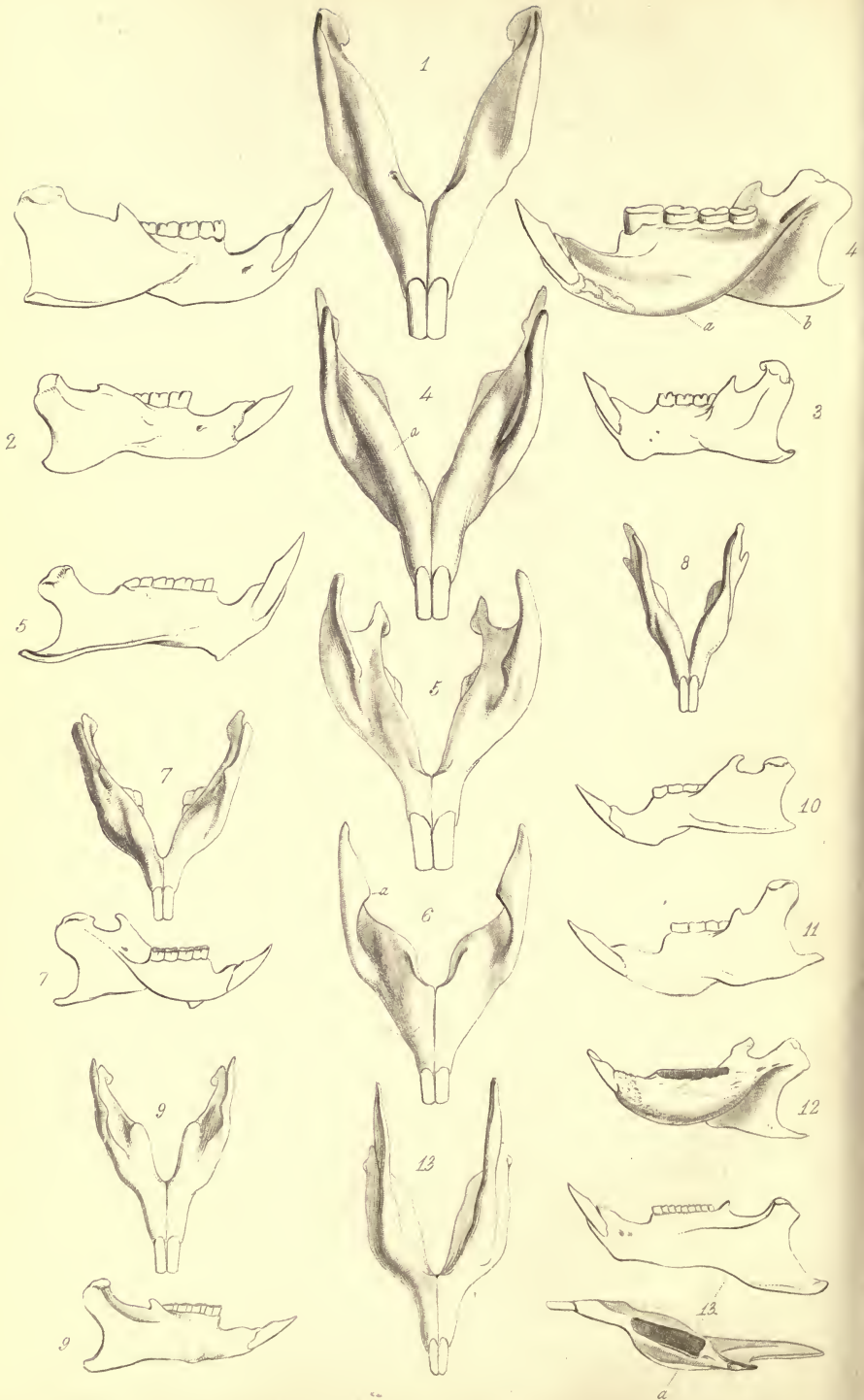
\* I believe Mr. Swainson first noticed this fact.

the lower jaw of each of the principal genera of the Hystricine section, together with a view of the lower jaw of the rat, which will serve for comparison. The lower jaw in the *Hystricina* is remarkable, generally, for the small size and advanced position of the coronoid process. The condyloid is in almost all the species much compressed, and of considerable antero-posterior extent; the articular surface, which is very narrow, is chiefly confined to the anterior part of the condyloid process—such is the case in the *Dasyprocta Echimys*, *Octodontidæ*, *Chinchillidæ* and *Caviidæ*, but in the *Hystricidæ* the articular surface is broader. The most important character in the present group, however, is observable in the angular portion or descending ramus (Pl. VIII. *b*, fig. 4.). In form, the descending ramus, or that portion which lies behind and below the bony covering of the great inferior incisor, almost invariably approaches to a triangular figure; the posterior portion is more or less deeply emarginated, and the lower posterior angle is produced. The modifications in the form of this part may be best described by selecting the lower jaw of *Echimys* (fig. 7.) as a type, and pointing out the deviations from that type. Here the descending ramus is deeply emarginated behind, the emarginated portion being in the form of a semicircle: the lower boundary of the ramus, when viewed from beneath, presents a flat surface, and is produced about the middle on the inner side into an obtuse angle, as seen in the view of the under side of the jaw, fig. 7, and at *a*, fig. 6. The lower jaw in *Nelomys*, *Cercomys* (f. 10.), *Poëphagomys*, *Ctenomys* (f. 11.), *Schizodon*, *Octodon* (f. 12.), and *Capromys* (f. 6.) is essentially the same, differing almost only in the depth of the posterior emargination, in having the posterior angle a little more or less produced, &c., which differences are seen by an inspection of the figures. The lower jaw of *Myopotamus* (f. 5.) is also essentially the same, but the descending ramus is thrown more boldly outwards, its depth is less, and the width of the horizontal plate which forms the lower boundary is greater—the angle\*, as at *a*, fig. 6, is still distinct. In the smaller size of the coronoid process we observe an approach to the jaws, fig. 9 and 13. (*Lagostomus* and *Cavia*), which is accompanied with other characters, such as the extremely contracted condition of the palate between the anterior molars, exhibited in the skulls of the three genera. In *Lagostomus* (fig. 9.), in addition to a very small coronoid process, are other peculiarities, in which we find a most perfect transition between the jaw of

\* This angle is found in no Rodents excepting those belonging to the Hystricine section.







Jaws of Rodentia.

*Echimys* and the other genera above noticed, and the *Caviidæ*: this is not only evinced in the modification in the form of the descending ramus, but in the ridge exhibited in the side-view of the jaw, fig. 9, which runs obliquely downwards and forwards from the condyle. In the cavy (fig. 13.) the same kind of ridge is observable, but it is extended more forwards, and forms the outer boundary of the remarkable protuberance (*a*) on the outer side of the horizontal ramus, which forms so peculiar a character in the *Caviidæ*\*. The upper surface of this protuberance is concave.

The lower jaw of *Lagostomus* does not possess the horizontally flattened plate which forms the inferior boundary of the descending ramus in *Echimys*, &c., and the angle exhibited at *a*, fig. 6, is here nearly lost, nor do we observe this angle in the Cavies, *Dasyproctas*, or *Hystrices*. This last-mentioned group is so admirably illustrated by Brandt, that it will be unnecessary here to dwell upon it.

In the present section of Rodents, the angular portion of the lower jaw (Pl. VIII. *b*, fig. 4.) is not, as in the rats (fig. 8.), in the same vertical plane as the dental portion (*a*, fig. 4.), but is attached as it were to the outer side of that part. In the great section *Murina*, the angular portion of the jaw descends from the *under* side of the alveolus of the incisor, whilst in the *Hystricine* section it is at its commencement thrown outwards from the lateral part of the bony covering of that tooth (Pl. VIII. *a*, fig. 4.), and when the jaw is viewed from beneath, a longitudinal groove generally separates the dental from the angular portion. This character is most strongly marked in *Hystrix*, *Dasyprocta*, *Capromys*, *Echimys*, and the *Octodontidæ*; in the *Chinchillidæ*, and especially in the *Caviidæ*, it is less strongly marked, owing to the comparative shortness of the lower incisors.

## DESCRIPTION OF PLATE VIII.

Fig. 1. Lower jaw of *Hystrix*.

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|----------|---------------------|
| 2. ————— | <i>Atherura</i> .   |
| 3. ————— | <i>Erethizon</i> .  |
| 4. ————— | <i>Dasyprocta</i> . |
| 5. ————— | <i>Myopotamus</i> . |
| 6. ————— | <i>Capromys</i> .   |
| 7. ————— | <i>Echimys</i> .    |

Fig. 8. Lower jaw of *Mus*.

- |           |                     |
|-----------|---------------------|
| 9. —————  | <i>Lagostomus</i> . |
| 10. ————— | <i>Cercomys</i> .   |
| 11. ————— | <i>Ctenomys</i> .   |
| 12. ————— | <i>Octodon</i> .    |
| 13. ————— | <i>Cavia</i> .      |

[To be continued.]

\* In the *Caviidæ* I include the genera *Cavia*, *Kerodon*, *Dolichotis*, Desm. (or *Mara* of Lesson), and *Hydrochærus*. It is one of the most distinctly marked groups in the *Rodentia*, and should not be confounded with the *Dasyproctas*, which differ much in skull and dentition.

XLIV.—*Information respecting Scientific Travellers.*

LETTER FROM EDWARD FORBES, ESQ.

London, Nov. 15, 1842.

DEAR SIR,—When your announcement of my proposed Egyptian movements came out in the 'Annals' on the 1st of November, I was undergoing the miseries of quarantine on board the Iberia steamer in Stangate Creek. Instead of leaving Smyrna for Alexandria I embarked for London on the 2nd of October, and after a slow and stormy passage reached England by the end of the month. A steamer is not the best conveyance for a naturalist; its way is too speedy and frothy for marine observations. During a few hours' stoppage at Gibraltar, however, I had an excellent opportunity of drawing and dissecting a beautiful Medusa of the genus *Pelagia*, one of the most phosphorescent of the larger species. Gibraltar bay abounds in marine animals, and under more favourable circumstances I might have reaped a rich harvest; as it was, I only secured the *Pelagia* and a number of specimens of the *Salpa maxima*. Almost every specimen of the last-mentioned curious mollusk which floated by the ship was deprived of the dark red visceral mass which is lodged in a cartilaginous ball at the posterior extremity. On examination I found the test of such mutilated animals to be perforated above the site of the viscera, and not long after saw the cause in a fierce attack on a squadron of *Salpæ* by an army of gulls, who ferociously imitated the eagles which tormented Prometheus by picking out the livers of their victims, untouching the less delicate parts of their bodies. Nevertheless the *Salpæ*, *de-livered* from the grasp of the gulls, swam away without livers and ovaries, with apparently as much vigour as before their misfortune.

Before leaving Smyrna I dredged the Gulf, with results of considerable interest, and following in the footsteps of my friend Mr. Strickland, examined the geology of that beautiful district.

Though my personal researches in the Ægean are over, yet, I trust, natural history will gain much more from that quarter. I have left an active staff of naturalists behind me in the officers of the survey, who are forming collections in all departments with great success, under the auspices of the head of the survey, my most excellent friend Capt. Graves, who will with the greatest delight assist in every way in his power any British naturalist who may select the Archipelago for the scene of his travels and studies.

Ever, dear Sir, most sincerely,

*To Richard Taylor, Esq.*

EDWARD FORBES.

MR. SCHOMBURGK.

Letters have been received by the Geographical Society from Mr. Schomburgk, by which it appears that he had explored the river Takutu to its source, in about  $1^{\circ} 45'$  N. lat. The Takutu is a tributary of the Rio Branco, into which it falls at San Joachim; and its source is so far to the eastward, that Mr. Schomburgk procured bearings of



his old acquaintances, the Wauguwai and Amucu mountains, near the junction of the Yuawauri with the Essequibo. The highest mountains in the vicinity of the Upper Takutu cannot be less than 5000 feet. All the mountains are granitic, with masses of quartz, but no igneous rocks were seen. Mr. Schomburgk has made observations of the magnetic intensity at Waraputa, at Pirara, and near the sources of the Takutu, &c. The tropical winter commenced on Sunday the 29th of May, an uncommonly late period. He has subsequently returned to Demerara in good health. We learn also that one of the silver medals of the Société de Géographie of Paris has been awarded to him for his researches in Guiana.

*Notice of the Vegetation in the neighbourhood of Georgetown, Demerara, in a letter from Dr. W. H. Campbell to Professor Balfour, dated Aug. 16th, 1842.*

Dr. Campbell writes, "I have only had two days' recreation since I arrived in this country, and one of these I devoted to a regular exploration into the Bush, about nine miles up the Demerara river. Some of the vegetable wonders and novelties I saw were truly magnificent, the luxuriance of the vegetation surpassing anything you can conceive. Every inch of ground was occupied, and the eye looked in vain for any spot which nature had left unclothed and less bountifully supplied than that immediately around you. Indeed, it seemed as if there was one dire scramble for existence, and that each was striving with might and main to reach the upper light and air, lest, being left behind in the race, the forfeiture of life should be the penalty. Rapid as is the growth of these children of the forest, no less rapid is their decay; and race after race spring into being, rear their heads ambitiously for a while and pass away, to be succeeded by their children, who scramble over them with parricidal haste. A slower but no less certain fate awaits the oldest denizens of the forest. A climbing palm sending forth his grappling arms clutches one in his embrace, and gradually spreading and accumulating a huge weight of vegetation upon him, some gigantic limb, or the whole tree, destroyer and destroyed, are borne to the earth; the one to die, but the other—the immortal palm—to rise again, and continue with renewed vigour and pliant limb his onward and destructive progress. Others again, like the monarchs of the forest, still rear their heads triumphant; but they too must die, for the bush-rope is festooning his branches, epiphytes are insinuating themselves in every crevice, and the birds are daily sowing the seeds of vines and parasites, which, although apparently renewing the youth of the tree and decorating it with the most graceful drapery, are eating into its very vitals and feeding on its heart's blood, till limb by limb down goes the old veteran at last,—a noble wreck amidst the upstart generation who are rising around him and hastening his decay. The insidious fungus soon completes the wreck, and fibre by fibre the giant trunk is resolved into its pristine elements.

"One of the species of bush-rope which I saw is most curious, and by far the most fantastic production of nature I have ever met

with. Suppose a tolerably large wide-spreading tree with naturally rather rugged and picturesque branches, forming a canopy overhead and a tolerably clear space below. On this tree were suspended a multitude of large bunches of papilionaceous flowers, the product of a climber which had enveloped the tree. At first I could not perceive the mode in which the flowers were suspended, and I gazed with astonishment, thinking that it was by no means impossible that some of these unaccountable pendants would drop down upon me to satisfy my curiosity. The flowers were like clusters of grapes of a claret colour, and the elongated petiole from which they were suspended varied from five to ten feet in length, without a vestige of a leaf, bractea or scale upon it, resembling considerably in colour, size and substance the appendages by which *Stratiotes Aloides* is moored to the bottom of the water, when the plant floats on the surface during the flowering season. So unnatural-like was the whole affair, that it was really difficult to suppose that Nature had any hand in it, for it more resembled the work of a parcel of monkeys, who, having culled the flowers, had amused themselves by suspending them from the branches with pieces of packthread,

“ Another thing which struck me particularly during my ramble was a beautiful fern; it was seven or eight feet high with peculiarly graceful fronds, resembling in some degree *Attyrium Filix femina*; but its principal peculiarity to my unpractised eye was in being densely covered on the rhachis with large aculei resembling those on the rose-bush, and quite as penetrating\*.

“ I think I have mentioned to you before a tree called trumpet wood (*Cecropia*), very common in the bush, and which springs up very rapidly in abandoned cane pieces. I had an opportunity of inspecting it to better advantage lately when some trees were felled, and I was surprised to find that the leaves at the summit bear a considerable resemblance to a coarse umbelliferous plant, such as *Heraclium flavescens* (*Sibericum*, L.); and the tree is of such a soft spongy texture in the young shoots, that if they were detached there would be some difficulty in saying whether they belonged to a tree or a herbaceous plant. The tree ranges from fifteen to forty feet high, with a straight trunk, destitute of branches, until it ends in a crown of large leaves.

“ As good an instance as I have seen of the rapidity of growth here, is a silk cotton tree (*Bombax Ceiba*) in the ground attached to the house where I am now living. It was planted fourteen years ago, and now resembles in trunk, in limb, and in height, a huge oak of a century. It is really a magnificent tree, and one of the largest and finest to be seen about Georgetown; and yet it seems, but of yesterday, when one looks back to the date when it was planted. The trunk is of great girth at the base, owing to the roots being to some extent superficial, and of an unwonted size. They have a peculiarly flattened and compressed appearance, with their sharp edges projecting from half a foot to a foot above ground, and they extend to an immense distance, threatening even to undermine the house,

\* The fern is probably a species of *Hemitelia*.—J. H. B.

which they would have done had not a trench been dug and the main roots cut across in that direction. The stem is densely covered in some parts, and more sparingly in others, with very large spines, which are from an inch to two inches long, and singularly hard. The tree is casting its leaves at present, and the period of hybernation or rest is indeed short. In a few days from the time when the leaves first begin to fall the whole of the glorious foliage is gone, and the naked branches remind you of the winter livery of trees in our northern clime; but it may in all truth be said that the old leaves are pushed off by the new ones, for as the old leaves fall the buds swell, and the last leaf has not left the tree ere the new foliage begins to unfold; and as with the rapidity of an enchanter's wand, winter passes away, and the beauteous livery of spring is arrayed before you. Such is the process twice every year; so what becomes of the theory of the necessary rest for plants which winter periodically affords? Nor do I quote a single instance; the same biennial return of autumn and spring, of seed-time and harvest, seem to be common to almost every tree and shrub, so far as I have been able to learn or observe. I should have mentioned, that this tree, differing from most others, rarely produces fruit oftener than once in five years, and then its profusion of cotton becomes a downright nuisance, penetrating everywhere, and absolutely choking you with cotton wool.

“ Next to the silk cotton tree grows a sandbox tree (*Hura crepitans*), likewise planted about the same time, and of equal magnitude with the other. It has leaves somewhat between the lime-tree (*Tilia*) and the elm, with the graceful regular and depending branches of the beech.

“ In the garden grows what I take to be a very rare plant here, the *Garcinia Mangostana*, Mangosteen, which is not indigenous in the colony. The tree ought to be generally introduced for the sake of its fruit, which is said to be excellent.

“ I saw a wonderful branch of plantains exhibited the other day. It had not arrived at maturity, but had fallen from its own weight, and although mutilated by the fall and in some degree curtailed, yet it weighed 112 lbs. There were about 200 plantains on the branch, from eight to ten inches long, and it was estimated by skilful plantain-growers, that if it had been allowed to ripen it would have weighed at least 40 or 50 lbs more. The productiveness of the plantain in this country certainly exceeds anything I had previously conceived. A plantain-walk in bearing requires scarcely any attention beyond weeding and watching. A gentleman here has fifty acres of plantains now in progress, and he tells me that the average crop will probably be 10,000 or 12,000 branches annually, which at a guilder a-piece (the lowest price), equal to 1s. 4d. sterling, you will see would realize a very handsome annual profit after paying all the expenses.

“ Of the plants mentioned in your list I see a good many growing around me in the garden and shrubbery, such as the black-eyed pea, pigeon pea, buona vista pea, lemon, lime, orange, cassava, guava,



tamarind, granadilla, capsicum, mango, sapodilla, quassia, &c. The okra or ochra (*Hibiscus esculentus*) is an exceedingly common vegetable, the capsules before they are ripe being boiled and made into soup, yielding a large quantity of mucilage which is nutritive and aperient. The sea-side grape (*Coccoloba uvifera*) is abundant, and the fruit I have often eaten; it resembles in flavour a fully ripe sloe, and has a most disproportionately large stone.

“ I have observed here one tree previously unknown to me, which I am told is a gamboge tree yielding a pigment\*. Another tree, called *Orinogue* or *Bois immortelle*, puzzles me, as I can find no trace of it under either of these names. It grows with amazing rapidity, and bears an enormous profusion of leguminous flowers of a flesh and scarlet colour. These flowers are very thick and substantial in their petals, and of a large size, tumbling off the tree in great quantities without ripening their fruit †.

“ I still think the cabbage-palm here is different from that so called in the Edinburgh Botanic Garden.”

#### BIBLIOGRAPHICAL NOTICES.

*The Botanical Text-Book.* By ASA GRAY, M.D., Fisher-Professor of Natural History in Harvard University. 12mo, pp. 413. New York, 1842.

WE have carefully perused this work, and have much pleasure in recommending it to the attention of all students of botany. It gives a comprehensive view of the present state of botanical science, and is written in a clear and lucid style, so as to render it accessible to all classes of readers. It is divided into two parts: 1. an introduction to structural and physiological botany; and 2. the principles of systematic botany, with an account of the chief natural families of the vegetable kingdom, and notices of the principal officinal or otherwise useful plants. The work is illustrated with engravings on wood, which are highly useful to the student.

In giving a short notice of some of the contents of the work, we shall confine our attention chiefly to those subjects concerning which some differences of opinion exist among botanical writers.

In speaking of the changes which the leaves of plants produce on the air during day and night, Dr. Gray remarks,—“ It is by an entirely false analogy that the loss which plants sustain in the night has been dignified with the name of *vegetable respiration*, and vegetables said to vitiate the atmosphere, just like animals, by their respiration, while they purify it by their digestion. Respiration is merely a part of digestion: in animals it consists in throwing out the excess of carbon which their highly *carbonized* food contains; in vegetables it consists in the elimination of the superfluous oxygen of their highly *oxidized* food.”

\* This is probably a *Vismia* belonging to the natural order *Hypericaceæ*.—J. H. B.

† Probably *Cæsalpinia pulcherrima*, or Barbadoes pride.—J. H. B.

On the subject of the formation of wood, the author adopts the theory of Petit Thouars. The different kinds of inflorescence, and the centripetal and centrifugal expansion of flowers, are explained in such a manner as to render the subject easily intelligible. The same may be said of the explanation given of the carpellary theory.

In alluding to the formation of the placenta in different cases, Dr. Gray notices the theory which has been recently advanced in Germany, in which the placenta is considered an *axile* formation, or one belonging to the axis and not to the carpellary leaves. "This theory," he says, "offers the readiest explanation of free central placentation, especially in such cases as *Primula*. It is also perfectly applicable to ordinary central placentation, where we have only to suppose the cohesion of the inflexed margins of the carpellary leaves with a central prolongation of the axis or receptacle which bears the placenta. But in the case of parietal placentation, the advocates of this theory are obliged to suppose that the axis divides within the compound ovary into twice as many branches as there are carpels in its composition, and that these branches regularly adhere in pairs, one to each margin of all the carpellary leaves. Its application is attended with still greater difficulties in the case of simple or uncombined pistils, where the ovules occupy the whole inner suture, as in *Sedum* and the Columbine, which are doubtless justly assumed as the regular and typical state of the gynœcium; but to which the new hypothesis can be adapted only by supposing that an ovuliferous branch of the axis enters each carpel, and separates into two parts, one cohering with each margin of the metamorphosed leaf. This view, however, not only appears very improbable, but may perhaps be disproved by direct observation, as it has been most completely by those monstrosities in which an anther is changed into a pistil, or even one part of the anther is thus transformed and bears ovules, while the other, as well as the filament, remains unchanged; a case where the formation of the placenta from a process of the axis is out of the question. The hypothesis, therefore, is entirely untenable as a general theory; and whether it affords a correct explanation of any form of central or basilar placentation, must be left for further observation to determine."

In the systematic part of the 'Text-Book' a good view is given of the principle of classification, and the Artificial and Natural methods are well explained. In speaking of a natural method it is remarked, that this term is applied because the method "expresses the natural relations of plants as far as practicable; for every form yet contrived, or likely to be devised, is to a considerable extent artificial: 1. Because the affinities of a particular group cannot be fully estimated until all its members are known; and thus the progress of discovery leads to changes, or modifies our views, as in every other department of knowledge. 2. Because the boundaries of groups are not so arbitrarily circumscribed in nature as they necessarily are in our classifications, but individuals depart from the assigned limits in various directions (like rays from a centre), the edge of difference being as it were softened down by an easy transition. 3. Because, even sup-

posing the groups to be perfectly natural and their affinities completely understood, it is impossible to arrange them in a single continuous series, in such a manner that each shall be preceded and followed by its nearest allies; since the same family, for instance, may be equally related to three or four others, only two of which points, at best, can be indicated in the lineal series which must be adopted in books. And 4. we are still obliged to use avowedly artificial characters for the sake of convenience; as in the arrangement of the numerous orders of Exogenous plants into the polypetalous, monopetalous, and apetalous divisions, although different genera of the same order, or different species of the same genus, may present these very diversities."

The nomenclature of botany receives a due share of attention, and the following remarks in our opinion deserve notice: "As a general rule the names of orders are formed from that of some leading or well-known genus, which is prolonged into the adjective termination *aceæ*. Thus, the plants of the order which comprises the Mallow (*Malva*) are called *Malvaceæ*, i. e. *Plantæ malvaceæ*, or in English, malvaceous plants . . . .; but the rule is only applicable to ordinal names derived from those of the genera, and affords no sanction to the absurd change of *Leguminosæ* into *Leguminaceæ*, *Labiata* into *Labiaceæ*, *Crucifera* into *Cruciaceæ*, &c., names which are formed upon a different principle. The appellations *Graminaceæ* (instead of *Gramineæ*) and *Palmaceæ* (instead of *Palmæ*) are equally objectionable; the former not being *Plantæ graminaceæ*, but grasses; the latter not *Plantæ palmaceæ*, but palms: and so likewise *Algæ*, *Fungi*, &c.

In the systematic part the arrangement of DeCandolle has been followed as nearly as practicable, so far as relates to the series of the orders; while these have been at the same time thrown into small artificial groups for the convenience of analysis. A conspectus of these groups is given, but there is no complete analytical view of the orders. Such an artificial analysis is of great assistance to the student of botany, and we trust that it will be added in a future edition.

Upon the whole, we look upon this work as one of the best Text-Books which has yet appeared. In saying this we by no means wish to undervalue the excellent 'Elements of Botany' published by Dr. Lindley. In the structural and physiological part we prefer Dr. Gray's work as being a fuller and more comprehensive guide to the student, while in regard to the natural orders nothing can be better than Lindley's work, whether we consider the descriptions or illustrations. Lindley's 'Elements,' indeed, appear to us to have served as the model for the work now under consideration.

*The British Flora, comprising the Phænogamous Plants and the Ferns.*

By Sir W. J. Hooker, K. H., &c. &c. Fifth Edition. London, 1842. Longmans.

We have just received the new edition of this well-known work, which has undergone considerable change in appearance by the genera and species being now arranged under the *natural orders*, instead



of according to the Linnæan system, as was formerly the case. After a careful examination and comparison we do not find that much if any alteration of consequence has been made in the description of the orders, genera, or species. Indeed, even the notes appended to the species in most cases continue to be identically the same, and not the least attention has been paid to the observations upon some of them which have appeared in the 'Transactions of the Botanical Society,' the 'Phytologist,' and in this Journal. In short, with the exception of the introduction of a *few* newly-discovered species, the work may be considered as a differently arranged reprint of the fourth edition. Plates illustrative of the Compositæ and Ferns have been added.

If we had not believed that Sir W. J. Hooker never hoped for, or expected to obtain, any increase of reputation by his 'British Flora,' we should have felt surprise at finding him boldly, and without note or comment (except perhaps a reference to Steudel's 'Nomenclator'!!), combining species distinguished by some of the first botanists of Europe, such as Fries and Koch, whose opinions upon *Europæan* plants we certainly consider of far higher value than that of the author of the 'British Flora:' although, when the species of *other countries* are concerned, we think that no name (Robert Brown's excepted) stands so deservedly high as that of Hooker. The 'Edinburgh Catalogue of Plants' is constantly referred to, and as it has been considered deserving of so much attention, it seems wonderful that (apparently) no application should have been made to its compilers for information concerning numerous species contained in it, upon whose claims to be considered natives of Britain the author states that he is ignorant.

We have much doubt if the change from the Linnæan to the Natural arrangement, although highly satisfactory to us, will tend to promote the sale of the work, and we fear that it will bring into more extensive use a modern but old-fashioned Linnæan flora which has already done considerable injury, from leading its readers back to the ideas of botanical structure that were prevalent fifteen or twenty years since.

We are sorry to see several misprints of considerable consequence still retained in this edition, such as the following, which, as they affect the sense, we notice for the convenience of our readers:—

- Page 41, line 26, read *seeds sixteen pendulous*, omitting *in each cell*.  
 — 282, — 14, — fruit *longer* than the perianth.  
 — 284, — 12, — spikes lax, filiform, *usually erect*.  
 — 284, — 45, — lower ones *not* cordate.  
 — 356, — 48, — *black* capsules.

*An Account of Askern and its Mineral Springs, together with a Sketch of the Natural History of the neighbourhood.* By E. Lankester, M.D., F.L.S., &c., &c. London, 1842.

In addition to a valuable account of the mineral waters of Askern near Doncaster, the author has given an interesting description of the geology, and a sketch of the botany and zoology of that neigh-

bourhood. The botanical part is the most complete, and may indeed be considered as a pretty perfect flora of the district. The author has adopted a judicious plan for communicating the greatest amount of information in the least possible space, by not giving lists of the plants, but arranging his matter under the following heads:—

1. A numerical statement of the genera and species of each natural order.
2. A list of the less common plants, taking Watson's 'New Botanists' Guide' as the rule for judging of their rarity.
3. A list of the plants common to the twelve counties referred to by Watson, which he has not found near Askern.
4. The names of a few plants which are but rarely seen there, but which are considered of general distribution by Watson.

In the zoological department the more interesting species are noticed, and a complete list of the birds that have been found near Askern is given. The chemical and medical portion of the work appears to be well executed, but that does not come within the objects of our journal.

*Extracts from 'Excursions in and about Newfoundland during the years 1839 and 1840.'* By J. B. Jukes, M.A., F.G.S.

*Change of timber in a forest after a fire.*—Much of this flat land [in a valley called Southern Gut, Conception Bay,] was covered with raspberry bushes; and Mr. Cousins informed me, that after a fire in the woods the first thing that covers the ground is a luxuriant growth of raspberry bushes, which are gradually succeeded by a thick wood of birch, although previous to the fire nothing but fir and spruce may have been seen for miles.—Vol. i. p. 45.

*Newfoundland Dogs.*—A thin short-haired dog came off to us today. The animal was of a breed very different from what we understand by the term *Newfoundland dog* in England. He has a thin tapering snout, a long thin tail, and rather thin but powerful legs, with a lank body, the hair short and smooth. These are the most abundant dogs of the country, the long-haired curly dogs being comparatively rare. They are by no means handsome, but generally more intelligent and useful than the others. This one caught his own fish. He ate on a projecting rock beneath a fish-flake or stage where the fish are laid to dry, watching the water, which had a depth of six or eight feet, and the bottom of which was white with fish-bones. On throwing a piece of cod-fish into the water, three or four heavy clumsy-looking fish, called in Newfoundland "sculpins," with great heads and mouths, and many spines about them, and generally about a foot long, would swim in to catch it. Then he would "set" attentively, and the moment one turned his broadside to him, he darted down like a fish-hawk, and seldom came up without the fish in his mouth. As he caught them he carried them regularly to a place a few yards off, where he laid them down; and they told us that in the summer he would sometimes make a pile of fifty or sixty a day just at that place. He never attempted to eat them, but seemed to be fishing purely for his own amusement. I watched him for about two hours, and then the fish did not come; I observed he once or twice put his right foot into the water and

paddled it about ; this foot was white, and Harvey said he did it to "toll" or entice the fish ; but whether it was for that specific reason, or merely a motion of impatience, I could not exactly decide. The whole proceeding struck me as remarkable, more especially as they said he had never been taught anything of the kind.—Vol. i. p. 191.

*Newfoundland Seals.*—There are four seals known on the coast:—

1. The bay-seal, (this I believe is the *Phoca vitulina* of Linnæus,) as its name denotes, is confined to the bays and inlets, living on the coast all the year round, and frequenting the mouths of the rivers and harbours. It is the smallest of the four, and prettily marked with irregular spots of small size. From what I have heard I am led to suspect that it breeds in the autumn.

2. The harp-seal. (*P. grænelandica*, Müller) is so named from the old male animal having, in addition to a number of spots, a broad curved line of connected blotches proceeding from each shoulder and meeting on the back above the tail, forming a figure something like an ancient harp or lyre. The female has not this harp, neither has the male till after his second year. The young when born are covered with white fur, they are then called "white-coats;" at about five or six weeks old they shed this white coat, and a smooth spotted skin appears. When twelve months old the males are still scarcely to be distinguished from the females. The next season the male has assumed his harp. The harp-seals herd together, at least during the breeding-season, and probably at other times. They are not seen on the coast of Newfoundland at other times, and probably come from the north to the ice-fields on the northern shores of the island for the purpose of bringing forth their young. The mothers leave their young on the ice, and fish about the neighbourhood for their own subsistence, returning occasionally to give suck. We did not absolutely see one suckling her young one, but found milk in the mouths and stomachs of one or two young ones that were brought on board ; and it was of a thick creamy consistence and of a yellowish white colour. Meanwhile the males are congregated together in the open pools of water, sporting about. The young ones increase in size very rapidly from their birth, and are fattest at about three weeks old, at which time they are almost half the bulk of the old ones. From that time the fat diminishes slightly, although the bulk of the internal body increases.

3. The hooded-seals (*Stenmatopus cristatus*, F. Cuvier) are larger than the harps. Their skin is of a lighter gray colour, with many dark irregularly shaped spots and blotches of considerable size. The male is distinguished from the female by the singular hood or bag of soft flesh on his nose. When attacked or alarmed they inflate this hood so as to cover the face and eyes, and it resists seal-shot. The young of this species is not provided with the thick woolly coat of the young harp-seal ; or if they have it, it is shed very shortly after birth. They have whitish bellies and dark gray backs, which when wet have a bluish tinge. The hooded-seals do not form such large herds as the harps, and the male and female seem to keep more to-



gether, both being commonly seen near the young one. The hooded-seals generally bring forth their young two or three weeks later than the harps, and they always occupy different districts, being generally found further to the north.

4. The "square-flipper" is described as being much larger than the hooded-seal. It is, however, very rare, and we did not see one, or hear of one being seen this season. I do not know what is the scientific name of this seal, and whether he has been described at all. Captain Furneaux told us that they were sometimes twelve or even fifteen feet long. It may be the *Phoca barbata* of Müller.—Vol. i. p. 308–312.

*Newfoundland Woods.*—The woods occupy indifferently the sides or even the summits of the hills and the valleys and lower lands. The trees consist for the most part of fir, spruce, birch, pine, and juniper, or larch; and in some districts the wych-hazel, the mountain-ash, the alder, the aspen, and some others are found. The character of the timber varies greatly, according to the nature of the subsoil and situation. In some parts, more especially where the woods have been undisturbed by the axe, trees of fair girth and height may be found; these, however, are either scattered individuals, or occur only in small groups. Most of the wood is of small and stunted growth, consisting chiefly of fir-trees about twenty or thirty feet high, and not more than three or four inches in diameter. These commonly grow so close together, that their twigs and branches interlace from top to bottom, and lying indiscriminately amongst them, there are innumerable old and rotten stumps and branches, or newly fallen trees, which, with the young shoots and brushwood, form a tangled and often impenetrable thicket. Every step through these woods is a matter of toil and anxiety, requiring constant vigilance to avoid falling, and constant labour to procure standing-room; climbing and creeping, and every mode of progression must be had recourse to, and new directions have constantly to be taken, in order to find the most practicable places through which to force a slow and tortuous way.—Vol. ii. p. 212–213.

## PROCEEDINGS OF LEARNED SOCIETIES.

### MICROSCOPICAL SOCIETY.

At a meeting of the Microscopical Society held November 16th, 1842, Prof. Lindley, President, in the Chair, a second paper was read by Arthur Hill Hassall, Esq., on the destruction of fruit by fungi. The author stated, that he had obtained more conclusive evidence of the influence of fungi in producing decay in fruit, from the fact that this decay can be communicated at will by inoculating sound fruit with the decayed matter containing the spawn of the fungi, and the effects of this inoculation become manifest in twenty-four hours. The author concluded by observing, that the decay of fruit might be retarded by coating the surface over with a varnish which would ex-

clude the influence of the atmosphere. Mr. Hassall then made a few observations on a peculiar form of spiral vessel which he had found in the Vegetable Marrow: it consisted of secondary fibres placed longitudinally across and within the spire of the vessel, and when the vessel was broken up or unravelled the longitudinal fibres were found to be split up into short pieces and to adhere to each turn of the spiral. A similar vessel, the author stated, had been noticed by Mr. Edwin Quekett in the *Canna bicolor* (a specimen of which was exhibited to the Meeting) and in the *Loasa contorta*, by Mr. Wilson in *Typha latifolia*, and by Schultz in *Urania speciosa*.

A letter was read from the Rev. J. B. Reade upon various matters. The author sent for inspection a specimen of Cocoa-nut cake, covered with a dense mass of minute filamentary fungi: the cake, which has been proposed as a substitute for oil-cake, he found to contain a large quantity of ammonia, and the fungi growing on it were remarkable for the quantity of nitrogen they contained. The author then directed the attention of the Society to a statement in Liebig's 'Organic Chemistry,' p. 114, that "the nitrogen in the air is applied to no use in the animal œconomy." Mr. Reade expressed his intention of hereafter showing that it is only a very limited view of the wisdom displayed in the composition of the atmosphere, which denies the agency of its larger constituent, and of endeavouring to prove that it tends directly to the production of many millions of pounds of carbonate of ammonia in the *breath of man*. Although the quantity of this agent in a single expiration may be too small to be "quantitatively ascertained by chemical analysis," it is discoverable by the microscope, as was afterwards shown in a specimen which accompanied the communication.

Specimens of microscopic animalcules, which had been sent up alive from Lewes by Edward Jenner, Esq., through the post, were exhibited by Mr. Ross. They had been enclosed, with the weeds they were attached to, in pieces of wet linen, covered over with tin foil.

#### BOTANICAL SOCIETY OF LONDON.

Oct. 7th, 1842.—Adam Gerard, Esq., in the Chair.

Mr. Daniel Stock presented specimens of *Thelephora caryophyllea* (new to Great Britain) discovered by him in August 1841, in a plantation at Bungay, Suffolk. This is distinct from *Thelephora terrestris* (syn. *Auricularia caryophyllea*, Bulliard) and *Thelephora laciniata* (syn. *Helvella caryophyllea*, Bolton, and *Auricularia caryophyllea*, Sowerby).

Mr. Stock also presented monstrosities collected by him at Earsham, Norfolk, of *Scolopendrium vulgare*, bearing two fronds, the one being barren and reniform, the other bearing sori and elongated, with the midrib spirally twisted; also of *Aspidium lobatum*, with the rachis much abbreviated and slightly recurved, pinnæ numerous and overlapping; and of two abortive specimens of a rose, from his garden, both of which produced perfectly formed and leafy branches from the axis of the flowers.

Mr. John Thompson presented specimens of *Carex irrigua* (Smith), collected by him in Northumberland.

Mr. T. Twining, Jun., exhibited a large collection of cultivated specimens from Twickenham.

Read, the continuation of a paper from Mr. R. S. Hill, being "An Inquiry into Vegetable Morphology." Irregular metamorphoses of flowers are extremely common, and usually consist either of an actual multiplication of petals, or of the transformation of stamens and pistils into petals; the effect of these changes being the formation of double flowers, the impletion of which appears to take place in different ways in different plants. In most Icosandrous and Polyandrous plants, impletion appears to result almost entirely from the conversion of the stamens, and in some instances of the pistils, into petals; in the double varieties of *Ulex europæus* it results from the same change. In Oligandrous plants we usually find an actual multiplication of petals, as may be seen in the double stocks and wall-flowers of our gardens. Where the impletion is the result of this alteration of the essential floral organs, the plants are necessarily barren. Such, however, is not the case with the dahlia, aster and other plants, which belong to the Corymbiferous section of *Compositæ*; in these the impletion results, first, from the change of the tubular florets of the disc into ligulate florets, the same as those of the ray, as in the dahlia; and secondly, by simple enlargement and elongation of the tubular florets, as in the many varieties of the China aster. Such monstrosities, from the fact of the essential organs not being in any way implicated, are capable of perfectly impregnating their ovules. Thus a knowledge of the mode in which impletion occurs is of importance to the gardener, in order that he may be enabled to calculate on the possibility of producing new varieties by seed.

Dr. Lindley says, that "these changes always occur in the order of development, or from the circumference to the centre; that is to say, that the calyx is transformed into petals, petals into stamens, and stamens into ovaria; but that the reverse does not take place." In proof of this hypothesis he further says, "that if the metamorphosis took place from the centre to the circumference, or in a direction inverse to the order of development, it would not be easy to show the cause of the greater beauty of double flowers than of single; because the inevitable consequence of a reversed order of transformation would be, that the rich or delicate colour of the petals, upon which all flowers depend for their beauty, would be converted into the uniform green of the calyx. Such a change, therefore, instead of increasing the beauty of a flower and making it superior to its original, would tend to destroy its beauty altogether." Now, were this hypothesis correct, and founded on fact, what ought to be the condition in which we find the organs in double flowers? We ought surely to find the centre of the flower filled up with an increased number of pistils. But is this the case? It is plain it is not; indeed, were it the case, the beauty of a double flower would be most effectually destroyed. This theory must therefore fall to the ground,



and we must confess that we are unable to find any laws by which the order of transmutation in such monsters is governed. The aim and object with the cultivators of double flowers is, to convert all the floral organs into petals, and we generally refer to cultivation as the cause of flowers becoming double; further than this, we are ignorant of the causes of their impletion. They probably owe their origin at first to accidental circumstances, and afterwards the variety is carefully propagated by the methods usually adopted for that purpose. The two classes of vegetable functions, namely the vegetative and reproductive, notwithstanding their close connexion, appear to be performed in some degree in opposition the one to the other; thus any excessive development of the one class takes place at the expense of the other.

November 4th.—Hewett Cottrell Watson, Esq., V.P., F.L.S., in the Chair.

Mr. R. Ranking, F.L.S., presented a monstrous specimen of *Plantago coronopus*, collected at Hastings, showing the easy and natural transition from a spike to a raceme; also a specimen of *Dactylis glomerata*, in which the glumes were become foliaceous.

The Chairman presented a specimen of *Cnicus Forsteri*, which he said corresponded exactly with the cultivated specimen of the same species preserved in Smith's Herbarium. The specimen exhibited by Mr. Watson was also a cultivated one, the root having been found near Whitemoor Pond in Surrey, in June 1841, and flowering specimens of it exhibited before the Society last year. The wild specimens had from two to four flowers only in each stem, whilst the cultivated specimens had ten or a dozen each. Mr. Watson exhibited the specimens for the purpose of pointing out the differences between *Cnicus Forsteri* and *Cnicus pratensis*, branched specimens of the latter species having been in several instances mistaken for the former.

The commencement of a paper was read from Mr. G. Clark, of the Island of Mahé (communicated by Mr. H. W. Martin), "*On Lodoicea Sechellarum.*"

#### LINNÆAN SOCIETY.

March 15, 1842.—E. Forster, Esq., V.P., in the Chair.

Mr. R. H. Solly exhibited a Cabinet for Microscopic objects made of Cedar-wood, the specimens contained in which, consisting of thinly ground sections of fossil-wood cemented on glass, had become covered with a very adhesive varnish. Where the fossil-wood was quite sound, and the cement (probably of Canada Balsam) did not project beyond its edges, very little of the varnish was deposited; but where the fossil-wood was cracked or unsound, or where the cement projected beyond its edges, it was found in considerable quantity; and on the specimens not cemented to glass, it was deposited chiefly in the pores or cracks which had imbibed some of the oil used in polishing the surface. The cabinet was quite new when the specimens were placed in it, and Mr. Solly supposes that the air con-

tained in the drawers had become loaded with vapour from the Cedar-wood, which coming into contact with oil or resin combined with it to produce a varnish.

Read a paper "On *Edgeworthia*, a new genus of Plants of the Order *Myrsineæ*." By Hugh Falconer, M.D., Superintendent of the Hon. E. I. C.'s Botanic Garden at Saharunpore, communicated by J. F. Royle, M.D., F.L.S., &c.

Dr. Falconer refers this new genus to the Tribe *Theophrasteæ*, and characterizes it as follows :—

EDGEWORTHIA.

*Calyx* 5-partitus; laciniis obtusis imbricatis. *Corolla* hypogyna, subcampanulata; tubo brevi crasso, intùs squamis 5 adnatis acuminatis, cum limbi 5-partiti lobis acutis (in æstivatione contorto-imbricatis) alternantibus, instructo. *Stamina* 5, corollæ tubo inserta, ejus denique laciniis opposita, exserta; filamenta subulata, basi cum squamis confluentia; antheræ extrorsæ, versatiles, loculis longitudinaliter dehiscensibus. *Ovarium* 1-loculare; placenta basilaris, parva; ovula pauca, erecta, anatropa. *Stylus* elongatus, etiam in alabastro exsertus; stigma minutum, indivisum. *Drupa* mono- (rarò di-) sperma. *Semen* peltatum, hilo lato excavato umbilicatum; testa ossea. *Embryo* intra albumen (cartilagineum) ruminatum excentricus, transversè arcuatus; radícula infera. — *Arbuscula sempervirens*; foliis alternis extipulatis, solitariis v. fasciculatis, ellipticis, integerrimis, coriaceis, marginatis; ramis spinescentibus; pedicellis bracteolatis; floribus parvis subsessilibus in capitula axillaria subumbellata densè coacervatis, chloroleucis; drupâ eduli dulci.

*Obs.* Genus inter *Theophrasteas*, *Jacquinia* et *Theophrastæ* juxta characteres tribuales affine, sed ab utroque et a sociis albumine ruminato, necnon inflorescentiâ distinctum. Notatu dignissimum, stylum etiam in alabastro exsertum!

*Edgeworthia buxifolia.*

*Hab.* in collibus aridis Provinciarum Taxilæ et Peucelaotis in Bactriâ Inferiore; passim obvenit propè Peshawur, Cohaut et Attock, indigenis *Goorgoora* dicta. Floret Februario; fructus maturescit Julio. Semina dura globosa vulgò in monilia precatória conseruntur.

Dr. Falconer describes *Edgeworthia* as one of the most characteristic forms of Lower Affghanistan, where it grows associated with a species of *Dodonæa*, *Olea Laitoona*, a species of *Rhazya*, and an undescribed Asclepiadeous genus. To the latter, which he refers to the tribe of *Periploceæ*, he gives the name of *Campelepis*, with the following generic characters :—

CAMPELEPIS.

*Corolla* rotata, 5-fida; fauce coronatâ, squamis 5 cum segmentis alternantibus, brevibus, flexuoso-trilobis, confluentibus, medio aristatis, aristis filiformibus erectis apice uncinatis; tubo intùs squamulis totidem inclusis, laceris, patentibus, staminibus oppositis, instructo. *Filamenta* distincta, faucibus infra squamas inserta; antheræ sagittatæ, apiculo acuto terminatæ, dorso barbatae, basi stigmatis medio agglutinatæ. *Massæ pollinis* solitariæ, granulosae, corpusculorum stigmatibus appendiculis dilatatis applicitæ. *Stigma* dilatatum, muticum. *Folliculi* cylindracei, læves, divaricatissimi. *Semina* ad umbilicum comosa.—Frutex erectus, ramosissimus, glaber quasi aphyllus; foliis nempè squamæformibus, deci-

*duis, remotis; cymis brevè pedunculatis, paucifloris; floribus parvis, coriaceis; corollæ laciniis intùs propè apicem barbatis, disco leprosis.*  
*Campelepis viminea.*

*Hab.* passim in Bactriâ Inferiore, propè Peshawur, Attock, &c.

April 5.—R. Brown, Esq., V.P., in the Chair.

Read the commencement of “A Catalogue of Spiders, either not previously recorded or little known as indigenous to Great Britain, with remarks on their Habits and Economy.” By John Blackwall, Esq., F.L.S., &c.

## MISCELLANEOUS.

### FILAGO GALLICA, LINN.

The Rev. W. L. P. Garnons, F.L.S., has had the good fortune to rediscover this plant in Essex. In the autumn of 1841 he gathered a single individual, and on the 12th of last October met with a considerable number of specimens in fields at Bere Church near Colchester.—C. C. B.

### NEW BRITISH CARICES.

Through the kindness of their respective discoverers, I have been favoured with specimens of two species of *Carex*, which have not as yet found a place in the catalogue of British plants. 1. *C. paradoxa* (Willd.), found in Ireland—the exact place not stated—by D. Moore, Esq.: it is closely allied to *C. paniculata*, from which I believe it is to be distinguished by its much more strongly ribbed fruit, and by the convex faces of its triquetrous stems. It also is very similar to *C. teretiusecula*, from which it is separated by its strongly ribbed fruit, and the bulbous base of its style. 2. *C. Boeninghausiana* (Weihe), discovered near Hertford by the Rev. W. H. Coleman: closely allied to *C. remota* and *C. axillaris*, but easily distinguished from them by having the edges of its fruit fringed with minute teeth from the end of the beak quite to the base of the fruit itself.

I may take this opportunity of stating that *C. irrigua* (“Sm.” Hoppe), which was first detected by Mr. John Thompson at Muckle Moss, Ridley, Northumberland, has also been found at Terregles near Dumfries, by Mr. P. Gray. It is probably a common plant on quaking bogs, having been overlooked as *C. limosa*, to which it is very similar in appearance, differing by its broader leaves, scarcely striated fruit, and glumes without a central longitudinal green band.—C. C. B.

### PUS-LIKE GLOBULES OF THE BLOOD.

Although the pus-like globules found in the blood of patients affected with various severe inflammatory and suppurative diseases are very like the pale globules now so well known as belonging to healthy blood, it often happens that the former globules differ manifestly from the latter.

In inflammatory affections the pus-like globules of the blood are generally rather larger, more irregular in size and form, and some-



times more opaque, than the pale globules of healthy blood; and the globules occurring in disease are frequently clustered together very remarkably; they are sometimes of a reddish colour, including from one to four blood-discs, rarely five or six, in a very delicate and pale envelope. Besides, in the pus-like globules of the blood of patients labouring under inflammatory disease, the molecules composing the nucleus are mostly surrounded, and often more or less separated, by a quantity of minutely granular matter, which is either generally less obvious, or even absent, in the pale globules of healthy blood, as is shown by the illustrative figures.

In a case of great swelling with purulent deposits in the leg of a mare, the pus-like globules of the blood presented an average diameter of  $\frac{1}{2666}$ th of an inch, and were nearly as numerous as the red discs; while in the blood of a healthy mare, examined at the same time for comparison, the pus-like globules were by no means so plentiful, and they almost all ranged between  $\frac{1}{3500}$ th and  $\frac{1}{2900}$ th of an inch.—From *Mr. Gulliver's Contributions to Minute Anatomy*, London and Edinb. Philos. Magazine for September 1842.

ORIGIN OF FIBRE.—STRUCTURE OF FIBRINE AND OF FALSE MEMBRANES.

Since the researches of Schwann, the origin of fibre, and of all the tissues, has been ascribed to the growth of cells; but it becomes questionable whether cells are essential to the formation of all textures, since fibrils, which may be the primordial fibres of certain parts, are formed in a few minutes in fibrine by the mere act of coagulation.

“ Mr. Gerber (*Gen. Anatomy*, fig. 16–18.) has delineated what he terms the first, second, and complete stages of *fibrillation* in the fibrine composing coagulable lymph; but he does not say how much his drawings are magnified, though in some of them a very low power must have been employed. Others are sufficiently enlarged to show the cells from which he says the fibres are formed; and this is precisely the point in which my observations are at issue with the views now generally entertained concerning the origin of fibre.

“ ‘ All the organic tissues,’ says Dr. Schwann, ‘ however different they may be, have one common principle of development as their basis, viz. the formation of cells; that is to say, nature never unites molecules immediately into a fibre, a tube, and so forth, but she always in the first instance forms a round cell, or changes, when it is requisite, the cells into the various primary tissues as they present themselves in the adult state.’

“ How,” adds Mr. Gulliver, “ is the origin of the fibrils which I have depicted in so many varieties of fibrine to be reconciled with this doctrine? And what is the proof that these fibrils may not be the primordial fibres of animal textures? I could never see any satisfactory evidence that the fibrils of fibrine are changed cells; and indeed in many cases the fibrils are formed so quickly after coagulation, that their production, according to the views of the eminent physiologist just quoted, would hardly seem possible. Nor have I

been able to see that these fibrils arise from the interior of the blood-discs, like certain fibres delineated in the last ingenious researches of Dr. M. Barry."

It has been very commonly supposed that fibrine only exhibits an organized appearance when it has coagulated in contact with living parts. In his Notes and Appendix to Gerber's 'Anatomy,' Mr. Gulliver has shown a distinct structure in fibrine which has clotted, within or out of the body, simply from rest, as well as in a false membrane. He now gives several figures to illustrate the analogy of structure in fibrine coagulated merely from rest, and fibrinous exudations resulting from inflammation. This structure is made up of fibrils of extreme delicacy and tenuity, and of corpuscles possessing the characters of primary cells, or organic germs.

It may be added that these observations are not devoid of interest in relation to reparative process. If a clot of fibrine consists of primary cells and fibrils, even when coagulation has taken place simply from rest, it may be easily understood that inflammation is unnecessary to the healing of wounds; and this is precisely the view which Dr. Macartney has long since supported against the current doctrines of the day.—Abridged from *Contributions to Minute Anatomy*, by G. Gulliver, F.R.S. Lond. Edinb. and Dublin Philos. Magazine, October 1842.

*An Extract of a Letter addressed to a friend containing an account of Tortricides captured in the New Forest in the month of September 1841. By Capucina\*.*

I took about eighty different species and upwards of 700 specimens; amongst them were *Stilbia anomolata* and *Cleora teneraria*; but passing over the *Noctuae*, *Geometrae*, &c., I shall confine myself to two or three genera of the smaller kinds.

I secured all the known species of the genus *Sarothropus*, including the more rare ones, *undulanus*, *ramosanus*, and the beautiful and almost unknown *Stoninus*; the more common species were abundant, especially *degenerarius* and *dilutanus*.

The capture which I next describe is the 'Tufted *Peronea*,' and of which I am inclined to be somewhat proud. I took 153 specimens of them, amongst which are three new species. I found them somewhat in the following proportions: *P. semiustana*, plentiful; *striana*, the same; *substriana*, not quite so plentiful; *bruneana*, rather scarce; *vittana*, plentiful; *spadiceana*, the same; *consimilana*, plentiful; *defontiana*, the same; *fulvocristana*, sparingly; *albovittana*, scarce; *cristalana*, numerous; *fulvovittana*, the same; *albipunctana*, took but one specimen; *cristana*, very plentiful; *Bentleyana*, took but three specimens; *sequana*, the same; *subcristalana*, only one specimen; *chantana*, one; *ruficostana*, sparing; *obsoletana*, took but one specimen; *favillaceana*, very numerous; *tristana*, the same; and *reticulana*, likewise very numerous; all in very good order. I will now describe those which I consider to be *new Buttons*, and will do so to the best of my power; but being but indifferently acquainted

\* Communicated by J. Curtis, Esq., F.L.S.

with the terms proper to be used for the purpose, I must bespeak your indulgence if I fail to make myself intelligible. The first I have named *Capucina*; the ground of the superior or upper wings dark brown, with a shade of burnt umber, and an elevated white tuft or button in the centre of each wing; the palpi and head white; and the corslet and anterior part of the wings as far as the tuft nearly covered with an incrustation of pure white, with two blotches of the same, and several raised snow-white dots towards the extremity of the wings; the under wings shining pale brown, not unlike those of some of its congeners. Now as it is usual, I believe, for entomologists to designate new insects by the names of the persons who discover them, you will not be surprised if I have been desirous of following their example. Indeed I consider myself fortunate in possessing a name so appropriate for this beautiful little insect,—*P. Capucina*, nor does it sound so badly. The second is also a *White Button*; the anterior part of the upper wings a bright chestnut, besprinkled with a profusion of powdery white dust-like particles, the blending of the two colours producing a beautiful roan; the under wings are not dissimilar to those of *Capucina*. I propose to call this insect *Gumpinana*; and although I am not connected with the family of Gumps, the name is not without its charms, and therefore I hope it will not be unacceptable to the public. The third is so nearly allied to *ruficostana*, which is so well described by Mr. Curtis\*, that it is unnecessary to particularize respecting it; the shape of the wings and the colours throughout are precisely the same, with the addition of a well-formed red tuft or button on each of the upper wings: I have therefore ventured to name it *ruficristana*. I fear I am tiring you with this tedious account, and therefore will trouble you with only one genus more, and that is *Leptogramma*. I did not meet with one specimen of *scrabrana*; *literana* I found in great abundance; *squamana* equally so, if not more numerous; *irrorana* tolerably plentiful; *tricolorana* plentiful; and *fulvomixtana* very plentiful. I captured a host of other Lepidoptera, several of which are supposed to be rare, if not new insects.

Some of the old collectors here are pleased to say that I made a "good hit" during my excursion; but I must confess that my success was mainly attributable to the clear directions I received from Mr. Bentley, to whom I am under great obligation for this and many other civilities, and it proves that his favourite locality, from which he so largely enriched his valuable cabinet, continues to deserve the best attention of the practical lepidopterist.

I remain, yours &c.,

G. CAPUCINA.

NATIONAL ENCOURAGEMENT OF SCIENCE.

We have great satisfaction in recording the grant of an annual pension of £300 to Prof. Owen, of the high value of whose talents, laboriously and disinterestedly applied in the service of natural sci-

\* Vide 'British Entomology,' 2nd edition, where all the species are described.



ence, it would be quite superfluous in us to speak. And it is with similar pleasure that we mention an annual pension to the eminent naturalist, John Curtis, Esq., F.L.S., of whose great work on British Entomology we have already expressed our opinion. His attention has latterly been directed to practical inquiries into the habits of insects as connected with agriculture and horticulture, the interesting results of which have been published in the 'Transactions of the Agricultural Society,' and under the signature of Ruricola in the 'Gardeners' Chronicle.'

*Books received for Review.*

An Introduction to Entomology, by W. Kirby and W. Spence. 6th edit.

Popular Conchology, by Agnes Catlow.

METEOROLOGICAL OBSERVATIONS FOR OCTOBER 1842.

*Chiswick.*—October 1. Clear and fine. 2. Foggy: fine. 3. Foggy: overcast. 4. Very fine. 5. Cloudless and very fine. 6—8. Cloudy and fine. 9. Light haze: cloudy. 10. Overcast. 11. Foggy: clear and very fine. 12. Cloudy. 13. Overcast. 14. Hazy. 15. Overcast. 16. Light haze: very fine. 17. Hazy: overcast and fine. 18. Very fine: heavy rain at night. 19. Fine. 20. Clear and frosty: fine: frosty at night. 21. Sharp frost: fine: frosty. 22. Densely overcast: heavy rain. 23. Rain: heavy showers. 24. Boisterous: clear and fine at night. 25. Rain: stormy at night. 26. Very clear. 27, 28. Cloudy and fine. 29. Frosty: cloudy and fine: clear and frosty at night. 30. Frosty: clear and fine. 31. Overcast: clear at night.—Mean temperature of the month 5°·94 below the average.

*Boston.*—Oct. 1. Cloudy: rain early A.M. 2. Cloudy. 3. Cloudy: rain A.M. 4. Cloudy. 5—8. Fine. 9, 10. Cloudy. 11. Fine. 12, 13. Cloudy. 14. Fine. 15—17. Cloudy. 18. Cloudy: rain P.M. 19. Stormy. 20, 21. Fine. 22. Stormy: rain A.M. 23. Cloudy. 24. Windy: rain A.M. 25. Cloudy: rain P.M. 26—31. Fine.

*Sandwick Manse, Orkney.*—Oct. 1. Showers: cloudy. 2. Showers. 3. Cloudy. 4. Showers. 5. Clear: cloudy. 6. Showers: rain. 7. Damp: cloudy. 8—13. Cloudy. 14, 15. Drizzle: cloudy. 16. Cloudy. 17. Cloudy: showers. 18. Rain: sleet. 19. Hail-showers: sleet. 20. Snow: hail. 21. Sleet-showers: cloudy. 22. Rain. 23. Showers. 24. Snow: aurora. 25. Rain: aurora. 26. Rain: showers. 27—29. Showers. 30, 31. Damp.

*Applegarth Manse, Dumfries-shire.*—Oct. 1—3. Fair and fine. 4. Frost: fair and clear. 5—8. Fair and fine. 9, 10. Fair and fine, but cloudy. 11. Fair and fine: clear. 12. Fair and fine. 13. Fair and fine: frost A.M. 14. Fair and fine, but cloudy. 15. Fair and fine. 16. Fair and fine: cloudy. 17. Cloudy, but fair. 18. Shower. 19. Shower of snow. 20, 21. Fair and clear. 22, 23. Heavy showers all day. 24. Fair and clear. 25. Heavy fall of snow. 26. Snow A.M.: melting P.M. 27. Fair and clear. 28. Fair and clear: snow gone. 29, 30. Fair and clear: frost. 31. Fair and clear: no frost.

Sun shone out 28 days. Rain fell 4 days. Frost 4 days. Snow 3 days.

Wind North 3 days. North-east 1 day. East-south-east 1 day. South-east 2 days. South-south-east 1 day. South 1 day. South-west 4 days. West-south-west 4 days. West 3 days. West-north-west 6 days. North-west 3 days. North-north-west 2 days.

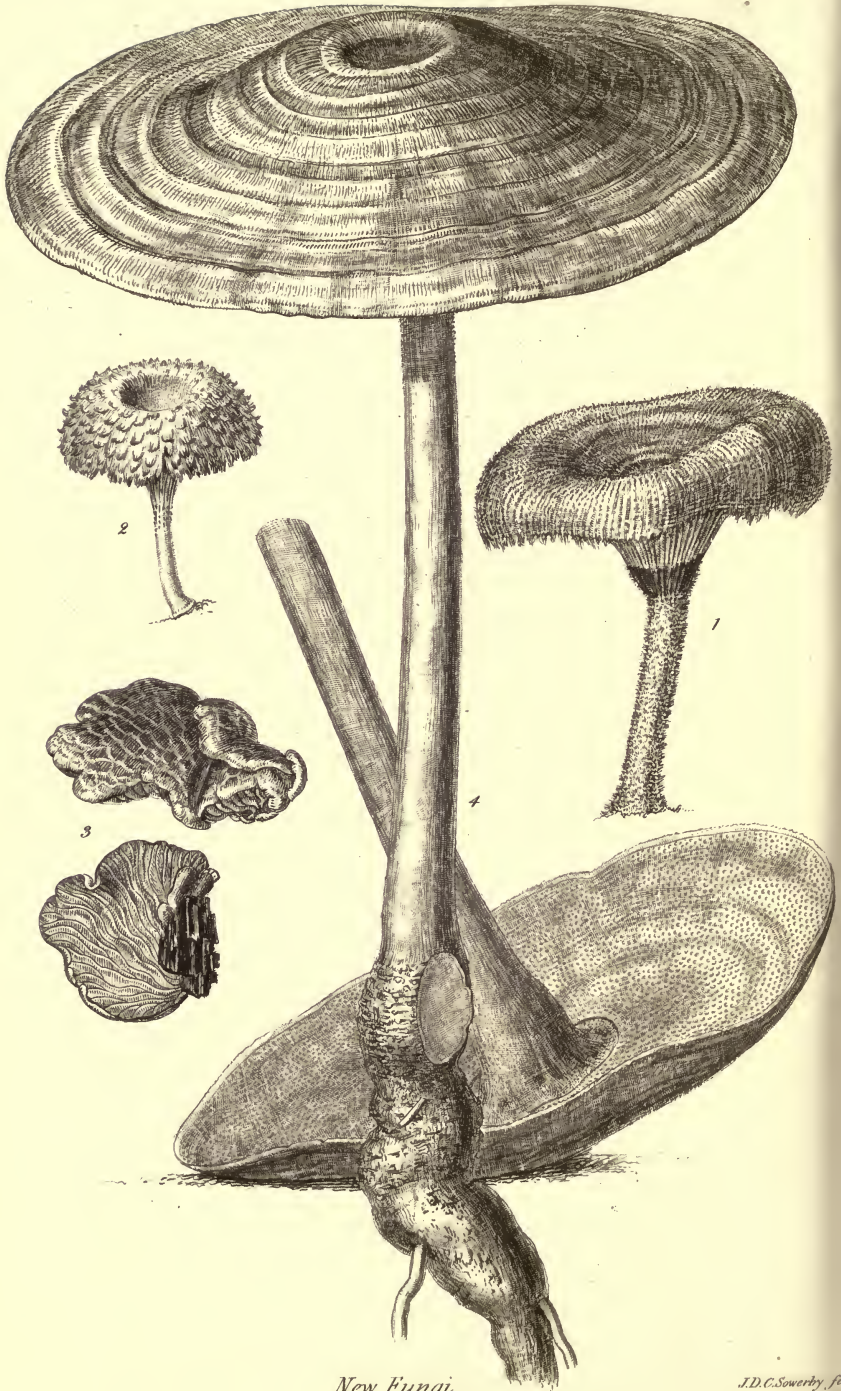
Calm 12 days. Moderate 5 days. Brisk 9 days. Strong breeze 4 days. Boisterous 1 day.

Mean temperature of the month .....	44°·45
Mean temperature of October 1841 .....	45·75
Mean temperature of spring-water .....	49·60









*New Fungi.*

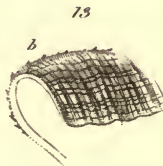
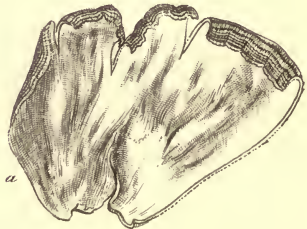
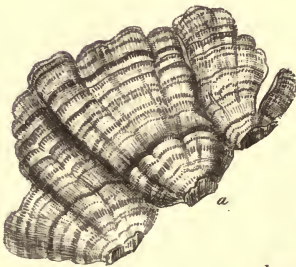
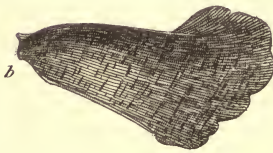
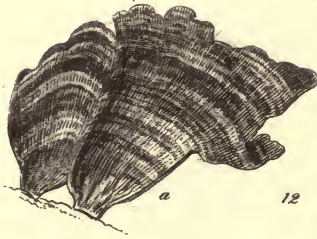




*New Fungi.*

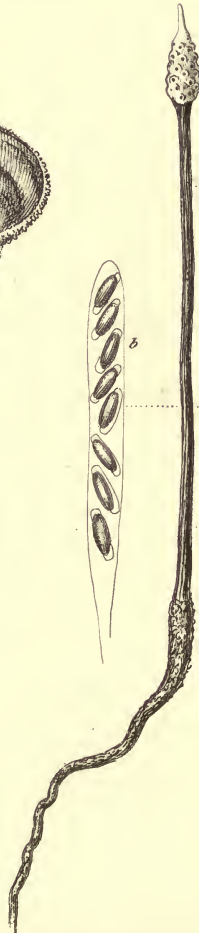
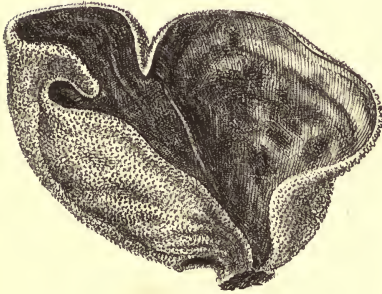
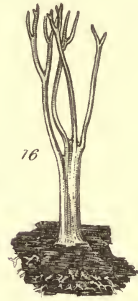












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XLV.—*Notices of Fungi in the Herbarium of the British Museum.* By the Rev. M. J. BERKELEY, M.A., F.L.S.

[With Four Plates.]

THE greater part of the Fungi described in the present memoir were collected by König in Ceylon, a country which has hitherto made very slight contributions to mycology. They consist principally of *Polypori*, which, with the exception of one or two cosmopolites, are new. König had evidently in most cases well distinguished the species, and probably intended to publish them. As most of them have manuscript names, I have thought it incumbent upon me to preserve them where it was possible, though obliged to alter the generic name. The other Fungi are mostly those described by Swartz in his 'Flora Indiæ Occidentalis.' Of several of these I have given figures, which will I trust be acceptable as clearing up difficulties and illustrating some very interesting and singular productions. I trust that one effect of my labours may be to draw attention to a portion of our national herbarium, which, though containing several objects of interest, is perhaps that which has hitherto received the fewest contributions.

As regards the species themselves, it is very possible, though I have had access to a large portion of the described species of exotic Fungi, that I may have failed to recognise some already published. If so, it will at any rate be in the power of any competent person to correct the errors I may have made by an inspection of the individual specimens described. I cannot close these observations without making due acknowledgement to Dr. Brown and Mr. Bennett for the free and continued access which they kindly gave me to this portion of the herbarium.

1. *Lentinus fulvus*, n. s. Pileo profunde infundibuliformi sulcato-striato subzonato badio; tomento brevi fasciculato fulvo subhispido versus marginem densiori vestito, inmixtis setis longioribus rectis; lamellis cinereis distantibus integerrimis omnibus una desinentibus; stipite hispido-tomentoso subæquali.

In Herb. Mus. Brit., without habitat.

Pileus  $1\frac{3}{4}$  of an inch broad, deeply infundibuliform, regularly striato-sulcate from within a short distance of the obscurely-zoned dark-bay centre, clothed with short fasciculate, tawny, somewhat hispid down, which is denser towards the margin and mixed with long straight browner setæ; margin arched. Gills cinereous brown, distant, ending nearly at the same point, but slightly decurrent, their edge quite entire. Stem  $1\frac{1}{2}$  inch high, 2 lines thick at the base, nearly equal, clothed with hispid down unmixed with setæ, which extends for some distance up the gills, making a dark band at their base.

There is a slight resemblance between this well-marked species and *Lentinus strigosus*, but its closest ally is *Lentinus fasciatus*.

PLATE IX. fig. 1. *Lentinus fulvus*, nat. size.

2. *Lentinus crinitus*, Fr. Pileo infundibuliformi pilosotomentoso stipiteque tenerrime subglabro lævi subochraceis; lamellis æqualibus denticulatis pallidioribus. *Ag. crinitus*, L. Sp. Pl. ed. 2. p. 1644. *Pocillaria lanuginosa*, &c., Brown's Hist. Jam. tab. 15. fig. 1.

Jamaica, Swartz. Herb. Mus. Brit.

Pileus  $\frac{3}{4}$  of an inch broad, deeply infundibuliform, pale ochraceous, clothed with somewhat curled, soft, pale, tawny, subfasciculate hairs; margin deflexed. Gills pale, very narrow, all ending at the same point, their edge denticulate, with shallow notches. Stem about 1 inch high, about 1 line thick, sprinkled with little downy patches, beneath which it is pale and silky.

Described from a specimen in the British Museum, marked by Swartz. The synonym of Plumier quoted by Linnæus and Fries is evidently something very different.

PLATE IX. fig. 2. *Lentinus crinitus*, nat. size.

3. *Lentinus connatus*, Berk. in Lond. Journ. of Bot. = "*Peziza Agaricina*, Fl. Zeyl.," König in Herb. Mus. Brit.

4. *Panus areolatus*, n. s. Pileis imbricatis suborbicularibus undulatis glabris areolatis lateritio-fulvis; lamellis paucis latis rigidis lateritio-cinereis.

In Herb. Mus. Brit., without habitat. On charred wood.

Pilei 1 inch broad, scarcely so much long; stemless, suborbicular, subpubescent, imbricated, areolate, smooth, but the areolæ are minutely cracked, so as to present a pruinose appearance, tawny, with a shade of brick-red. Gills few, very broad, rigid, cinereous, with a sublateritious tinge, not at all dichotomous; edge entire.

PLATE IX. fig. 3. *Panus areolatus*, nat. size.



5. *Xerotus Berterii*, Mont. ! (non *X. Bertierii*) = "*Pez. nervosa* concava hemisphærica atropurpurea; habitat in densissimis sylvis Malacca." König in Herb. Mus. Brit.

Dr. Montagne remarks to me in a letter lately received, speaking of *Lentinus Berterii*, that Fries has unfortunately changed the name *Berterii* into *Bertierii*. He writes that this is the more important, as there is a French surgeon at Bourbon named Bertier who is a mycologist.

6. *Schizophyllum commune*, Fr. = *Ag. radiatus*, Sw. ! Prodr. p. 148.

7. *Lenzites striata*, Fr. = *Ag. striatus*, Sw. ! Prod. p. 148; Fl. Ind. Occ. p. 1920.

This species appears to be common in Guiana from the quantity of specimens brought by Dr. Schomburgk. The name is calculated to mislead, as the pileus is in fact scarcely at all striate. Swartz's specific name probably referred to the obsolete zones. This and another nearly allied species from Guiana resemble much *Lenzites abietina*. I shall hope to describe both in an account of the Fungi collected by Schomburgk which are now in the herbarium of Sir W. J. Hooker.

8. *Pol. Agariceus* (König sub *Boleto*). Pileo e lento coriaceo convexo umbilicato azono glaberrimo; margine involuto demum subnudo; stipite centrali subelongato flexuoso deorsum velutino; poris submagnis subhexagonis decurrentibus. "*Bol. agariceus*, Fl. Zeyl. in nemorosis," Kön. in Herb. Mus. Brit.

Ceylon, König. Herb. Mus. Brit.

Pileus 1 inch broad, quite smooth, convex, umbilicated; margin more or less involute, obscurely ciliated. Stem  $1\frac{1}{4}$ — $1\frac{1}{2}$  inch long,  $\frac{1}{2}$ —1 line thick, flexuous, rather thickened above, where it is nearly smooth, velvety below. Pores radiating, subhexagonal, elongated,  $\frac{1}{8}$ th of an inch broad, decurrent; dissepiments thin, acute.

Allied to *Pol. arcularius* and *P. tricholoma*, but abundantly distinct. In an early stage of growth the cilia are probably more visible.

9. *Polyporus sacer*, Fr. Pileo tenui rigidiusculo orbiculari profunde umbilicato zonato, fusco rufoque variegato glabrescente, radiatim striato. Stipite centrali radicato fulvo-brunneo, sursum attenuato velutino; hymenio pallido a stipite omnino distincto; poris mediis subhexagonis.

Herb. Mus. Brit., without habitat.

Pileus 4 inches across, rather deeply umbilicate, thin, but rather rigid, orbicular, beautifully zoned, and variegated with shades of deep brown and red; at first minutely velvety, marked in a radiating direction with striæ. Stem 6 inches high, about half an inch thick, hard, white within, attenuated

upwards, and then expanding; below incrassated, flexuous, and rooting deeply, coated with a dull tawny brown crust, which, especially near the pileus, is permanently though minutely velvety. Hymenium pale, ending abruptly both towards the margin and stem; margin brown, quite barren; pores rather long,  $\frac{1}{60}$ th of an inch broad, subhexagonal, rather regular; substance white, corky, but silky.

This very splendid species appears clearly to be the same with what Fries has described from Guinea, where it is said to be an object of superstition with the negroes. As the figure to which he refers is unpublished, the present sketch will not be superfluous. Only a single sheet in the form of an academic dissertation has appeared of the description of Afzelius' *Fungi*. This I possess through the kindness of Dr. Areschoug, who informs me that it is merely to be considered as a pro-dromus to a more complete illustration of the species.

PLATE IX. fig. 4. *Polyporus sacer*, nat. size.

10. *Pol. xanthopus*, Fr. = "*Bol. pictus*," König.  
Ceylon. In Herb. Mus. Brit.

11. *Pol. crenatus* (König sub *Boleto*). Pileo brevissime stipitato tenui plano rigido subreniformi crenato-lobato rufo glabrescente zonato; hymenio pallide brunneo; poris minutissimis. "*Boletus crenatus*, Fl. Zeyl.," König in Herb. Mus. Brit.

Ceylon, König. Herb. Mus. Brit.

Pilei 2—3 inches broad,  $1\frac{1}{2}$  inch long, laterally confluent, flat, thin, rigid, corky, shortly but distinctly stipitate, subreniform, regularly crenate with rounded lobes, bright red-brown, at first clothed with short, dull, tawny, velvety down, at length quite smooth and shining, repeatedly zoned; margin slightly turned back, obtuse. Hymenium dull brown, uneven; pores round, so minute as to be quite indistinct to the naked eye.

This species has a very peculiar habit. It resembles some states of *Pol. xanthopus*, which, like most central-stemmed *Polypori*, varies with a lateral or almost obsolete stem. It belongs with the two following to the section 4. *Hornotini*, Fr. Epicr.

12. *Polyporus pæcilus*, n. s. Stipite brevi laterali; pileis subreniformibus rigidis lateraliter connatis brunneis subglaucis subzonatis; hymenio ochraceo; poris submagnis angulatis; dissepimentis tenuibus dentato-elongatis. "*Boletus variegatus*," König in Herb. Mus. Brit.

Habitat uncertain. Herb. Mus. Brit.

Forming patches 9 inches broad,  $4\frac{1}{4}$  inches long, consisting

of laterally connate pilei 3 or 4 inches broad. Pilei subreniform, slightly lobed, thin, very rigid, rugged behind, obscurely zoned, of a nearly uniform bistre-brown, with the edge however paler; smooth, but with a glaucous aspect, as if very minutely velvety; margin rather obtuse. Hymenium uneven, ochraceous; pores rather large,  $\frac{1}{36}$ th of an inch broad; dissepiments thin toothed and elongated, often absorbed, so as to give the hymenium a Dædaloid aspect. Stem lateral, distinct, three-quarters of an inch broad and long, pale like the margin of the pileus, very obscurely velvety or pruinose.

This species must be arranged near *Pol. flabelliformis*, Kl., but I am unable to point out any species with which it has a close affinity.

13. *Pol. Königii*, n. s. Pileo tenui rigido duro semiorbiculari subtiliter pruinoso-velutino glabrescente lineato-punctulato cervino zonis obscurioribus castaneove; margine obtusiusculo; poris parvis distinctis rotundis; dissepimentis subintegris; contextu ferrugineo pallidioribus. "*Bol. spadiceus*," Kön. Herb. Mus. Brit. "*Bol. castaneus*, Fl. Zeyl.," Kön. l. c. ut videtur provector.

Ceylon, König. Herb. Mus. Brit.

Pileus 2—3 inches broad, thin, very hard and rigid, semi-orbicular, not undulated, marked with little linear pits, at first clothed with obscure velvety down, fawn-coloured with rufous zones. Stem very short, lateral, arising from an elongation of the vertex. Substance corky, ferruginous. Pores small,  $\frac{1}{100}$ th of an inch broad, distinct, round, with their borders even, paler than the flesh.

*Boletus castaneus*, Kön., is the same species of a more rufous tinge, with the stem more evidently arising from the vertex, and fewer zones.

14. *Pol. (Trametes) lactineus*, n. s. Pileo sessili irregulari subcrasso duro rigido azono suberoso lacteo pruinoso-velutino inæquali verruculoso; margine lobato; hymenio pallido; poris mediis rotundis dissepimentis crassis obtusis. "*Boletus lacteus*," König in Herb. Mus. Brit.

König, Herb. Mus. Brit., without habitat.

Stemless. Pileus 7 inches broad,  $3\frac{1}{2}$  inches long, irregular, very hard and rigid, corky, rather thick, lobed, zoned ss, clothed with a uniform, very short, pruinose velvety down, uneven, with numerous little warts. Hymenium pallid, wood-colour; pores middle-sized,  $\frac{1}{8}$ th of an inch broad, perfectly round, with thick obtuse dissepiments; substance of a pallid wood-colour.

15. *Pol. (Trametes) aureus*, n. s. Pileo convexo dimidiato conchiformi sessili setis brevibus aureis vestito; zonato; mar-



gine acutissimo ; hymenio sub-brunneo ; poris longis pallidolignicoloribus mediis, acie irregulari denticulata.

Without habitat. Herb. Mus. Brit.

Pileus  $2\frac{1}{4}$ —3 inches broad,  $1\frac{1}{2}$  inch long, conchiform, clothed with bright, tawny, straight, short, more or less distinct bristles, distinctly zoned with darker shades ; margin extremely acute and rigid, very slightly waved, substance thin. Hymenium brownish ; pores long,  $\frac{1}{80}$ th of an inch broad, pallid wood-coloured, with a distinct trama, middle-sized, irregular ; edge slightly toothed ; margin barren.

This species is evidently allied to *Pol. suaveolens*, but it is a much more beautiful plant, and differs greatly in its shortly setose pileus.

16. *Pol. (Trametes) laticolor*, n. s. Pileo sessili semiorbiculari tenui suberoso-coriaceo subzonato carneo-fulvo subpruinoso ; contextu lignicolori, poris magnis rotundis acie obtusa. On decayed trunks of trees in woods.

Ceylon. König in Herb. Mus. Brit.

Pileus 2 inches broad,  $\frac{3}{4}$  inch long. Stemless, semiorbicular, thin, suberoso-coriaceous, very obscurely zoned, bright fawn-coloured, slightly uneven, nodulose behind, clothed with extremely obscure pruinose down. Substance wood-coloured, velvety ; edge thin, not lobed. Hymenium nearly even ; pores large,  $\frac{1}{4}$ th of an inch broad, round, their dissepiments obtuse.

The only species to which this appears to be allied is *Pol. (Trametes) Beyrichii*.

17. *Polyp. dubius* (Kön. sub *Boleto*). Pileo fuliginoso-fulvo, coffeato-pruinoso sessili basi effusa semiorbiculari quandoque obliquo tenui duro rigido e sulcis radiantibus zonis decussatis rugoso ; margine obtusiusculo ; contextu duro suberoso cervino ; poris mediis badiis irregularibus angulatis dissepimentis tenuibus sæpe confluentibus. "*Bol. dubius*, Fl. Zeyl.," Kön. in Herb. Mus. Brit. On rotten wood in shady woods.

Ceylon, König. Herb. Mus. Brit.

Pileus 3 inches broad,  $1\frac{1}{2}$  inch long, stemless, effused at the base, thin, very hard and rigid, semiorbicular, at length sometimes oblique, tawny brown, with a coffee-coloured bloom, rugged, with radiating furrows, which are crossed by many narrow zones ; edge thin, but obtuse. Substance hard, corky, fawn-coloured ; pores middle-sized,  $\frac{1}{8}$ th of an inch broad, bay, irregular, angular ; dissepiments rather thin, often confluent.

There is a *Polyporus* also from Ceylon in König's collection, which, though differing in some points, I refer to the same species. Some specimens are scarcely at all zoned, though others, especially when young, have many zones. The most striking difference consists in the absence of the strong radiating furrows, which give the state described as normal a re-

markedly wrinkled appearance. The pores and substance are alike, which are the points on which the greatest stress must be laid when difficulties occur. The pores however, especially in *Hexagona*, vary much in size, so that even these are not always decisive. This state appears to approach *Pol. levissimus*, Fr. Ep. The colour in these specimens is far brighter.

18. *Polyporus supinus*, Fr. *Boletus resupinatus*, Swtz. ! Pr. p. 149. *B. supinus*, Fl. Occ. p. 1926 = *Pol. Valenzuelianus*, Mont. !

The plant of Montagne, of which a figure will appear in the history of Cuba, is precisely that of Swartz. It was next to impossible without inspection of specimens to have ascertained their identity, the name of Swartz being altogether inapplicable, as the species is not resupinate. The name could have arisen only from an accidental inversion of the specimens obtained, which Swartz informs us were very few.

19. *Polyporus zonalis*, (Kön. sub Bol.) *Suberosus tenuis imbricato-multiplex sessilis lateraliter connatus rigidus*; pileis semiorbicularibus rotundato-lobatis repetito-zonatis rugulosis pruinosis cervinis; zonis glabris subnitentibus rufis, margine acuto; poris minutissimis fusciscentibus. "*Boletus zonalis*, Fl. Zeyl.," König.

Ceylon, König. Herb. Mus. Brit.

Imbricated; pilei 1—2 inches broad,  $\frac{3}{4}$ — $1\frac{1}{4}$  inch long, sessile, lobed; lobes roundish or reniform, very hard and rigid, corky, contracted in drying, pruinose, fawn-coloured, with numerous rufous, smooth and rather shining furrow-like zones, with many of the interstices raised and forming sharp ridges; rugulose, in some specimens regularly decussated by minute radiating lines; edge very thin. Pores extremely minute, invisible to the naked eye, except a few whose orifices are oblique, brownish.

This species is allied to *Pol. microporus*, but differs from it in its regularly zoned brightly coloured pileus and in its whole habit. It is perhaps more nearly allied to *Polyporus micromegas*, Mont., but the specimens of that species hitherto obtained are so few and imperfect as to make it impossible to speak positively; better specimens may prove them scarcely at all allied. It is a very beautiful species.

PLATE X. fig. 5. *Polyporus zonalis*, nat. size.

20. *Polyporus microporus*, Fr. *Pileo lignoso effuso-reflexo rugoso glabro pallido intus albido, poris minimis acutis pallidis fusciscentibus. Boletus microporus*, Swartz! Fl. Ind. Occ. p. 1925.

Jamaica, Swartz. Herb. Mus. Brit.

Pileus 2—3 inches broad, widely effused behind; margin

free, reflexed, waved, rugose, unequal, rigid, pallid, wood-coloured, zoned, very obscurely silky. Substance hard, pallid; margin very acute. Tubes very slender, stratose; orifices very minute\*, nearly invisible to the naked eye, at first wood-coloured, then pale gilvous, at length, according to Fries, brown, angular or subrotund: dissepiments very thin, acute.

This species resembles in many respects *Polyporus Auberianus*, Mont., as the foregoing does *Pol. micromegas*, Mont. It is allied to *Pol. ulmarius*. Fries describes this species as zoneless, but the specimen in the British Museum from Swartz is very evidently zoned. *Polyporus Auberianus* also is sometimes without zones or furrows; it differs so much in its large size and free development, that, from the inspection of a single specimen only of either species, it would be rash to give too decided opinion as to their identity.

PLATE X. fig. 6. *Polyporus microporus*, nat. size.

21. *Polyporus scytinus*, n. s. Pileis basi effusis lateraliter connatis limbo semiorbiculari coriaceo flexili pallide badiosufusco zonato spongioso-tomentoso; margine tenui acuto; poris parvis subirregularibus, dissepimentis subobtusis pileo concoloribus. Cum. Phil. n. 2031.

Philippine Islands, Cuming. Herb. Mus. Brit.

Pilei 3 inches broad,  $2\frac{1}{2}$  long, stemless, effused at the base, horizontal, semiorbicular, scarcely lobed, laterally confluent, coriaceous, flexible, of a pallid bay-brown, repeatedly zoned, clothed with short spongy down; edge thin, acute, barren. Substance of the same colour as the pileus, soft, like that of *Polyporus fomentarius*. Pores short, small,  $\frac{1}{96}$ th of an inch broad, rather irregular, their dissepiments rather obtuse.

Very much resembling *Polyporus caperatus*, but not so rigid and the pores are much larger. This species was not in the set described in the 'London Journal of Botany' from Sir W. J. Hooker's herbarium nor in my own.

The specific name of *Pol. intybaceus*, Berk., in 'Lond. Journal of Botany,' a species from the Philippine Islands, being pre-occupied, I beg to substitute for it that of *Pol. cichoraceus*.

22. *Polyporus Floridanus*, n. s. Pallide badius, pileis subflabellaribus lateraliter connatis tenuibus coriaceis zonatis pubescentibus; zonis glabrescentibus; poris parvis irregularibus subdentatis contextu gilvo-badio.

Eastern Florida, near Matanza. On dead trees.

Val. Gardner, Esq. Herb. Mus. Brit.

Pilei forming patches 5 inches or more broad; the individuals of which they are formed being about 2 inches broad,  $1\frac{1}{2}$  long, laterally connate, subflabelliform, very thin, coria-

\* In the figure they are too strongly expressed.



ceous, repeatedly zoned, clothed with very short dense pubescence, which in the darker zones, which are comparatively smooth, is arranged in lines; margin very slightly lobed, extremely thin and acute; substance corky. Pores small,  $\frac{1}{100}$ th of an inch broad, irregular; dissepiments shortly dentate, elongated; margin barren, obscurely tomentose. Colour of the whole plant, including the substance, of a more or less pallid bay, like that of *Thelephora laciniata*.

The nearest ally of this species is *Pol. scytinus*, described in the present memoir. It is a smaller plant of a very different form, not to mention other points of distinction.

23. *Pol. zeylanicus*, n. s. Pileo valde tenui lobato coriaceo gilvo-cervino lineis pliciformibus fasciculato-fibrosis exasperato; postice scabroso; poris submagnis dissepimentis tenuibus dentatis elongatisque. "*Bol. radiatus*, Fl. Zeyl.," König in Herb. Mus. Brit.

Ceylon, König. Herb. Mus. Brit.

Pileus 2 inches long,  $2\frac{1}{2}$  inches broad, stemless, very thin, lobed, coriaceous, marked with radiating fold-like lines, which bear branched fascicles of fibres, and towards the base are rough with isidiiform processes, reddish fawn-colour with a satiny lustre. Substance fawn-coloured, silky. Pores rather large,  $\frac{1}{36}$ th of an inch broad, their edge toothed and elongated; margin extremely thin and acute, barren. Resembling *Pol. sericeo-hirsutus*, Kl. (*Hexagona sericea*, Fr.), with somewhat of the aspect of *Hexagona polygramma*, Montagne.

24. *Pol. nigro-cinctus*, n. s. Imbricatus rigidus; pileo fragili villo strigoso cinereo vestito; margine brunneo; poris parvis subcinereis. "*Boletus fragilis*," König in Herb. Mus. Brit.

Ceylon and elsewhere, König. Herb. Mus. Brit.

On trunks of trees, but not common.

Stemless, imbricated, with the habit of a small *Stereum*. Pileus one inch broad, half an inch long, thin, rigid, clothed with cinereous, rigid, matted, strigose hairs or bristles, with one or two zones; margin slightly lobed, striate, deep brown, extremely acute, forming occasionally a crest-like ridge. Pores small,  $\frac{1}{80}$ th of an inch broad; dissepiments rigid, cinereous, wood-coloured.

Two forms or rather states of this species occur: one, which seems to be the more normal form, described above; the other from Ceylon, on charred wood, is more regular and occasionally almost smooth, with the pores irregular and the dissepiments obtuse.

I am unable to point out any species to which it is nearly allied, except perhaps *P. cingulatus*.

25. *Pol. galbanatus*, n. s. Pileo subtenui plano suberoso obsolete zonato luteo-velutino setis longioribus passim im-

mixtis; hymenio pallide flavo; poris parvis subrotundis dissepimentorum acie æquali. "*Bol. lutescens*," König in Herb. Mus. Brit.

Habitat unknown. Herb. Mus. Brit.

Pileus sessile, plane,  $2\frac{1}{2}$  inches broad;  $1\frac{1}{2}$  inch long, rounded, rather thin, corky, obsoletely zoned, clothed with velvety down, towards the middle adorned with zones of longer and stiffer bristles; margin obtuse, even; disc slightly waved. Hymenium pallid yellow; pores small,  $\frac{1}{90}$ th of an inch broad, subrotund; border of dissepiments even.

Allied to *Pol. hirsutus*, but, as it appears to me, very distinct.

26. *Polyporus Menziesii*, n. s. Pileo cuneato antice rotundato tenui coriaceo flexili obsolete zonato lignicolori glabro; poris mediis dissepimentis tenuibus.

Sumatra, Menzies. Herb. Mus. Brit. on charred wood.

Pileus  $1\frac{1}{6}$  of an inch long,  $1\frac{1}{4}$  broad, in front cuneiform, arising from a minute round disc, laterally confluent, very thin and flexible, dull wood-coloured, obsoletely zoned, smooth, minutely radiato-striate in front, where it is rounded and scarcely lobed. Pores middle-sized,  $\frac{1}{80}$ th of an inch broad, angular; dissepiments thin, edge nearly even. Hymenium slightly concave, surrounded by a rather broad barren border.

In form resembling *Pol. sector*, but differing remarkably in the size of the pores.

27. *Polyporus membranaceus*, Fr. Flabellato-multifidus lobatus plicatus pallidus sericeo-striatus glabrescens subnitidus multizonatus membranaceus tenuissimus; poris parvis curtis; dissepimentis tenuibus demum laceris difformibus. *Boletus membranaceus*, Swartz! Prodr. p. 148; Fl. Ind. Occ. p. 1922.

Jamaica, Swartz. Herb. Mus. Brit.

Flabellato-multifid, repeatedly lobed and plicate; lobes rounded, sublaciniate, very thin and membranaceous, sericeo-striate, pallid, at length nearly smooth and shining, adorned with many zones, especially towards the margin, where they are close and regular. Pores ochraceous, small,  $\frac{1}{100}$ th of an inch in diameter, at length irregular; dissepiments very thin, toothed and elongated.

PLATE X. fig. 7. a, *Polyporus membranaceus*, nat. size; b, portion of the hymenium magnified.

28. *Dædalea inæquabilis*, n. s. Pileo tenui suberoso-coriaceo subrigido multizonato, subundulato, glaberrimo lignicolori; poris magnis plus minus elongatis, dissepimentis tenuibus acie acuta sæpe lacera.

Ceylon, König. Herb. Mus. Brit.

Pileus oblique, sessile,  $2\frac{1}{4}$  inches long, and about as much broad, thin, rather rigid, corky, wood-coloured, quite smooth,

repeatedly but not strongly zoned, slightly undulated and uneven; edge very thin and acute; substance of the colour and consistence of cork. Pores large,  $\frac{1}{16}$ th— $\frac{1}{20}$ th of an inch broad; dissepiments rather thin, acute, often torn and elongated behind, very shallow towards the margin, wood-coloured like the pileus. The pileus does not shine, but though of a different colour has somewhat the aspect of that of *Hexagona tenuis*. It resembles *Dædalea tenuis*, but is much more zoned, and the dissepiments are much thinner.

29. *Hexagona Wightii* (*sphalmate Wrightii*), Fr. *Polyporus* (*Scenidium*) *Wightii*, Kl. in Linn. vii. p. 200. *Boletus Favus*, L. Ins. Ind. Or., A. Dalrymple, Esq. Herb. Mus. Brit.

*Hexagona tenuis* is marked in the Linnæan Herbarium *Boletus Favus*, but not by Linnæus, with whose description it does not correspond. The name is evidently not authentic.

30. *Hexagona Königii*, n. s. Pileo suberoso-coriaceo subreniformi subazono plano fibroso-setoso gilvo-badio; alveolis irregularibus amplis, dissepimentis elongatis subflaccidis setulosis.

Ceylon, König. Herb. Mus. Brit.

Pileus 3 inches broad,  $2\frac{1}{4}$  long, thin, suberoso-coriaceous, subreniform, from a distinct but not stipitiform vertex, very obscurely zoned, deep red-brown, rugose, clothed with scattered branched rigid bristles, which at length fall off, leaving a raised line; substance ferruginous, velvety, like that of *Pol. fomentarius*; alveoli large, nearly a line broad, very irregular; dissepiments thick, not rigid, elongated and toothed, paler than the pileus, deep setulose within.

This species is very nearly allied to *Hexagona Wightii*, differing principally in the irregular elongated pores with flaccid, not rigid, dissepiments. The pores are so little hexagonal, that were it not for the very evident affinity, it might be placed in the genus *Dædalea*.

31. *Hexagona papyracea*, n. s. Pileo sessili semi-orbiculari, papyraceo, tenui, flexili, subtiliter velutino glabrescente crebri-zonato sanguineo-lignicolorique variegato; hymenio cervino; poris hexagonis regularibus mediis.

Herb. Mus. Brit. Hab. unknown.

Pileus 9 inches broad, 5 inches long, sessile, semiorbicular, thin as paper and very flexible, marked with little raised radiating striæ, repeatedly zoned with intermediate finer lines, variegated with sanguineous and ligneous shades, at first clothed with extremely fine olive-brown velvety down, like a coat of some *Cladosporium*; edge extremely acute, of a more tawny tinge than the rest of the pileus; substance bright fawn-coloured, silky. Hymenium fawn-coloured; pores hex-



agonal,  $\frac{1}{60}$ th of an inch broad, extremely regular, marked on the basal side with concentric lines.

This very fine and striking species, of which unfortunately the locality is unknown, resembles most a species gathered by Schomburgk in Brazil, which I have communicated to Dr. Montagne under the name of *H. variegata*, but which is considered by him as a non-setose state of his *Hexagona aculeata*. Both are entirely destitute of the strong fascicles of hairs or bristles which are so remarkable in many species.

32. *Hexagona sericea*, Fr. *Polyporus sericeo-hirsutus*, Kl. ! in Linn. viii. p. 483. = *Boletus villosus*, Swartz ! Prodr. p. 149; Fl. Ind. Occ. p. 1933.

The specimen in the Herbarium of the British Museum, marked by Swartz himself, is exactly the plant of Klotzsch. Fries however keeps the two distinct.

33. *Hexagona tenuis*, Fr. = "*Bol. Psidii*," Kön. in Herb. Mus. Brit.

This species varies much in the size of the pores. It is probable that the number of species in this genus, though small, will hereafter be considerably reduced.

34. *Hydnum flavum*, n. s. Pileo sessili suborbiculari convexo tenui "pallide flavo" glaberrimo, hymenio pallido, aculeis brevissimis granulato-denticulatis. *Peziza flava*, Swtz. ! Prodr. p. 150; Fl. Ind. Occ. p. 1933.

On wood. Jamaica, Swartz ! Herb. Mus. Brit.

Pileus  $1\frac{1}{2}$  inch long, nearly as much broad, suborbicular, but involute when dry, stemless, attached by the apex, thin, perfectly smooth and shining, of a bright orange-yellow when dry, darker at the margin, which is very acute. Hymenium pale; aculei very short, subcylindrical, with a few acute granular processes at the apex.

It gives me much pleasure to be able to clear up a very doubtful species, which proves to be a very beautiful and interesting *Hydnum*. The aculei are so minute as almost to justify the association of the species with *Grandinia*. The genera of *Hymenomyces* at present are however so unsettled, that I prefer placing it in *Hydnum*. Swartz described the smooth outer surface of the pileus as the hymenium; it contains however no asci, and is most certainly the upper surface, as will be seen by the figures.

PLATE X. fig. 8. *a*, *Hydnum flavum*, nat. size; *b*, section magnified; *c*, a portion of the substance of the pileus highly magnified.

35. *Hydnum discolor*, Fr. Pileo sessili carnosio convexo lævi glabro pallido, aculeis cylindricis obtusis subulatisve æqualibus ferrugineis. *Hydnum agaricoides*, Swartz ! Prodr. p. 149; Fl. Ind. Occ. p. 1927.

On wood. Jamaica, Swartz. Herb. Mus. Brit.

Stemless,  $1\frac{1}{2}$  inch or more across, convex, attenuated behind, semi-orbicular, rather thick, pale, with a few indistinct zones, fleshy and brittle when fresh, when old tough and dark like the prickles; smooth, except towards the very slightly undulated margin, where it is scabrous; substance pale; prickles 2—3 lines long, crowded, simple, diaphanous, ferruginous brown, cylindrical, slender, obtuse, or acute.

In the dry state the pileus is nearly as dark as the prickles, but the substance remains pale.

*Hydnum sericeum*, Swtz.! (*Thelephora sericea*, Fl. Occ. p. 1928) belongs to the genus *Dichonema*, or rather *Dictyonema*, for the latter seems to be a more perfect state of the former.

PLATE X. fig. 9. *d*, *Hydnum discolor*, nat. size; *e*, section near the margin, magnified.

36. *Thelephora setosa*, Swtz. Imbricata e basi effusa reflexa ferrugineo-fusca fibris ramosis vestita subzonata; hymenio inæquabili granulato setuloso. *Hydnum resupinatum*, Swartz! Prodr. p. 149. *Thelephora setosa*, Fl. Ind. Occ. p. 1929.

Jamaica, Swartz. Herb. Mus. Brit.

Pilei stemless, imbricated, 1 inch or more broad,  $\frac{3}{4}$  of an inch long; base effused, margin reflected, of a dull ferruginous brown, obscurely zoned, clothed with coarse branched fibres somewhat after the manner of *Pol. hydnoideus*,  $\frac{1}{4}$  of an inch long, which compose almost the whole substance of the pileus. Hymenium granulated, of the same colour as the pileus, with very minute scattered bristles.

An extremely curious and well-marked species, being to *Thelephora* what *Corticium crinitum* is to *Corticium*.

PLATE XI. fig. 10. *Thelephora setosa*, nat. size.

37. *Stereum pusillum*, n. s. Cartilagineo-coriaceum, pileo flabellari nitide umbrino-rufo azono sericeo-striato glabro; margine acutissimo tenui lobato; stipite curto sublaterali erecto, hymenio pallido lævi glabro. "*Clavaria pezizæformis*, Fl. Zeyl.," König in Herb. Mus. Brit.

Ceylon, König. Herb. Mus. Brit.

Stem  $\frac{1}{4}$  of an inch high, lateral but vertical, giving off a flabelliform pileus not  $\frac{1}{2}$  an inch long and broad, slightly lobed, laterally connate, rather rigid, smooth but sericeo-striate, of a bright burnt umber, not zoned; edge very thin, divided into two or three obtuse lobes. Hymenium pale, smooth, quite free from bristles. Allied to *Stereum elegans*.

38. *Stereum reniforme*, Fr. Ep. p. 546. "*Helvella nova*." Herb. Mus. Brit.

Herb. Mus. Brit. Without habitat. Probably from Swartz.

Stem more than an inch high, about one line thick, lateral, attenuated upwards, downy, ferruginous, sprinkled, as is the whole plant, with short bright brown setæ. Pileus 1 inch broad, about  $\frac{1}{2}$  an inch long, thin and flexible, but coriaceous, reniform, slightly lobed, obscurely zoned, marked with very fine radiating raised lines of a golden cinnamon-brown. Edge very thin and acute, slightly waved. Hymenium even, of the same colour as the pileus, setulose.

I have referred this beautiful plant to *S. reniforme*, Fr., with which it very closely agrees, differing chiefly, as far as may be judged from the short diagnosis, in its more golden hue. The colour and substance are exactly those of some of the bright-coloured exotic forms of *Stereum rubiginosum*.

PLATE XI. fig. 11. *Stereum reniforme*, nat. size.

39. *Stereum atratum*, Fr. Umbonato-sessile, pileo tenui rigido lævi fusco nigro-fasciato subtiliter olivaceo-velutino demum glabro versus marginem undulatum pallidiori; hymenio demum rimoso glabro atro. *Helvella atrata*, Swartz! Prod. p. 149. *Thelephora atrata*, Fl. Ind. Occ. p. 1933.

Jamaica, Swartz. Herb. Mus. Brit.

Pilei  $1\frac{1}{4}$  inch long, 1 inch broad, laterally connate, rotundato-cuneiform, slightly lobed or undulated, thin but very rigid, clothed at first with minute subolivaceous velvety down, dark brown, with narrow black concentric bands; substance cervino-ferruginous. Hymenium dark brown, rather scabrous but not bristly, concentrically cracked.

The specimen which I have had an opportunity of inspecting is old and in a bad state, but it presents one or two characters not noticed by Fries.

PLATE XI. fig. 12. *Stereum atratum*, nat. size; *a*, upper side; *b*, hymenium.

40. *Stereum versicolor*, Fr. Umbonato-sessile submembranaceum; pileo subtiliter villosa; villis radiantibus; zonis marginæ glabrescentibus fuscis variegato; hymenio lævi glabro pallido. *Helvella versicolor*, Swartz! Prod. p. 149. *Thelephora versicolor*, Fl. Ind. Occ. p. 1934.

Jamaica, Swartz! Herb. Mus. Brit.

Pilei 1 inch long, laterally connate, umbonato-sessile, of a tawny ligneous hue, variegated with narrow concentric bands of greater or less intensity, coriaceo-membranaceous, lobed and undulated, clothed with silky villous fascicles, all lying in a radiating direction. Hymenium pale ochre, very smooth.



The distinguishing character of this elegant species appears to depend on the peculiar nature of the villous coat. *Stereum lobatum* is also characterized by Fries as villous, but in one of the forms, that published by Klotzsch in the 'Linnæa,' the pubescence is thickly matted, none of the individual hairs projecting beyond the main mass; while in the other, though the hairs are more distinct, there is nothing like the radiating arrangement which is visible in Swartz's specimens. The habit too is different. *S. versicolor* is a much smaller species. The subject being really one of some difficulty, a figure from authentic specimens cannot fail to be acceptable.

PLATE XI. fig. 13. *a a*, *Stereum versicolor*, nat. size; *b*, portion magnified.

41. *Guepinia palmiceps*, n. s. Stipite compresso subtiliter velutino cum pileo palmato-lobato confluyente; hymenio subplicato rufo. "Clav. muscoides, Fl. Zeyl."

Ceylon. Herb. Mus. Brit., König.

From  $\frac{1}{2}$  to  $\frac{5}{4}$  of an inch high; stem compressed, dark at the base, fawn-coloured, clothed, as is the pileus, with very minute velvety down, divided into two or more branches, which expand above into a somewhat spathulate pileus, with about six nearly equal, sometimes emarginate lobes; margin slightly thickened, subreflexed. Hymenium very obscurely folded, deep rufous.

PLATE XII. fig. 14. *a a*, & 15 *b*, left side, *Guepinia palmiceps*, nat. size.

42. *Guepinia fissa*, n. s. Stipite compresso subtiliter velutino; pileo fisso, lobis demum linearibus; hymenio luteo. "Clavaria lutea, Malacca and Siam."

König. Herb. Mus. Brit.

Nearly of the same size as the foregoing; pileus irregularly split into more or less linear lobes, which are themselves slightly lobed at the side. Hymenium ochraceous yellow.

Very much resembling the last, but differing in the less regular mode of division and in the paler hymenium. The clothing of the pileus and of the stem is the same in both species.

Both the species have a strong resemblance to *Guepinia spathularia*; but after an inspection of abundant specimens of the North American species, which has the hymenium very much more strongly plicate, I am inclined to consider them as distinct.

PLATE XII. fig. 15. *b*, the right hand figure, *Guepinia fissa*, nat. size.

43. *Clavaria compressa*, n. s. Pallida, mycelio fibrilloso niveo, stipite compresso, furcato; ramis paucissimis tenuibus cylindricis; apicibus acutis.

Jamaica. Herb. Mus. Brit. On rotten wood.

Plant  $1\frac{1}{4}$  inch high; mycelium white, branched, fibrillose, penetrating into the wood; stem compressed,  $1\frac{1}{2}$  line thick, springing from a broader base, divided above into four principal, rather flexuous, slender cylindrical branches connected at the base, and forked once or twice only; tips very acute. The whole plant is of a pallid ochraceous hue.

This species is evidently allied to *Clavaria crispula* and *byssiseda*. It agrees more with our common forms of *Clavaria* than those which are peculiar to the Tropics.

PLATE XII. fig. 16. *Clavaria compressa*, nat. size.

44. *Exidia rufa*, n. s. Cupularis sublateralis intus nigra; extus setis brevibus fasciculatis rufis vestita.

Herb. Mus. Brit. Ceylon, König.

Two or three inches or more across, cup-shaped, generally attached laterally; very hard and rigid when dry; slightly plicate at the base, clothed with short, fasciculate, hispid, bright sienna-brown bristles. Hymenium smooth, not much wrinkled, dark brown, inclining to black. Very distinct from every species I have seen in its bright red-brown bristles. The nearest species is *Exidia polytricha*, Mont.

PLATE XII. fig. 17. *Exidia rufa*, nat. size.

45. *Exidia fusco-succinea*, Mont.

Jamaica, Mr. Poore. Herb. Mus. Brit.

This is perhaps *Pez. nigra*, Swartz, which is certainly an *Exidia*.

46. *Sphæria thyrsus*, n. s. Suberosa, simplex, clavula obovata acuminata pallida, peritheciis sursum spectantibus magnis, ostiolis subelongatis obtusis nigris; stipite elongato cylindrico deorsum longissime radicato. "*Clathrus acuminatus*," Roxb.

In the Botanic Garden, Calcutta. Herb. Mus. Brit.

Whole plant nearly six inches high, rooting deeply into the soil; root flexuous, attenuated downwards; stem cylindrical, nearly equal, black, slightly wrinkled, white within, surmounted by the pale fawn-coloured, acuminate, obovate head, which is rough from the protrusion of the black ostiola, which all point upwards, so as to give it the appearance of a little fir-cone. Perithecia obovate, with a short neck. Asci linear, obtuse, containing eight subcymbiform dark brown sporidia, which are furnished on one side with a gelatinous coat projecting beyond the apices.

This species, of which I understand from Dr. Brown much larger specimens occur, is allied to *Sph. pedunculata*, Dicks.

Like that species, the sporidia have a gelatinous coat, but surrounding only one side, like an arillus. This is sometimes contracted at the sides, so that a portion of it projects at either end of the sporidium, forming a little transparent appendage. It is probable that in an earlier stage of growth the coat entirely surrounded the sporidium.

PLATE XII. fig. 18. *Sphæria thyrsus*, nat. size; *a*, ostiola and perithecia; *b*, ascus with its sporidia; *c*, sporidium with its gelatinous appendage. All more or less magnified.

47. *Sphæria ianthino-velutina*, Mont.

*Clavaria fusca*, Swartz! Prod., is referable to this or some closely allied species. The specimens are very imperfect, and without fruit.

48. *Sphæria escharoidea*, n. s. Suberosa simplex clavula cylindrica apiculata ex ostiolis conicis prominulis scabra, pallida; stipite elongato, cylindrico, radicato. "*Clavaria pistillaris?* membrana escharoidea tecta. Fl. Zeyl." König in Herb. Mus. Brit.

Ceylon, Dr. König. Herb. Mus. Brit.

Whole plant about 3 inches high, rooting deeply; root nearly equal, flexuous, uneven, nodulose, about  $\frac{3}{4}$  of a line thick; stem 1 inch high, cylindrical, equal, slightly thickened at the base, about  $\frac{1}{3}$ rd of a line thick, black, washed with a dull white coat, minutely striate or wrinkled, quite smooth; head cylindrical, equal, nearly an inch high, obtuse at either end, tipped with a sharp apiculus, pallid, rough, with the conical prominent ostiola of the small perithecia. Sporidia not yet developed.

A very distinct species, which can scarcely be confounded with any described by authors. The head resembles the spike of a *Peperomia*.

PLATE XII. fig. 19. *Sphæria escharoidea*, nat. size.

49. *Sph. œdipus*, Mont. Jamaica. Herb. Mus. Brit.

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XLVI.—*Observations on a new Group, Genus and Subgenus, of Freshwater Confervæ, with descriptions of Species mostly new.* By ARTHUR HILL HASSALL, Esq., M.R.C.S.L. Corresponding Member of the Dublin Natural History Society.

[Concluded from p. 344.]

It now becomes necessary that I should make a few brief remarks upon the classifications of the younger Agardh and M. J. Decaisne, but only in so far as these have reference to the group *Vesiculaspermæ*.



M. Agardh divides the Algæ into two classes, of one only of which we have at present to speak, viz. the Zoospores, which are made by Agardh to embrace the following orders: *Nostochinæ*, *Oscillatoria*, *Confervæ*, *Conjugatæ*, *Ectocarpæ*, *Ulvaceæ*, and *Siphonaceæ*. It is thus characterized:

“Materia granulosa interna uniuscujusque loculi (cellulæ articuli vel tubi) frondem constituentis tandem in fructificationem abeunte; sporidiis maturitate motu præditis et singulis loculis per porum unicum egredientibus, demum, per extensionem evolutis. Viridescentes incolæ præcipue aquæ dulcis marisque minus salsi, in scrobiculis sinibusque, rarissime in aperto vel profundiori mari.”

From this most extensive class as constituted by Agardh, in which the most diverse productions are evidently embraced, M. J. Decaisne, as already noticed, has removed the *Conjugatæ* of Vaucher, and raised them into a distinct group under the name of Synspores, doubtless on very sufficient grounds; and I have contented myself with subtracting the true freshwater *Confervæ*, concerning the reproduction of which such erroneous notions are entertained both by Agardh and M. J. Decaisne; the opinion of the latter differing only from that of the former in the disbelief of the motion of the zoospores, I feel at the same time assured that it ought to be reduced within still narrower limits. Although I am not disposed to go the length of questioning the existence of the motion of zoospores in all *Confervæ*, I yet feel confidence in doing so in reference to all freshwater *Confervæ* with simple filaments, whether belonging to the group of *Synsporeæ*, the *Vesiculaspermæ*, or the *Sphæropleæ*, excluding only *C. mucosa* and *C. punctata*.

Many other objections besides those already urged in the course of these remarks might be raised to Agardh's definition of the zoospores; but for the present I pass these by, reserving one or two observations, until we come to speak of the zoospores as limited by M. Decaisne.

M. Decaisne thus defines the zoospores, which he makes to embrace only the *Nostochinæ*, the true *Confervæ*, and the *Ulvaceæ*: “Ont la spore formée aux dépens de la matière verte qui s'organize à l'intérieur de chacun des articles ou utricles qui composent toute la plante; chacun de ces organes peut contenir une seule ou plusieurs spores.”

And again, M. Decaisne, in another part of his memoir, thus more particularly defines the true *Confervæ*, or *Vesiculaspermæ*: “Les Conferves proprement dites, dont les filaments n'offrent jamais le curieux phénomène de la conjugation, et chez lesquelles les spores sortent des tubes sous la forme de

vésicules extrêmement petites, ordinairement munies, au centre, d'un globule plus transparent, qui se colore soit en lilac, soit en brun, par l'action de l'iode."

From what has been said of the true *Confervæ*, it is evident that both of the above definitions are full of error, in so far as they have reference to the *Confervæ* proper. Thus I have shown that more than one spore is never contained in the same cell; that this spore is not formed, as described in the first definition, at the expense of the green matter, "qui s'organise à l'intérieur de CHACUN des articles ou utricles qui composent toute la plante," but from the concentration of the matter in two contiguous cells of the same filament: nor, as stated in the second, are they "extrêmement petites vésicules," but large elliptical spheroidal or ovate bodies of the same dimensions and structure as the similar bodies of the *Conjugatæ*.

I have shown, too, that the majority of the *Confervæ* with simple unbranched filaments are perpetuated by means of true spores and not zoospores, and that these spores are in all these cases formed in the same manner by the union and concentration of the contents of two cells, placed either, as in some but not all *Conjugatæ*, in two distinct filaments, or in the same filament, as in the *Vesiculaspermæ* and *Sphæropleæ*, a statement now for the first time promulgated, and upon the important conclusion from which, with reference to the animality of the *Confervæ* and *Spirogyræ* in particular, I have already dwelt.

The passage of the contents of one cell into the interior of a contiguous one has not hitherto, I believe, been witnessed by any observer. I was lately so fortunate as to notice the manner of this transference in one of the species of the genus *Vesiculifera*. It would appear not to be a momentary operation, but a continued action, being the result of a sustained attraction existing between the contents of the two cells, but most powerfully in that in which the seed is to be formed. This attraction occasions the separation, at intervals of some minutes, of three or four of the bright spherules, which, with a thick colourless fluid, compose the contents of the cells, which, when separated, immediately start into the seed-bearing cell, and unite with the material already there.

The tapering of the filaments alluded to in the definition of the genus requires a careful examination for its detection, and accounts satisfactorily for the variable size of the filaments in the same species; indeed, the more closely we study these productions the more satisfactory will be the investigation of them, and the fewer the number of the supposed anomalies.

The cause of the variation in the length of the joints has been explained by the discovery of the law which governs the development of the Confervæ generally; and here, again, observation affords a reason for the difference of diameter observable among the filaments of the species of this genus. The more simple the structure of any plant, the more simple and isolated will be the laws which preside over its œconomy, and the fewer consequently should be the abnormal conditions to which it is subject.

#### *New Species.*

*Vesiculifera princeps.* Filaments of considerable diameter; cells usually rather longer than broad; spores circular, lying in cells, which in the thickest part of the filaments are scarcely inflated, but are more so near their terminations.

The above species is to be referred without doubt to the *Prolifera composita* of Vaucher, which the elder Agardh considered merely to be a variety of his *Conferva capillaris*. It would appear, however, to be specifically distinct from the *Conferva* which I regard as the *C. capillaris* of Agardh.

I have conferred the name of *princeps* upon this species, less from the size of its filaments than from its great abundance, both in this country and on the continent. The generic and specific names of Vaucher are altogether inapplicable to the species, both conveying false impressions with respect to its reproduction; thus the specific term *composita* is derived from a branched parasite which Vaucher observed growing upon it, and which he erred in supposing to be the proliferous offspring. The fact of the parent filament being *simple* and that of the parasite *branched*, ought to have saved Vaucher from this error.

There is a specimen of this species in the herbarium of Dr. Greville, from Caen, put up by M. Chauvin under the name of *C. capillaris*—var.  $\beta$ . *alternata*, Ag.

*Vesiculifera condensata.* Filaments of more considerable diameter than those of the preceding species; cells not so long as they are broad.

This species I conceive to be the *Conferva capillaris* of Agardh, whose name for it I have been obliged to change, inasmuch as it is very distinct from that which is probably the true *C. capillaris* of Linnæus.

It is evidently a very rare species, for I have only met with one small specimen, procured I believe from the lake in the pleasure gardens at Kew.



*Vesiculifera capillaris*, Linnæus? Filaments of considerable diameter; cells varying in length from nearly twice to almost four times their diameter; spores large, circular, contained in distinct inflations of the cells of an evidently ovate form.

I am unable to quote a single synonym for this species with certainty; I am inclined, however, to refer to it the *Conferva tumidula* of 'English Botany\*.'

Very abundant in ponds in the brick-fields near Notting Hill; it also occurs occasionally in the vicinity of Cheshunt.

*Vesiculifera crassa*. Filaments of very considerable diameter; cells usually about five times as long as broad; spores oval, generally solitary, but sometimes binary, contained in cells of a slightly oval form, the length of which exceeds the diameter about twice.

The only species near to which this approaches is *Vesiculifera Landsboroughi*, than which the filaments are thicker, and the inflated cells shorter and less marked.

In a fish-pond at Wood Green near Bury Green, vicinity of Cheshunt.

*Vesiculifera Landsboroughi*. Filaments of considerable diameter, but scarcely so large as those of the preceding species; cells at the period of fructification about five or six times as long as broad; spores oval, contained in inflated cells of an elongated but not regularly oval form; these occur usually single at intervals of three or four cells, but sometimes two are juxtaposed.

I have much pleasure in dedicating this one of the finest species of the genus to the Rev. David Landsborough, by whom the merit of its discovery is shared equally with myself, as an expression of my warm admiration of the devotion displayed by that gentleman to the cause of natural science.

I have met with this species but sparingly myself, but have received excellent specimens of it in a state of reproduction from Mr. Landsborough, who aptly compares the form of the spore-bearing cells to that of the "soldering of lead pipes."

Vicinity of Cheshunt; very rare.—A. H. H. In an old coal-pit near Stevenston, Ayrshire; abundant.—Rev. D. Landsborough †.

\* I am led to suspect, from observations made subsequent to the writing of the above description, that *Vesiculifera princeps* is merely this species in a young condition; however, I am by no means certain of this.

† Under the name of *Conferva tumidula* a fine specimen of this species was sent me by Mr. Ralfs a few days since; but that *Conferva*, as already mentioned, I conceive ought to be referred to *Vesiculifera capillaris*, described above.

*Vesiculifera prolongata.* Filaments more slender than those of the preceding species; cells usually seven times as long as broad; spores oval, contained in inflated cells of an ovate form.

This species is known from *Vesiculifera Landsboroughi* by its finer filaments, longer cells, and ovate form of the spore-bearing inflated cells. I have twice met with it, once in a pond near Louton, and again near Enfield.

*Vesiculifera lacustris.* Filaments nearly equal in diameter to those of *Vesiculifera prolongata*; cells from three to five times as long as broad; spores oval, sometimes almost quadrangular, solitary, occasioning no very considerable enlargement of the cell in which it lies; empty cell next the spore also inflated.

*Vesiculifera lacustris* differs principally from *V. crassa* in the less diameter of its filaments, and in the presence of the inflated empty cell placed next to the spore.

In the New River Reservoir near Cheshunt, sparingly, and other places in the vicinity.

*Vesiculifera paludina.* Filaments of less considerable diameter than those of *Vesiculifera capillaris*; cells two and a half or three times as long as broad; spores at first circular, but subsequently becoming ovate, contained in distinctly inflated cells of an ovate form.

This species bears some resemblance to *Vesiculifera capillaris*, from which it is to be distinguished principally by its smaller size, and the form of the perfect spores.

It is very abundant, and is now (August) to be met with plentifully in fructification, in ponds in brick-fields near Notting Hill.

*Vesiculifera pulchella.* Filaments nearly equal in diameter to those of the preceding species; cells usually two and a half or three times as long as broad, but sometimes twice, and rarely four times as long as broad; spores circular, contained in much inflated cells, which are at first oval, then circular, and lastly somewhat hexagonal.

This is a very fine species, seeking usually rather pure water; it is of an intense and beautiful green colour. I have met with it several times both in the neighbourhoods of Cheshunt and Notting Hill.

*Var. a.* Filaments more slender than those of the preceding species; cells four times as long as broad; spores circular, contained in cells which are nearly of a spherical form.

I am inclined to regard this as a distinct species ; however, it is perhaps safer to consider it for the present, until it has again been met with in other localities, as a variety.

I received a fine specimen of it in fructification from that excellent observer Mr. Ralfs, by whom it was found near Penzance.

*Vesiculifera cardiaca.* Filaments about equal in diameter to those of the preceding species ; cells five or six times as long as broad ; spores circular, contained in much inflated cells, which may be compared to a heart in form.

I have only met with this very distinct species once, in a pond near Notting Hill. There is no other *Conferva* known to me wherewith it could be confounded.

*Vesiculifera ovalis.* Filaments more slender than in the preceding species ; cells five or six times as long as broad ; spores oval, contained in cells of a regularly oval form, and not filling the entire cavity of the cells.

The above species approaches more nearly than any of the others described in this paper to the figure of *Conferva tumidula* in 'English Botany ;' the cells are, however, twice as long as they are said to be in that species. From *Vesiculifera prolongata* it is distinguished by the greater fineness of its filaments, and the more regularly oval form of the spore-bearing cells.

Vicinity of Cheshunt ; very rare.

*Vesiculifera virescens.* Filaments equalling in diameter those of *Vesiculifera dissiliens* ; cells once and a half or twice as long as broad, fasciated ; spores spheroidal, contained in much inflated cells of the same form.

This at the period of reproduction is a peculiarly elegant species, the elegance of its appearance arising from the grace of form and regularity of disposition of the spore-bearing inflated cells.

I have found it in two localities in the vicinity of Notting Hill, near London.

*Vesiculifera dissiliens*, Lyngb. et Ag.? Cells scarcely so long as broad ; spores circular, contained in inflated cells of the same form, which are usually solitary.

The above is a very beautiful species under the microscope ; it is to be distinguished from all others by the shortness of its cells. I have preserved several fine specimens of it in seed. In the herbarium of Dr. Greville I find a specimen of this species, not indeed in a state of reproduction, put up by M. Chauvin, and marked with doubt as *Conferva dissiliens*, Lyngb.



It is certainly not the *Conferva dissiliens* either of Dillwyn's work or of 'English Botany'; that of the latter work being probably identical with *Desmidium mucosum*.

*Vesiculifera ovata.* Filaments of less diameter than those of *V. paludina*; cells three or four times as long as broad; spores at first ovate, but subsequently becoming circular, contained in inflated cells of an ovate form.

I do not see that this species can be confounded with any of the others. I have met with it but in one locality, viz. in a small pond near the New River Reservoir, which is entirely filled by it.

*Vesiculifera concatenata.* Filaments about the thickness of those of *Vesiculifera ovalis*; cells six times as long as broad; spores oval, contained in much enlarged cells of a beaded form, from three to six of which occur contiguously to each other.

The inflated cells in this species appear very large compared with the size of the filaments, and are never, so far as I have observed, solitary, three being generally placed together, but not unfrequently as many as six.

Cheshunt Common, and in a pond near Highgate.

*Vesiculifera aurea.* Filaments of nearly the same diameter as those of *Vesiculifera ovalis*; cells from four to seven times as long as broad; spores oval, frequently of a golden colour, usually solitary, but sometimes binary. When there is but one spore an inflated empty cell is always placed next to it; and when there are two, these lie in adjacent cells, with an enlarged cell not containing a spore next to one or other of them; not unfrequently six or seven contiguous cells are inflated, which gradually taper from the first to the last.

This species has occurred abundantly to me in a pond at Wood Green near Bury Green, vicinity of Cheshunt; it appears to be very distinct from any of the others. In the condition in which I met with it, viz. in seed, the filaments were of a bright russet colour and the seeds golden.

*Vesiculifera fasciata.* Filaments of less diameter than those of *Vesiculifera virescens*; cells about three times as long as broad; spores circular, contained in cells of the same form.

This species approaches more closely than any of the others to *Vesiculifera virescens*, from which it differs principally in being altogether smaller. I do not know whether the cells are fasciated in all stages of their growth, but I should imagine not.

In a pond on Nazing Common, Essex.

*Vesiculifera compressa*. Filaments slender; cells twice or thrice as long as broad; spores contained in inflated cells of a compressed ellipsoidal form.

The filaments are a shade finer than those of the following species, which I have named *Vesiculifera spherica*; and the form of the inflations is also different, being in *V. compressa* not unlike the knobs upon dumb-bells.

In Mr. York's brick-field near Cheshunt.

*Vesiculifera spherica*. Filaments slender; cells about once and a half or twice as long as broad; spores spherical, contained in enlarged cells of the same form.

Vicinity of Cheshunt.

*Vesiculifera fugacissima*. Filaments of less diameter than those of *Vesiculifera spherica*, mucous, and of a light green colour; cells usually as long as broad, but sometimes much longer than broad, at others their breadth exceeds their length.

Although I have not seen this species in a state of reproduction, I have but little hesitation in referring it to the genus *Vesiculifera*, the joints being strongly marked, and when dried somewhat contracted, as is usual with the species of that genus. The filaments, notwithstanding their mucosity, do not exhibit any gloss when in a dried condition, in this also resembling other *Vesiculiferæ*.

Cheshunt Common and High Beach.

*Vesiculifera elegans*. Filaments slender, but of greater diameter than those of *Vesiculifera tenuis*; cells about six times as long as broad; spores oval, contained in greatly enlarged cells of the same form.

There is not a more distinct or prettier species in the genus, differing from *Vesiculifera tenuis* in the greater diameter of the filaments.

I have twice met with it, once near Cheshunt Common and again in ponds on Hertford Heath.

*Vesiculifera tenuis*. Filaments very slender; cells many times as long as broad; spores oval, contained in cells of a much elongated but regularly oval form.

A distinct, graceful, and very rare species.

Vicinity of Cheshunt.

*Vesiculifera Mülleri*. Filaments very slender; cells fully four times as long as broad; spores spherical, contained in inflated cells of a regularly globular form.

This species comes very close to the following.

In the New River Reservoir, and other places in the vicinity of Cheshunt.

*Vesiculifera bombycina.* Filaments more slender than those of the preceding species; cells fully four times as long as broad; spores spherical, contained in inflated cells, which have their sides somewhat compressed. Three or four inflated cells sometimes occur in juxtaposition.

Common, Cheshunt.

*Vesiculifera angusta.* Filaments scarcely equal in diameter to those of *Vesiculifera bombycina*, somewhat mucous; cells usually about three times, but sometimes nearly four times as long as broad.

The joints of this species are somewhat inconspicuous from the fineness of the filaments, as well as from the circumstance of the endochrome filling the entire cavity of the cells. Although I have not seen any of the cells inflated, I yet regard it as a *Vesiculifera*, on account of the contraction of the joints in drying, and the absence of gloss on the filaments. This species is by no means uncommon, and has probably been confounded with *V. bombycina*.

Cheshunt and other places; Ilfracombe, Mr. Ralfs.

*Vesiculifera pygmæa.* Filaments about equal to those of *V. bombycina*; cells rather longer than broad, joints strongly marked.

This species resembles greatly *Sphæroplea vermicularis*, but has longer cells and more strongly marked joints. It often adheres to the roots of trees which grow in the water.

Cheshunt; Penzance, Mr. Ralfs.

#### SUBGENUS.

CHAR. Filaments attenuated, brittle; joints strongly marked, when dry somewhat contracted; filaments lustreless; spores placed in inflated cells, two of which enter equally into the formation of each inflation.

*Vesiculifera composita.* Filaments somewhat slender, very fragile, of a dark chocolate colour; cells rather longer than broad; spores circular, placed in inflated cells of the same form.

So remarkably does this species differ from other *Vesiculasperms*, that I should have hesitated to have associated it with that group, had I not discovered the vesicles upon the species, of which a definition is given above. It agrees with other *Vesiculiferæ* in having attenuated filaments and strongly marked joints, but, on the other hand, it is remarkably distin-



guished from them by its exceeding fragility as well as by the circumstance of the inflations being formed by two cells instead of one, as is the case with all other *Vesiculasperms*.

This is by no means an uncommon species, although it is rare to find it with inflated cells. It appears to prefer pure water, for it is usually met with in ditches in which the water glides slowly along.

Cheshunt marshes; Stevenston, Ayrshire, Rev. D. Landsborough.

Accurate figures, many of them coloured, have been preserved of the whole of the species above described.

## PROCEEDINGS OF LEARNED SOCIETIES.

### ZOOLOGICAL SOCIETY.

Jan. 11, 1842.—William Yarrell, Esq., Vice-President, in the Chair.

A letter from the Society's corresponding member, H. J. Ross, Esq., was read, in which he states that the Common Green Woodpecker of Europe (*Picus viridis*, Auct.) is to be found in great numbers at Trebizond, and that he has shot them as high as Gumushkhaugh, which is between Erzeroum and Trebizond.

M. P. Gervais exhibited a drawing representing the details of a new genus of Marsupial animals, and communicated to the Meeting, in his own name and that of M. Jules Verreaux, the description of this new Mammal, which formed part of a collection brought from Swan River, and, in the opinion of the authors of the paper, will constitute among the *Marsupialia* the type of a distinct family, for which these naturalists propose the name *Tarsipedidæ*, and for the species the name of *Tarsipes rostratus*.

In general appearance, observe the authors, the *Tarsipes rostratus* bears some resemblance to a Shrew (*Sorex*); but the head is longer, and the muzzle is much elongated. The head and body together measure  $4\frac{1}{2}$  French inches, and the tail  $3\frac{1}{2}$  inches. The fur is tolerably dense, and composed of shortish silky adpressed hairs, which are of a slate-grey colour next the skin, and yellowish externally. The back is of a brownish yellow colour, and a dorsal black stripe extends from the shoulders to the base of the tail, and on each side of this stripe the fur assumes a paler hue: the upper part of the head and muzzle are of the same brownish colour as the back; the under side of the body as well as the inner side of the limbs are yellowish; the hairs of the moustaches are brown, and tolerably long, some about one inch in length. The muzzle is terminated by a little *muflé*; the nostrils are laterally pierced and virguliform; the inter-nasal furrow is nearly equal in length to the nostrils. The tail is furnished at the base with fur like that of the body, but the greater portion is covered with short hairs, as in the rat tribe: its extremity is naked beneath, but the naked portion is but a few lines in length. The ears are tolerably short, somewhat rounded, and may be compared to those of the Shrews.

The animal is plantigrade; its hinder limbs are rather longer than those in front. The palm of the hand is naked, as well as that of the foot, which is rather narrow and somewhat elongated, as in certain climbing Mammals. The fore-feet are provided with five toes, which are free, moderately short, and naked beneath as well as the part above, on the ungueal phalanx of which the digital pad is large, and forms a little cushion, as in the fingers of the *Lemuridæ* which are provided with three pairs of mammæ (*Tarsius*, *Galago*, and *Cheirogale*): the thumb has the same direction as the other fingers, and like them it has a little depressed nail, which covers but a small portion of the apical fleshy pad. The middle finger is the largest, the fingers joining it are nearly equal in length, and the thumb is rather shorter than the outer finger.

The principal peculiarities in the hinder limbs consist in the smallness of the middle toe and that next it on the inner side, and these toes are united as far as the last phalanx, as in the Syndactyle *Marsupialia*, and like these animals, are provided each with a pointed nail bearing some resemblance to a little hoof. The thumb is opposable to the other toes, has no nail, but terminated by a fleshy pad: the fourth and fifth toes are provided with a pad similar to that of the corresponding toes of the fore-feet; they have moreover small depressed nails, which do not extend to the outer margins of the pad: the fourth toe is the largest, and the fifth, though shorter, extends beyond the line of the two syndactyle toes.

Before pointing out certain peculiarities of the skeleton of the Tarsipes, we may add, that in the male the scrotum is suspended in advance of the penis, and that in the female the mammæ, four in number, are placed in an abdominal pouch. There is but one opening for excretion and defecation.

In Paris there are several specimens of this singular animal. The skull of a female studied by MM. Gervais and Verreaux had the hinder part, as well as the lower portion in the mesial line, injured; and this circumstance, combined with its small size, observes these authors, renders it difficult of examination; they were able, however, to observe many of its essential characters.

The skull is much elongated, especially its facial portion; and studying it isolately, one would be tempted to refer it to an animal of the Edentate order, and probably to the family of Ant-eaters, *Myrmecophaga*, &c. The sutures of its bones are not obliterated as those of the *Monotremata* of the same age, but their distinction is less marked on the face than in the cranial region properly so called. The nasal bones are elongated, and terminate in an angle projecting at their point of junction with the anterior margin of the frontals; these are contracted at the interorbital portion, but they present no postorbital process to contribute towards the formation of a complete circular orbit: their antero-posterior development exceeds the transverse diameter.

The skull is broader in the parietal region, and the brain appears to have been more voluminous than in most other marsupial animals. In this form of cranium we perceive an analogy in the genus *Macrosclides*. The cranial cavity is proportionally more ample than in the great

Ant-eater (*Myrmecophaga jubata*). The occipital vertebra in the individual described is not perfect, and does not extend beyond the anterior occipital or interparietal, which is large and much broader than in the *Myrmecobius*. The ex-occipital, or, more correctly perhaps, the mastoid, articulates with the lateral margin of that bone. There is neither parietal crest nor occipital. The two temporal fossæ communicate by a nearly circular opening. The palatine portion of the intermaxillaries, and the anterior portion of the maxillary bones, have two small incisive foramina, and these are somewhat elongated; there is moreover in the palate two elongated openings, separated only by a very narrow bony ridge; the posterior boundaries of these openings and the termination of the palate, owing to the fractured condition of the skull, could not be seen. The suture between the nasal and maxillary bones, as well as the lachrymal, which is rather small, are nearly obliterated; the lachrymal canal is visible. The maxillaries, the length of which is proportionate to the nasal bones, give origin to a zygomatic process, and in fact there exists a complete zygomatic arch. The malar bone is of moderate thickness and depth; its posterior portion gives off a small process which projects above the temporal apophysis, and appears to represent, in a rudimentary condition, the little osseous temporal process observed in the *Echidna*, rather than a true orbital process of the zygoma, which in fact is wanting, as well as the orbital process of the frontal; and in this respect the *Tarsipes* differs from the *Myrmecobius*, with which there exists an analogy as regards some other characters. The alveolar portion of the maxillaries is very hard and presents a cutting edge, which is elevated in such a manner as to give to the palate a slightly concave surface.

The infra-orbital opening is small, and placed in a longitudinal groove of the maxillary bone situated a little in advance of the bone of the zygomatic process through which it is perforated. The auditory bullæ are convex, and nearly continuous with the squamous portion of the temporal. The tympanic circle is complete, and communicates in a direct manner with the bullæ by a large canal, which permits of the interior of the chamber being seen. The articulation of the squamous portion with the great ala of the sphenoid, is oblique from the inferior margin of the zygomatic process in the anterior central portion of the bone of the auditory chamber. The lower part of the squamous element and this outer portion of the pterygoid are on the same plane, and though bulbous, they do not form a second auditory chamber, as in some marsupials, but merely an inflated portion of the cranial cavity. The glenoid cavity for the articulation of the lower jaw is indistinct. This jaw resembles in general form that of *Myrmecophaga jubata*, and it moreover bears a considerable analogy to that of the *Monotremata*. It is sublinear, slender, almost without a trace of coronoid process, and there being no angular process, it does not present the peculiar conformation of this part of the lower jaw which characterizes all the known marsupials; and the condyle, instead of being transverse as in these animals, is situated at the apex of a little curvature formed by the entire masseteric portion



of the maxillary, approaches to a circular form, and is somewhat oblique in its direction, as in the *Myrmecophaga jubata* and in the *Monotremata*. In the *Myrmecobius* an approach to this disposition of the condyle is observable. The masseteric depression is in the form of a longitudinal cleft, which is much longer than the cleft found in certain species of *Macropodidæ*, and very much resembles that which we observe in the lower jaw of some birds. The two inferior maxillary are joined at the *symphysis* by a ligament only, but their junction appears to be more perfect than in the *Edentata* in general: these bones are as remarkable for their compact structure as for their transparency.

Of the remaining portion but few parts are known, viz. the radius and the inferior portion of the cubitus; these are separated in their whole length; the tibia and the fibula, which are also separated as far as their articulation with the tarsus; the fibula is much compressed at its upper extremity.

The dental system of the *Tarsipes* is most anomalous: the lower jaw presents in front a pair of cultriform teeth which have the same horizontal direction as the jaw; the basal portion of these teeth is narrower than the other portion, and the root is very deeply inserted into the jaw; the apical portion is unfortunately broken. These teeth are applied one against the other by their internal surface. Near the posterior third of the dental portion of the same jaw is a small transparent gemmiform tooth, which has the appearance of a little process recurved angularly outwards.

On the anterior third of the left side of the upper jaw are three small teeth; the first, which appears to be in the incisive bones, and which is in a line with the incisive openings, is in the form of a minute simple tubercle; the third, which is situated at the hinder extremity of the anterior third of the dental portion of the jaw, is also gemmiform, rather slender, longer than the first, and somewhat inclined forwards. Between this and the foremost tooth is another tooth, which is smaller than either, and situated nearer to the third than the second tooth. All these teeth are transparent and have but one root; they are all which could be found in the specimen examined; and it is only by inspecting several individuals that the dental formula of this little animal could be correctly ascertained. It is supposed by the authors, that in front of the foremost pair of teeth of the upper jaw here described, another tooth exists, the root of which only is visible; if such should be the case, there would then be three pairs of incisors of unequal size in the upper jaw, and behind these a canine, which is the largest of those teeth.

The *Tarsipes*, as has been shown, presents characters which could scarcely be supposed to exist in a single species, and affords an additional proof that the inspection of a single portion of any animal is not sufficient for the determination of the peculiarities of other parts. Its feet are those of an animal elevated in the scale of organization, and nearly resemble those of the *Tarsius*, differing only in the union of the second and third toes of the hind-feet. The *Tarsipes* also having these two toes shorter than the others and

provided with subulated nails; the singular form of its teeth, and, above all, the analogy which its skull bears with that of the *Monodelph Edentata* and *Monotremata*, render it difficult to determine the rank which the *Tarsipes* ought to occupy among the *Syndactylous Marsupialia*. It may be observed that it makes a considerable approach to *Myrmecobius*, an animal which, in some respects, has likewise affinities with the *Edentata*; but here the feet nearly resemble those of the *Dasyuri*. The *Tarsipes* in all probability had a long tongue, as in the *Echidna* and the *Myrmecophaga*; and it appears, according to the observations made by Lieutenant Dale and Mr. Gilbert, and communicated to M. Gervais by Mr. Waterhouse, that the tongue of the *Myrmecobius* is also very long.

Mr. Gould exhibited a new species of *Petrogale*, which he characterized as follows:—

PETROGALE INORNATA. *Petr. facie et dorso arenaceo-cinereis; humeris canescente irroratis, lateribus pallidioribus absque notis conspicuis; antibrachiis tarsisque arenaceo-cinereis digitis ad apicem saturatè fuscis; caudâ dimidiâ basali arenaceo-fuscâ.*

*Hab.* North coast of Australia.

General colour of the upper parts sandy grey, grizzled over the shoulders, and becoming much lighter on the flanks; an indistinct line, of a lighter hue, along the face under the eye; a dusky red patch behind the elbow; under surface sandy white, inclining to rufous on the lower part of the abdomen; arms and tarsi sandy grey, passing into dark brown at the extreme tips of the toes; basal half of the tail sandy brown, the remainder black, the former colour extending along the sides of the tail for some distance towards the tip; ears sandy grey, bordered by a very narrow line of dark brown on their inner edge; a dark patch at the occiput, passing into a dark line down the forehead.

	Female.	
	Feet.	Inches.
Length from the tip of the nose to the extremity of the tail . . . . .	3	2
Length of tail . . . . .	1	3 $\frac{1}{4}$
Length of tarsus and toes, including the nails . . . . .	0	5 $\frac{1}{4}$
Length of arm and hand, including the nails . . . . .	0	5
Length of face, from the tip of the nose to the base of the ear . . . . .	0	4 $\frac{1}{2}$
Length of ears . . . . .	0	1 $\frac{7}{8}$

This new species, for which I am indebted to the kindness of B. Bynoe, Esq., of H.M.S. Beagle, differs from all the other members of the genus in the unusual uniformity of its colouring. Mr. Bynoe collected it on the north coast of Australia, and this is all that is at present known respecting it. In size it is about equal to the *P. lateralis* of the western coast, to which, as also to *P. penicillata*, it is very nearly allied, but differs from both in being destitute of any markings on the sides, in the absence of any dark colouring behind the ears, and in the light colouring of the arms and tarsi.

The following "Descriptions of some new species of *Helicinæ*, in the collection of H. Cuming, Esq.," by Mr. G. B. Sowerby, jun., was read:—

*HELICINA STRIATULA*, Thesaurus Conchyliorum, by G. B. Sowerby, jun., fig. 43. *Hel. testâ subdepressâ, concentricè substriatâ, fulvo-rufescente; aperturâ subquadratâ, margine albo, crasso, reflexo, integro, subsinuato, posticè subdepresso.*

Alt. .23; lat. .30 poll.

*Hab.* — ? Mus. Cuming.

The margin of the aperture in this species is slightly lobed, and sinuous above and below.

*HELICINA MAXIMA*, Sow. jun., Thes. Conch. fig. 11. *Hel. testâ globosâ, subdepressâ, lævi, albâ; aperturâ magnâ, semilunari, margine reflexo, acuto; labio interno crassiusculo; columellâ obtusè angulatâ.*

Alt. .50; lat. 1 poll.

*Hab.* — ? Mus. H. Cuming.

Rather more depressed and larger than *H. Major*, with the base of the columella angulated instead of being notched.

*HELICINA ACUTISSIMA*, Sow. jun., Thes. Conch. fig. 92 to 95. *Hel. testâ plus minusve depressâ, concentricè leviter striatâ, angulari, acutissimè carinatâ, infra angulos paululùm complanatâ; aperturâ triangulari; labio interno tenuissimo; columellâ subcomplanatâ, ad basim subundatâ; labio externo acuto, validè reflexo, expanso, super angulum subdepresso.*

*Hab.* apud ins. Philippinas. H. Cuming legit.

Var. *a.* *T. luteâ, rufescente, fasciâ rubrâ infra angulo positâ.* Alt. .35; lat. .70. *Hab.* Jacna, ins. Bohol.

Var. *b.* *T. luteâ, rufescente, fasciis rubris tribus ornatâ.* *Hab.* Jacna, ins. Bohol.

Var. *c.* *T. pallidè luteâ, fasciâ rubrâ infra angulum, et alterâ propè suturam positâ.* Alt. .25; lat. .40 poll. *Hab.* Siquijor.

Var. *d.* *T. pallidè luteâ.* *Hab.* Argao, ins. Zebu.

Var. *e.* *T. luteâ, subtùs rubrâ; carinâ albâ.* *Hab.* Argao, ins. Zebu.

Var. *f.* *T. fuscâ, nigricante.* *Hab.* Loboc, ins. Bohol.

Var. *g.* *T. rubrâ, absque fasciis.* *Hab.* Loboc, ins. Bohol.

The above are found on leaves of small shrubs.

*HELICINA TROCHIFORMIS*, Sow. jun., Thes. Conch. f. 90. *Hel. testâ luteâ, Helicinæ acutissimæ simillimâ, sed spirâ altiori; labio externo posticè subdepresso.*

Alt. .20; lat. .30.

*Hab.* Ins. Negros, Philippinarum. H. Cuming legit.

Found on leaves of palms on mountains. It differs from *H. acutissima* principally in being much more conical, and in having the upper part of the outer lip more depressed.

*HELICINA MINUTA*, Sow. jun., Thes. Conch. f. 40, 41. *Hel. testâ parvâ, depressâ, subangulatâ, rubrâ vel stramineâ; margine*



*crasso, effuso; labio interno calloso; columellâ ad basim subemarginatâ.*

Alt. .10; lat. .15 poll.

*Hab.* —? Mus. H. Cuming.

HELICINA AGGLUTINANS, Sow. jun., Thes. Conch. f. 83 to 85. *Hel. testâ depressâ, angulatâ, obtusè carinatâ, supra infraque æqualiter convexâ, minutè concentricè striatâ; aperturâ quadrilaterali; labio interno tenuissimo; columellâ triangulari, complanatâ, subumbilicatâ, ad basin obtusè angulatâ; labio externo effuso, reflexo, positè leviter depresso; operculo crassiusculo, irregulariter quadrilaterali; epidermide aliquando per adhæSIONEM rupium fragmentorum in carinam latam præruptam productâ.*

Alt. .45; long. .75 poll.

*Hab.* apud ins. Philippinas. H. Cuming legit.

Var. *a.* *T. luted.* Ins. Guimaras.

Var. *b.* *T. aurantiâ;* *subtùs fasciâ rubescente.* *Hab.* Loboc, ins. Bohol.

Var. *c.* *T. aurantiâ-rubescente.* *Hab.* Dingley, Panay.

The shells of this species are found on rocks, the decomposed particles of which are agglutinated to the epidermis in some specimens, so as to form a broad broken keel on the angle of the whorls.

HELICINA LAZARUS, Sow. jun., Thes. Conch. f. 91. *Hel. testâ pallidè fulvâ, H. agglutinanti simillimâ, sed magis elevatâ; columellâ angustiori.*

Alt. .28; lat. .40 poll.

*Hab.* Bongabong, N. Ecija, ins. Luzon, Philippinarum.

Found on leaves of palms.

HELICINA POLITA, Sow. jun., Thes. Conch. f. 76 to 81. *Hel. testâ politâ, tenui, pellucidâ, plus minusve depressâ et angulatâ; anfractibus supernè subcomplanatis, infra ventricosis; labio interno tenui, anticè paululùm inflato; columellâ angustatâ, ad basim leviter angulatâ; labio externo tenui, expanso, reflexo, super angulum plus minusve depresso; operculo internè rubro, externè submargaritaceo.*

*Hab.* apud ins. Philippinas. H. Cuming legit.

Var. *a.* *T. aurantiâ, magnâ, angulatâ.* Alt. .40; lat. .60. Sorso-gon, pr. Albay, ins. Luzon.

Var. *b.* *T. aurantiâ, minori.* Alt. .20; lat. .25. Sinait, Ilocos, ins. Luzon.

Var. *c.* *T. aurantiacâ, supernè rubrâ.* Misamis, ins. Mindanao.

Var. *d.* *T. aurantiâ; fasciâ rubrâ in medio super angulum anfractuum.* Abulug, pr. Cagayan, ins. Luzon.

Var. *e.* *T. aurantiâ, fasciis albis binis ornatâ.* St. Nicholas, ins. Zebu.

Var. *f.* *T. aurantiâ, supernè pallidè rosed.* Abulug, pr. Cagayan, ins. Luzon.

From the large, somewhat angulated, orange variety, down to the more globose and small varieties, the gradation is so slow that it is impossible to find a line of demarcation sufficiently distinct to admit

of specific separation, although the two extremes differ considerably in general appearance.

HELICINA SIMILIS, Sow. jun., Thes. Conch. *Hel. testá H. politæ simillimá, sed impolitá, concentricè leviter striatá, fuscá.*

*Hab.* apud insulam Guadaloup. Mus. Cuming.

HELICINA PARVA, Sow. jun., Thes. Conch. f. 82. *Hel. testá H. politæ simillimá, sed magis rotundatá, labio externo minimè depresso.*

*Hab.* Argao, ins. Zebu. H. Cuming legit.

Found on leaves of bushes, and differs only from the smaller varieties of *H. polita* in being globular, and having the outer lip not at all depressed above.

HELICINA GUADALOUPENSIS, Sow. jun., Thes. Conch. f. 65, 66. *Hel. testá levi, depressá, subangulatá, concentricè leviter striatá; columellá ad basin subnodosá; labio externo crasso, reflexo; anfractibus gradatim crescentibus, supra infraque subventricosis; operculo fusco.*

*Hab.* apud insulam Guadaloup. Mus. H. Cuming.

Var. a. *T. rubrá, lutescente, majori.* Alt. .35; lat. .60.

Var. b. *T. pallidè brunnea, minori.* Alt. .20; lat. .35.

A memoir on the family of *Touracoos*, by Dr. E. Rüppell, was next read. In this memoir the author characterizes the following two new species of the genus *Chizærhis* from Abyssinia:—

CHIZÆRHIS PERSONATA. *Chi. regione ophthalmicá, genis, mento et gulá, pennis denudatis, cute nigricante, vibrissis brevissimis vestita; pileo crista plicatilis, plumis laxis, elongatis, colore murino; nuchá, regione paroticá, juguloque albidis, jugulo et pectore viridi-glaucis; abdomine et tibiis rufo-cervinis; auchenio, dorso et alis cæσιο-umbrinis, reetricibus olivaceis; caudá elongatá, subrotundatá, suprâ cinerea, infrâ luteo-virenti, rostro et pedibus nigris; iride albo-cinerascente.*

The most characteristic peculiarity in the present species, observes Dr. Rüppell, consists in the absence of feathers on the face and throat, the skin of these parts presenting only small scattered hairs, and apparently being of a blackish purple colour. The feathers of the upper surface of the head are elongated, and have the plumelets soft and flowing; they no doubt are erectile, and form a crest at the will of the bird. The two sexes agree perfectly, both in size and colouring. The dimensions in French measure are as follow:—

	in.	lin.
Total length from the tip of the beak to the tip of tail .	19	0
Tail . . . . .	10	0
Length of the beak, measuring along the upper curvature	1	1
Greatest height of the two mandibles . . . . .	0	7½
Length of the wing from the bend to the extremity of } the fourth wing-feather, which is the longest . . . . }	8	0
Length of the tarsus . . . . .	1	6
Length of the middle toe, including the nail . . . . .	1	10

CHIZÆRHIS LEUCOGASTER. *Chi. pileo crista plicatilis, plumis apice truncatis, capite, gutture, collo, cervice, dorso et alis cæsio-umbrinis; reatricibus medianis nigro-marginatis, remigibus dimidio basali albis, dimidio apicali umbrino-nigris; caudâ subrotundatâ, suprâ et subtùs nigrâ, fasciâ albâ latâ transversâ; reatricibus duabus intermediis cæsio-umbrinis; abdomine et tibiis albis; rostro et pedibus nigricantibus, iride umbrinâ.*

A peculiarity in this species consists in the truncated form of the feathers which constitute the crest. Both sexes agree in size and colouring. The dimensions are as follow:—

	in.	lin.
Total length . . . . .	18	9
Tail . . . . .	9	9
Beak . . . . .	0	11½
Height of beak . . . . .	0	6½
Length of the wing to the end of the fifth wing-feather	7	9
Tarsus . . . . .	1	8
Middle toe, including the nail . . . . .	1	10

January 25.—William Horton Lloyd, Esq., in the Chair.

Mr. W. D. Cooper communicated to the Meeting some notes, by T. S. Thomson, Esq., relating to the habits of the *Bassaris astuta* of Lichtenstein. These notes are confirmatory of the observations of Mr. Charlesworth, made at a former meeting of the Society\*. The animal, Mr. Thomson has been informed, is found in most parts of the republic of Mexico, but is not known beyond the habitations of man. Besides fowls, butchers' meat, &c., it will eat bread, fruit, and sugar; it breeds principally in outhouses, and particularly in neglected spots, producing three or four at a birth. Sometimes it is tamed, and used like the domestic cat to destroy rats, mice, &c.

Mr. Gould exhibited several Australian Mammals, from his own collection, which he considered to be new to science. The first to which he drew attention was a species of the genus *Macropus*, as now restricted, which, from the sooty black colouring of the face, he proposed to describe under the name

MACROPUS MELANOPS. *Macr. vellere molli obscurè griseo; dorso, collo, plagâque magnâ ad basin femoris, fuliginoso-lavatis; lateribus corporis indistinctè fulvo tinctis; capite fuliginoso; rhinario nigro; auribus intus pilis albis vestitis, extus pilis albis, nigro irroratis, ad basin nigris; gulâ pectoreque albescentibus; tibiis tarsisque fusco-albis, digitis nigris; caudâ robustâ, suprâ fuliginosofuscâ, subtùs pallidiore, dimidiâ apicali nigrâ.*

	unc.	lin.
Longitudo ab apice rostri ad caudæ basin. . . . .	33	0
———— caudæ . . . . .	20	6
———— tarsi digitorumque . . . . .	11	9
———— ab apice rostri ad basin auris . . . . .	5	9
———— auris . . . . .	3	9

\* Proceedings for July 13, 1841, p. 60.



The most striking character in this species is the general deep hue of the fur of the upper parts of the body and neck; the colour may be described as sooty grey, but having moreover a brownish tint; the whole upper surface and sides of the head are nearly black; on the sides of the body and outer side of the hind legs, at the base, a very faint fulvous tint is observable; a large space on the haunch is of the same deep hue as the back; the throat and chest are whitish, the visible portion of the hairs on these parts being white; at the base, or next the skin, they are of a deep grey colour, and so are those on the abdomen; but here, though the hairs are tipped with white, the grey tint shows itself to a greater degree. The ears are thickly clothed with long white hairs on the inner side; externally they are pencilled with black and white, in about equal proportions, but at the base they are clothed with the same dense fur as that of the head, and this is black. The fore-legs, like the outer surface of the ears, are pencilled with black and white, the black becoming more conspicuous towards the toes, which are covered with black hairs. The hind-legs and tarsi are chiefly of a brown-white hue, but on the toes there is a considerable admixture of black; the hairs which cover the nails and the sides of the toes are almost entirely black. The tail is of the same colour as the body at the base, and has the apex black; the portion covered with black hairs is rather less than that clothed with the paler fur.

The following new Australian Mammals were also characterized by Mr. Gould:—

**BELIDEA ARIEL.** *Bel. pallidè cinerea, lined dorsali, a basi rostri ferè usque ad basin caudæ extensâ, circulo interrupto ad basin auris, membrandque laterali suprâ nigrescentibus, hac ad latera flavescenti-albâ; corpore subtùs pallidè flavo; caudâ gracili ad apicem nigrâ; auribus mediocribus; pedibus pallidis.*

	unc.	lin.
Longitudo ab apice rostri ad caudæ basin . . .	6	0
———— caudæ . . . . .	7	0
———— auris . . . . .	0	8
———— ab apice rostri ad basin auris . . . .	1	3½

Two specimens of this species of Flying Phalanger were received by Mr. Gould from Port Essington. In size and proportions it approaches most nearly to the *Belidea breviceps*, being considerably less than the *Petaurus sciureus* of authors; but it is readily distinguished by its general pale colouring, and more especially by the pale yellow tint of the under parts of the body. The tail is slender as in *B. breviceps*, Waterh.; the fore and hind-feet are of a pale yellowish hue in one specimen; in the other the fore-feet have a pale brownish tint: a narrow black mark, commencing between the eyes, runs along the back, and extends nearly to the root of the tail; a narrow blackish line surrounds the eyes, and a black ring encircles the base of the ears, but is interrupted under the ear, which is sparingly clothed with minute hairs, excepting at the base externally, where they are covered with fur like that on the head, and which is of a black colour, forming a

portion of the dark ring before mentioned; and on the hinder margin of the ear, at the base, is a fringe of pale yellowish hairs. The upper surface of the head is of a paler hue than the upper parts of the body, which are of a pale ash-colour, slightly tinted with yellowish; the upper surface of the lateral membrane is blackish, and so is the anterior portion of the fore-arm and region of the wrist; a dusky tint is also observable on the posterior part of the hind-leg.

MUS PENICILLATUS. *Mus griseo-fuscus, vellere ferè ut in M. decumano; corpore subtùs pedibusque albis flavo lavatis; auribus mediocribus, posticè submarginatis; caudà corpore capiteque paulo longiore, gracili, dimidià apicali pilis longis nigris vestitá.*

	unc.	lin.
Longitudo ab apice rostri ad caudæ basin . . .	7	3
———— caudæ . . . . .	7	9
———— ab apice rostri ad basin auris . . . .	1	5½
———— tarsi digitorumque . . . . .	1	8
———— auris . . . . .	0	7¾

*Hab.* Port Essington.

This species of Rat is rather less than the *Mus decumanus*; in the character of its fur it nearly resembles that animal, but the hairs are rather more adpressed; the colouring of the upper parts of the body also nearly resembles that of *M. decumanus*; there is, however, a rusty tint in the region of the occiput and on the back of the neck. Around the angle of the mouth, the chin, throat, and all the under parts of the body, as well as the feet and inner side of the legs, are white, with a faint yellow tint, which might be described as cream-colour; and the hairs on these parts are of an uniform colour to the roots, excepting on the chest, where they are grey next the skin. The tail is long and slender, sparingly clothed at the base with minute bristly hairs, as in most species of the genus; but about the middle of the tail the hairs assume a black colour, and are longer, and towards the apex they soon attain a considerable length, measuring at and near the tip half an inch or more. The ears are narrower than usual, somewhat pointed, and slightly emarginated behind; they are sparingly clothed with minute hairs.

MUS HIRSUTUS. *Mus vellere hirsuto, corpore suprà fuscescente pilis nigris crebrè commixtis, subtùs fulvescens, fusco rufoque tincto; auribus mediocribus; caudà longà pilis nigris, aliquanto longis, vestitá; dimidià apicali pilis longioribus, his ad apicem caudæ rufescentibus.*

Of this large and curious Rat, Mr. Gould regretted that he did not possess a perfect skin; the somewhat mutilated skin which he exhibited, together with a perfect skeleton, however, displayed characters very distinct from other species of *Mus*. Compared with the known species of that genus, he observed it approached most nearly to the *Mus giganteus* of Hardwicke; it is equal in size to that animal, and has the same coarse shaggy fur, but is readily distinguished by its well-clothed tail, the hairs on this part being much longer than usual in the genus, especially on the apical half, where the scales are hidden by them; those at the point of the tail measure upwards of an inch in length, and at the distance of two inches from the point

they average about an inch in length; on this part they have a rusty hue, but on the remaining portions they are black. On the upper parts of the body the shorter hairs are of a yellowish brown colour, but the longer interspersed hairs being numerous, and of a black colour, give a deep general tint to these parts. The under parts of the body are of a rusty yellow colour, tinted with brownish on the neck and chest, and having a more decided rust-colour on the abdomen.

The skull approaches that of *Mus giganteus* in general form, but is rather narrower and longer; the palatal portion is broader, and the incisive foramina are shorter, terminating posteriorly, about one-eighth of an inch anterior to the foremost molars; whilst in *M. giganteus* these foramina terminate in a line with the front molars, or rather behind that line; the nasal bones are longer and rather narrower, and the occipital portion of the cranium is decidedly smaller. The principal dimensions, taken from the skeleton, are as follow:—

	in.	lin.
Length from tip of nasal bones to end of sacral vertebræ	10	4
Length of tail	13	0
Length of tarsus and claws	2	8½
Length of skull	2	6½
Width of ditto	1	3¾
Length of nasal bones	1	0½
Distance between incisors and molars of the upper jaw	0	9½
Width between molars	0	3½
Length of incisive foramina	0	5
Width of occiput	0	8

*MUS DELICATULUS.* *Mus suprâ pallidè fusco-flavus; corpore ad latera flavescente, subtùs albo; caudâ mediocri suprâ fuscâ, subtùs ad basin albescenti; auribus parvulis; pedibus gracilibus, albis.*

	unc.	lin.
Longitudo ab apice rostri ad caudæ basin	2	5
———— caudæ	2	2
———— tarsi digitorumque	0	8
———— ab apice rostri ad basin auris	0	8
———— auris	0	3¾

In colouring the present species greatly resembles the *Mus sylvaticus* of Europe, but it is a trifle paler; its size is less than that of the common mouse (*Mus musculus*, Auct.). The fur is soft and short; that on the upper parts of the body is of a pale yellow-brown colour. The sides of the body are of a delicate yellow tint, and the lower parts of the sides of the muzzle, the chin, throat, and whole under parts, as well as the feet, are pure white; along the mesial line of the abdomen and on the throat the hairs are of an uniform colour to the base. The feet are slender, and the ears are rather small. The tail is slender, and nearly equal in length to the head and body.

Two specimens exhibiting the above characters were exhibited by Mr. Gould.



## LINNÆAN SOCIETY.

April 19, 1842.—E. Forster, Esq., V.P., in the Chair.

J. O. Westwood, Esq., F.L.S., exhibited numerous species of *Sphingidæ*, *Nocturnal Lepidoptera*, and other insects, from the collection of Lieut.-Col. Hearsey, formed during a residence of thirty years in Central India. He stated this collection to be very interesting on account of its local character, and as compared with the splendid collections recently received from Sylhet and the Himalayas, exhibited at late meetings of this Society. In Colonel Hearsey's collection the species of the modern genus *Papilio* are very few in number, and well known. Of *P. Hector* there is but a single specimen. There is not a single species of *Lucanus*, nor true *Fulgora*, in the collection; a striking peculiarity as compared with the Sylhet and Himalayan collections. The collection, however, contains a species of *Paussus* and one of *Diopsis*, both new; a very minute *Apotomus*, specimens of both sexes of the interesting Hymenopterous genus *Trirogma*, a number of very English-looking *Harpalidæ*, various *Alhyrei* and *Bolboceri*, as well as most of the new species described by Mr. Saunders in the last Part of the Transactions of the Entomological Society.

Read the concluding portion of "A Catalogue of Spiders, either not previously recorded or little known as indigenous to Great Britain, with remarks on their Habits and Economy." By John Blackwall, Esq., F.L.S., &c.

The following is a list of the species enumerated by Mr. Blackwall:—

1. *Drassus sericeus*, Walck. In several of the northern counties of England and Wales.
2. *Drassus ater*, Walck. Common in Denbighshire and Caernarvonshire.
3. *Clubiona epimelas*, Walck. Found rarely in the wooded districts of Denbighshire.
4. *Clubiona accentuata*, Walck. In the woods of Denbighshire and Caernarvonshire.
5. *Clubiona erratica*, Walck. Frequent in the woods and commons of Denbighshire.
6. *Argyroneta aquatica*, Walck. In the fens of Cambridgeshire, *Mr. Bawington*; and in small pools in Cheshire, *Mr. Glover*.
7. *Ciniflo ferox*, Blackw. Abundant in England and Wales.
8. *Ergatis latens*, Blackw. On commons in Denbighshire.
9. *Tegenaria domestica*, Walck. Oxford and Cambridge.
10. *Lycosa andrenivora*, Walck. Commons and old pastures in various parts of England and Wales.
11. *Lycosa agrestica*, Walck. Old pastures in England and Wales.
12. *Lycosa aliodroma*, Walck., var. *leucophæa*. *Lycosa leucophæa*, Blackw., in Lond. and Edinb. Phil. Mag. x. p. 104.
13. *Lycosa picta*, Hahn. In Cheshire and Denbighshire, frequenting sandy districts on the coast.
14. *Lycosa lugubris*, Walck. Abundant in woods in Denbighshire and Caernarvonshire.
15. *Lycosa pallida*, Walck. Frequent on banks of rivers in Denbighshire and Caernarvonshire.

16. *Lycosa piratica*, Walck. Marshes and margins of pools in England and Wales.

17. *Dolomedes fimbriatus*, Walck. In the fens of Cambridgeshire, *Mr. Babington*.

18. *Salpicus cupreus*, Hahn. Mountain-woods of Denbighshire and Caernarvonshire.

19. *Salpicus coronatus*, Blackw. *Attus coronatus*, *Walck.* Common in the woods of Denbighshire and Caernarvonshire.

20. *Salpicus gracilis*, Hahn. Gwydir woods in Caernarvonshire.

21. *Thomisus brevipes*, Hahn. In fields adjacent to woods, at Oakland, near Llanrwst, Denbighshire.

22. *Thomisus bifasciatus*, Blackw. *Xysticus bifasciatus*, *Koch.* In pastures near Llanrwst.

23. *Thomisus citreus*, Walck. In the western parts of Denbighshire.

24. *Philodromus dispar*, Walck. In the wooded parts of Denbighshire and Caernarvonshire.

25. *Philodromus cespicolens*, Walck. In woods in Denbighshire.

26. *Philodromus oblongus*, Walck. In the north of Cheshire.

27. *Sparassus smaragdulus*, Walck. England, *Mr. Babington*; in the woods at Tan-y-Bwlch in Merionethshire, *Mr. Glover*.

28. *Theridion denticulatum*, Walck. Common in England and Wales.

29. *Theridion signatum*, Walck. Among heath in Denbighshire: rare.

30. *Neriëne trilineata*, Blackw. *Theridion reticulatum*, *Hahn.* Under stones in the neighbourhood of Manchester.

31. *Neriëne graminicolens*, Blackw. Sp. nov. a *Neriëne trilineata* diversa pedibus palisque unicoloribus nec annulatis. Old pastures at Oakland, near Llanrwst, Denbighshire.

32. *Manduculus vernalis*, Blackw. *Theridion vernale*, *Hahn.* In pastures in various parts of Lancashire and Denbighshire.

33. *Pholcus phalangioides*, Walck. Barmouth, Merionethshire, *Mr. Potter*; Liverpool, *Mr. Glover*; Isle of Wight.

34. *Linyphia pallida*, Blackw. *Theridium pallidum*, *Koch.* Among grass in the grounds about Oakland.

35. *Epeïra bicornis*, Walck. In the wooded parts of Denbighshire.

36. *Epeïra agelena*, Walck. In pastures near Llanrwst.

37. *Epeïra scalaris*, Walck. In the neighbourhood of London.

38. *Epeïra umbratica*, Walck. Abundant in various parts of England and Wales.

39. *Epeïra fusca*, Walck. In Denbighshire and Caernarvonshire.

40. *Epeïra antriada*, Walck. Common in the north of England and Wales.

41. *Dysdera erythrina*, Walck. In the town of Manchester; also in Cambridge, *Mr. Potter*.

42. *Dysdera rubicunda*, Koch. Cambridge, *Mr. Babington*.

43. *Dysdera Hombergii*, Walck. Plentiful in the wooded districts of Denbighshire and Caernarvonshire.

44. *Oönops pulcher*, Templ. *Deletrix exilis*, *Blackw.*, in Lond. and Edinb. *Phil. Mag.* x. p. 100. In Lancashire, Denbighshire and Caernarvonshire: abundant in the two last.

Mr. Blackwall states, that with a few exceptions, the spiders comprised in the foregoing catalogue have never before been recognized as British species. With respect to nearly the whole of them, numerous facts are detailed relative to their structure, instincts, economy and haunts, with occasional remarks on their nomenclature and systematic arrangement.

Read also "a Description of a new Indian species of *Paussus*." By J. O. Westwood, Esq., F.L.S., &c.

This species, which is in the collection made by Lieut.-Colonel Hearsey mentioned above, approaches *Platyrhopalus* in having the penultimate joint of its labial palpi about two-thirds the length of the terminal joint. In all its other characters, however, it accords so exactly with the Indian species of Mr. Westwood's second division of the genus *Paussus*, that were the antennæ broken off, it would be almost impossible to distinguish it from *Paussus cognatus*.

*Paussus Hearseyanus*, rufo-castaneus nitidus punctatus, elytris singulis plagâ latâ longitudinali nigrâ, capite pone oculos carinâ elevatâ transversâ alterâque longitudinali medianâ ad nasum ferè ductâ, antennarum clavâ subovatâ basi extus in hamum productâ; margine posticè supernè obliquè 3-impresso.

The only specimen known was captured by Col. Hearsey at Benares by night, having flown against the lamp and fallen upon the table, a habit observed in other species of the genus by several Indian entomologists.

May 5.—The Lord Bishop of Norwich, President, in the Chair.

Read a portion of Dr. Hamilton Buchanan's Commentary on the 8th Part of Rheede's 'Hortus Malabaricus.'

May 24.—The Lord Bishop of Norwich, President, in the Chair.

This day, the Anniversary of the birth of Linnæus, and that appointed by the Charter for the Election of Council and Officers, the President opened the business of the Meeting, and stated the number of Members whom the Society had lost during the past year, of some of whom the Secretary read the following notices:—

*Sir Charles Bell, K.H., F.R.S. Lond. & Ed.*, Professor of Surgery in the University of Edinburgh.

The very recent death of this eminent surgeon and distinguished physiologist precludes on the present occasion any detailed account of his life and works. He was born in Edinburgh in 1778, and the early part of his life was spent in his native city as the assistant of his brother John in his surgical lectures. He came to London in 1806, and became lecturer on surgery at the Hunterian School in Windmill Street, and afterwards one of the surgeons of the Middlesex Hospital. His important discoveries in the functions of the Nervous System, by which his fame has been most widely spread, were communicated in a series of papers read before the Royal Society, commencing in 1821. On the accession of King William the Fourth he received the honour of knighthood; and in 1836 he returned to Edinburgh, having been appointed to the Professorship of Surgery in that University. He died almost suddenly at the beginning of the present month.

*John Eddowes Bowman, Esq.*, was born at Nantwich in Cheshire, on the 30th October, 1785. He was in early life confined to business during more than twelve hours of the day, and yet contrived, by early rising, to cultivate a taste for botany, which he had



imbibed from his father. The small town in which he lived furnished no persons of congenial pursuits with whom he could associate, but this circumstance, though it limited his progress, did not damp his ardour. He became the manager of a bank at Welch Pool, and with an income extremely limited, was not only enabled to give a liberal education to his rising family, but, by the help of such books and instruments as he could purchase, to extend his studies to many branches of natural science with great zeal and success. In 1824 he became a partner in a banking establishment in Wrexham, from which he retired in 1830, and never entered into business again; for being in possession of a moderate competence, he willingly relinquished together the profits and the cares of active life, in exchange for the tranquil happiness he hoped to enjoy from the undivided pursuit of those sciences of which he had ever been passionately fond. Hitherto he had been able to follow them only as a recreation, having never allowed their cultivation to encroach on the time set apart for business; yet he had already, from the ample stores around him, acquired extensive collections in the departments of botany and geology, which were his favourite studies.

In 1837 he transferred his residence to Manchester, where he intended to pass the remainder of his life. During his short abode in that great emporium of manufactures and commerce he endeavoured by all the means in his power to advance and diffuse a love for science, and especially for natural history; and by his associates in the different societies of that place his memory will be warmly cherished. He had looked forward with much interest to the approaching meeting of the British Association for the Advancement of Science in that town, but this hope was not realized. He died after a sudden illness on the 4th December last.

Mr. Bowman became a Fellow of this Society in 1828. He has contributed two papers to the sixteenth volume of its 'Transactions': viz. "An Account of a new Plant of the Gastromycous order of *Fungi*," which is well described and figured under the name of *Enerthema elegans*; and a memoir "On the parasitical connexion of *Lathræa Squamaria*, and the peculiar structure of its subterranean leaves." The last-named paper is a valuable contribution to our knowledge of a very obscure branch of vegetable physiology, the connection, namely, of Root-Parasites with the plants on which they grow, and is beautifully illustrated by two plates of details, from Mr. Bowman's own pencil. His other natural-history publications are, with one exception, geological. They consist of, 1. a memoir "On the Longevity of the Yew, as ascertained from actual sections of its trunk, and on the origin of its frequent occurrence in Churchyards," in Loudon's 'Magazine of Natural History for 1836'; 2. "Notes on a small patch of Silurian Rocks to the W. of Abergele, on the northern coast of Denbighshire," communicated by Mr. Murchison to the Geological Society in 1838; 3. "On a white fossil Powder found under Peat-Bog in Lincolnshire, composed of the siliceous fragments of microscopic parasitical *Confervæ*;" 4. "On the origin of Coal, and the geological conditions under which it was produced;" 5. "Ob-

servations on the characters of the Fossil Trees discovered on the line of the Bolton Railway;" 6. "On the Upper Silurian Rocks in the Vale of Llangollen, North Wales;" (the four latter communicated to the Manchester Geological Society, and published in the first volume of their Transactions;) 7. three papers in the 'Philosophical Magazine' for 1840, "On the Natural Terraces on the Eildon Hills;" and 8. a memoir in the same Journal for 1841, "On the question whether there are any evidences of the former existence of Glaciers in North Wales."

*William Harrison, Esq.*, Queen's Counsel, a Bencher of the Inner Temple, Counsel of the Treasury and War Office, and Attorney-General for the Duchy of Cornwall, died at his seat at Cheshunt, Herts, on the 4th of October last. He was eminently distinguished in his profession, in the parliamentary business of which he for many years took the lead. Those among us who have visited his retreat at Cheshunt are not likely soon to forget the beautiful garden, with its noble range of stoves and conservatories, which he had formed there, or the kind hospitality with which they were received. Much of his leisure was devoted to planting, and his garden exhibited, in the great variety of trees and shrubs which it contained and the taste displayed in their arrangement, ample proof of his attachment to that pursuit.

*James Rawlins Johnson, M.D., F.R.S., &c.*, was author of "A Treatise on the Medicinal Leech, including its medical and natural history, with a Description of its Anatomical Structure; also, Remarks upon the Diseases, Preservation and Management of Leeches," 1816, 8vo, London; and of two papers published in the 'Philosophical Transactions' for 1817, entitled "Observations on the mode of Propagation of the *Hirudo vulgaris*, or Rivulet-Leech," and "On the *Hirudo complanata* and *Hirudo stagnalis*, now formed into a distinct genus under the name of *Glossopora*." These two papers were reprinted in 1825, with some additional facts and observations, under the title of "Further Observations on the Medicinal Leech." In these publications Dr. Johnson contributed much to the elucidation of the natural history of the Leech, which has since been so ably completed by Carena and others.

*Aylmer Bourke Lambert, Esq.*, the last survivor of the original members of the Linnean Society, and for nearly fifty years one of its Vice-Presidents, was born at Bath on the 2nd of February, 1761. His father, Edmund Lambert, Esq., of Boyton-House, near Heytesbury, Wilts., married Bridget, daughter of the last Viscount Mayo and his only surviving child, through whom Mr. Lambert inherited the family property and the name of Bourke. He was educated at St. Mary's Hall, in the University of Oxford, and attaching himself early in life to botanical pursuits, joined the Linnean Society at its foundation, and became one of its warmest friends and promoters. In 1791 he also became a Fellow of the Royal Society.

On succeeding to his paternal estate, he was enabled to indulge his taste for botany more freely, and laboured with great ardour and success to increase his herbarium, which at length acquired the charac-

ter of being one of the most valuable and important private collections in existence. Of this herbarium, and of the several collections from which it was chiefly formed, an account has been given by Mr. Don, who for many years acted as its curator, and who had also charge of Mr. Lambert's extensive botanical library. These collections were at all times most liberally opened by their possessor for the use of men of science, and one day in the week (Saturday) was constantly set apart for the reception of scientific visitors, travellers and others, who either brought with them or sought for information on botanical subjects.

Mr. Lambert's separate publications are two in number: "A Description of the Genus *Cinchona*," London, 1797, 4to, and "A Description of the Genus *Pinus*," London, 1803-24, in two vols. folio. Of the latter work, which is one of the most splendid botanical publications that ever issued from the press, a second edition, with additions, was published in 1828, and a third volume was added in 1834. A small edition, in two vols. 8vo, was also published in 1832.

His other works consist entirely of papers in our 'Transactions.' They are as follows:—

"An Account of the *Canis Graius Hibernicus*, or Irish Wolf-Dog," in vol. ii.

"Anecdotes of the late Dr. Patrick Browne, author of the 'Natural History of Jamaica,'" in vol. iv., containing some interesting particulars relative to that intelligent naturalist, from whom Mr. Lambert received and presented to this Society his MS. of a 'Flora Hibernica,' together with a small herbarium, collected in the counties of Mayo and Galway, and a separate collection of Mosses.

"A Description of the Blight of Wheat, *Uredo Frumenti*."

"A Description of *Bos frontalis*, a new species from India," described from a living specimen in the collection of Mr. Brookes of the New Road.

"Observations on the *Zizania aquatica*," accompanied by a figure from the pencil of Ferdinand Bauer, taken from specimens grown by Sir Joseph Banks in a pond at Spring-grove.

"A further Account of *Bos frontalis*," containing numerous particulars of its habits, taken from a Letter written by Mr. Macrae. These four papers are in vol. vii.

"A Description of a new Species of *Macropus* (*M. elegans*), from New Holland," from a living specimen in the collection at Exeter Change, in vol. viii.

"Some Account of the Herbarium of Prof. Pallas," in vol. x., which, besides a general account of the collection, then recently purchased by Mr. Lambert, contains characters of a number of new species of plants, which are figured on six accompanying plates.

"Notes relating to Botany, collected from the MSS. of the late Peter Collinson, Esq.," also in vol. x., and affording many interesting notices relating to botanists, gardeners and gardens in England, in the middle of the last century.

"Description of a new Species of *Psidium*" (*P. polycarpon*), which had ripened its fruit at Boyton, in vol. xi.



“Some Account of the Galls found on a species of Oak from the shores of the Dead Sea,” and a “Note on the Mustard-plant of the Scriptures,” in vol. xvii.

Mr. Lambert's health had for some years been failing, and he had ceased to visit his country-seat at Boyton, but preferred, when out of town, taking up his residence of Kew, where his proximity to the Royal Gardens, and to his friends in town, afforded him more copious sources of enjoyment than he could have found elsewhere. He died at Kew, on the 10th of January in the present year, and his remains were removed to Boyton for interment. He married Catharine, daughter of Richard Bowater, Esq., of Allesley in the county of Warwick, but was left a widower, without any family, some years before his death.

*Archibald Menzies, Esq.*, who, on the death of Mr. Lambert, became father of the Society, was born at Weem, in the county of Perth, on the 15th of March, 1754. He was early attached to the Botanic Garden at Edinburgh, of which his brother William afterwards had charge; and was enabled, through the kind assistance of Dr. John Hope, then Botanical Professor in that University, who was attracted by his love for natural history and especially botany, to pass through the academical studies necessary for his education as a surgeon. In the summer of 1778 he made a tour, under the auspices of Dr. Hope, through the Highlands and Hebrides, with the view of collecting their rarer plants, to which attention was then strongly directed by the recent publication of Lightfoot's ‘*Flora Scotica*.’ He afterwards became assistant to a surgeon at Caernarvon; but soon quitting for a time the practice of his profession on shore, he entered the navy, and became assistant-surgeon on board the *Nonsuch*, Captain Truscott, in which vessel he was present at the famous victory obtained by Rodney over the *Comte de Grasse* on the 12th of April, 1782. After the peace of that year he remained for some time on the Halifax station. In 1786 he embarked as surgeon on board the *Prince of Wales*, a vessel fitted out by the enterprising firm of John and Cadman Etches and Co., and was placed under the command of Lieut. (afterwards Captain) Colnett, of the Royal Navy, for a voyage of commercial discovery to the north-west coast of America. In this voyage he visited Staten Land, where he remained for some time, the Sandwich Islands and China, as well as North-western America, and returned from China by the direct route to England in the beginning of 1789. In the following year he was appointed in the capacity of naturalist, and with the rank of surgeon, to accompany Captain Vancouver, on board the *Discovery*, in his celebrated voyage; from which, after visiting King George's Sound on the south coast of New Holland, a part of New Zealand, Otaheite and the Sandwich Islands, and exploring by far the greater part of the north-west coast of America, he returned to England in the autumn of 1795. During one of the visits made by this expedition to the Sandwich Islands he ascended Wha-ra-rai and Mowna-roa, two of the principal mountains of the island of Owhyhee, and determined their heights (that of the latter exceeding 13,000 feet) by barometrical

observations made simultaneously with others on board the vessel. "Some account" of his ascent of the former was subsequently given by him in the 1st and 2nd volumes of Loudon's 'Magazine of Natural History.' From an early period of the voyage Mr. Menzies added to his duties as naturalist those of surgeon of the Discovery, and it affords a striking proof of his professional skill, that on so arduous a service and in so protracted a voyage, not a single man was lost by disease after quitting the Cape of Good Hope in their passage out.

From these various voyages Mr. Menzies brought back with him to England large collections of natural history, chiefly botanical. A very considerable number of the plants which he had collected, and especially of the Cryptogamous, to the study of which he was always devotedly attached, were new to science, and have been described from his specimens by Sir James Edward Smith, Mr. Brown, Sir W. J. Hooker and other botanical friends, among whom they were most liberally distributed. His own publications were few in number. In the 1st volume of our 'Transactions' are contained "Descriptions of three new Animals [*Echeneis lineata*, *Fasciola clavata*, and *Hirudo branchiata*] found in the Pacific Ocean" during his first voyage round the world; and in the 4th, "A new Arrangement of the Species of *Polytrichum*, with some Emendations," which, together with an Appendix, afterwards added, forms a valuable monograph of that extensive genus. In the 'Philosophical Transactions' for 1796, he gave, in conjunction with Mr. (afterwards Sir Everard) Home, "A Description of the Anatomy of the Sea-Otter," of which he had brought home a fine specimen, afterwards presented, with many other zoological specimens and a set of his plants, to the British Museum.

He subsequently served in the West Indies as surgeon of the *Sanspareil*, commanded by Lord Hugh Seymour; but early in the present century he quitted the sea, and continued to practise his profession in London. For some years previous to his death he had retired to Notting Hill, where he passed the tranquil remainder of his lengthened existence, eager to the last to obtain additions to his botanical collection, and enjoying the society of his numerous friends with a kindness of heart that never failed.

He died on the 15th of February in the present year, having nearly reached the age of 88, and was buried beside his wife (who died five years earlier, and by whom he had no children), in the Cemetery at Kensal Green. He left his herbarium, consisting chiefly of Cryptogamous plants, *Gramineæ* and *Cyperaceæ*, arranged with characteristic neatness on paper of an 8vo size, to the Botanic Garden at Edinburgh, where he had studied; and also gave by his will a bequest of £100 to this Society, of which he became a Fellow on the 19th of January, 1790, and to which he was always most warmly attached.

*David Pennant, Esq.*, son of the distinguished naturalist and elegant writer to whom we owe so many agreeable and instructive publications, and who, on the foundation of this Society, was elected

one of its Honorary Members, died on the 24th of June, in the 78th year of his age. He edited some of his father's posthumous works, to one of which, consisting of the third and fourth volumes of the 'Outlines of the Globe,' he supplied a preface containing some account of the latter days of his parent, and an eloquent tribute to his talents and virtues. He was himself one of the oldest Fellows of the Society, having been elected in 1792.

Among our FOREIGN MEMBERS we have sustained, in common with the whole world of science, a severe loss in the person of

*Augustin Pyramus DeCandolle*, a botanist of such distinguished eminence as to demand from us a more than ordinary tribute of respect. Descended from a family which came originally from Marseilles, but had for more than two centuries been settled at Geneva, and which towards the close of the sixteenth century furnished one of that illustrious band of classical printers who united in so high a degree the study of letters with the art of transmitting them to posterity, he was born in the latter city, of which his father had been Premier Syndic, on the 4th of February, 1778. His youthful inclinations were turned towards literature rather than science; but a residence in the country awakened in him a taste for botany, which his attendance on the lectures of Professor Vaucher confirmed, and at the age of sixteen his path in life was determined, and he devoted himself to the cultivation of botanical science.

In 1795 he paid his first visit to Paris, where he attended the lectures of Cuvier, Lamarck, Fourcroy, Vauquelin, and other distinguished professors; and when Geneva was a few years afterwards incorporated with the French Republic he returned to the metropolis, where he fixed his residence for several years, attending the medical classes and pursuing his botanical studies at the same time under Jussieu and Desfontaines, with both of whom he formed a close and intimate friendship. Soon after taking up his abode in Paris he commenced the publication of his '*Plantarum Historia Succulentarum*,' which was speedily followed by his '*Astragalogia*;' and in 1802 he began to furnish the text to Redouté's magnificent work, '*Les Liliacées*,' which he supplied up to the 4th volume. In 1805 he was associated with Lamarck in the third edition of that excellent naturalist's '*Flore Française*,' to which he prefixed an introduction, entitled '*Principes Élémentaires de Botanique*,' and containing the outlines of a course of lectures which he had delivered in the previous year at the Collège de France. A '*Synopsis Plantarum in Florâ Gallicâ descriptarum*' followed in 1806. He had previously, in 1804, connected his medical and botanical studies in an '*Essai sur les Propriétés Médicales des Plantes, comparées avec leur classification naturelle*,' of which a second edition appeared in 1816. At an early period of his residence in Paris M. DeCandolle took an active part in the formation, under the auspices of Baron Benjamin Delessert, of the *Société Philanthropique* for the supply of economical soups to the poor and other charitable purposes, of which he continued for several years to be the secretary. The Society for the Encouragement of National Industry is also stated to have been formed under his direction and management.



In 1806 he ceased to be permanently resident in Paris. He received in that year a commission from the Imperial Government to collect information on the state of botany and agriculture throughout the empire, and in pursuance of this commission he took for six successive years annual journeys into the several departments, the results of which are contained in his 'Rapports sur les Voyages Botaniques et Agronomiques faits dans les Départemens de l'Empire Français,' which were published in a collected form in 1813.

Soon after his appointment to this important task he quitted Paris for Montpellier, where he became Professor of Botany in the Faculty of Medicine in 1807, and a Chair of Botany having been established in the Faculty of Sciences of that Academy in 1810, he attached himself with renewed ardour to the promotion of his favourite pursuit. Under his direction the Botanic Garden was greatly improved, and a Catalogue, with descriptions of many new species, was published by him in 1813, in which year his 'Théorie Élémentaire de la Botanique' also made its first appearance. Many valuable memoirs, scattered through various publications, but chiefly taken from the 'Annales du Muséum d'Histoire Naturelle,' were in this year collected into a volume.

After the second Restoration of the Bourbons, circumstances occurred which induced him to quit Montpellier and return to his native city, now restored to independence. A Chair of Natural History was instituted expressly for him, of which he took possession in January 1816, and the Botanic Garden, established towards the close of the last century with the assistance of funds bequeathed for that purpose by the celebrated Bonnet, was greatly augmented, partly by assistance derived from the Government, and partly by voluntary subscription. Several Fasciculi of the 'Plantes rares du Jardin de Genève' attest the interest which he took in its success.

In 1816 he visited England for the purpose of consulting the Herbaria of our country with a view to the general system of plants, the publication of which he then meditated, and during his stay here communicated to the Linnean Society a paper entitled "Remarks on two Genera of Plants to be referred to the Family of *Rosaceæ*." These are *Kerria* and *Purshia*, previously strangely misunderstood, and as strangely misplaced in distant and very dissimilar families. His memoir on this subject, the only one by M. DeCandolle which has a place in our 'Transactions,' is contained in the twelfth volume.

In 1818 appeared the first volume of his intended 'Regni Vegetabilis Systema Naturale,' which was followed by a second in 1821. But the plan of this work was obviously too vast for accomplishment by individual industry, however great; and after the publication of these two volumes, M. DeCandolle recognized the necessity of confining himself within narrower limits. In the year 1824 he commenced the publication of his 'Prodromus Systematis Regni Vegetabilis,' the title of which indicates his intention at some future period to resume the more extensive work. But even this 'Enumeratio Contracta,' as he designates it, proved too mighty a labour, and in the remaining seventeen years of his life, all that his unwearied energy could accomplish was the publication of seven volumes, completing pro-

bably about two-thirds of the contemplated task. The value of these important manuals, in the present state of botanical science, can only be estimated by those with whom they are of necessity in daily use. On many of the more interesting families on which they treat he simultaneously published a series of descriptive memoirs.

It is the great merit of this important work, that, far more than any other approaching it in extent, it is founded on actual observation. M. DeCandolle's own herbarium was extremely rich; he had visited and carefully examined many of the most extensive collections, and especially those of Paris; and many entire collections as well as separate families, on which he was specially engaged, were from time to time submitted to his examination by their possessors. He had thus opportunities of comparison greatly beyond what in ordinary circumstances fall to the lot of an individual. His library too was stored with almost every important publication that could be required for his undertaking. With such ample materials, aided by his untiring zeal and the persevering energy of his character, he steadily pursued his allotted task, and only ceased to labour at it when he ceased to live.

It was not merely as a botanist that M. DeCandolle deserved well of his country and of mankind. Both as an individual and in the Council of his native city, he was ever active in the promotion of measures of public utility, whether they related to the improvement of agriculture, the cultivation of the arts, the advancement of public instruction, or the amelioration of the legislative code. Even in his botanical lectures he never lost an opportunity of inculcating the importance of these and similar subjects. Those lectures were attended by a numerous class, who caught from their teacher a portion of the enthusiasm with which he was himself inspired. Some idea of the manner in which he brought their subject before his auditors may be obtained from his 'Organographie' and 'Physiologie Végétale,' published in 1827 and 1832, which contain the substance of his lectures on those two great departments of the science.

For some years his health had been declining, and it is to be feared that the severe and incessant attention which he paid to the elaboration of the great family of *Compositæ* had made a deep inroad upon it. As a relaxation from his labours, he undertook, in the last year of his life, a long journey, and attended the Scientific Meeting held at Turin; but he did not derive from this journey the anticipated improvement in his health, which gradually failed until his death, on the 9th of September last. He has left a son, Alphonse, well known as the author of several valuable botanical publications, one of which, his memoir on the family of *Myrsinæ*, appeared in our 'Transactions.'

*Jens Wilken Hornemann* was born in 1770, and studied at the University of Copenhagen, where his 'Försög til en Dansk økonomisk Plantelære' obtained a prize in 1795. In 1798 he commenced a botanical tour through Germany, France and England, and in 1801 became lecturer at the Copenhagen Botanic Garden. He succeeded his teacher Vahl as Regius Professor and Director of the Garden in

1804, and published in 1807 an 'Enumeratio Plantarum Horti Havniensis,' and in 1813 and 1815 a more complete synopsis of the plants there cultivated under the title of 'Hortus Regius Botanicus Havniensis.' In 1819 he wrote a dissertation 'De Indole Plantarum Guineensium.' After the death of Vahl he superintended the publication of the 'Flora Danica,' and several papers by him have been published in the 'Transactions of the Danish Philosophical Society' and the 'Tidskrift for Naturvidenskaberne,' of which he was one of the editors. His lectures and writings have done much to extend the study of botany in Denmark, and have contributed to maintain the character acquired for Danish botanists by Kœnig, Forskåhl, Ceder, Rottböll and Vahl.

Among the ASSOCIATES we lament the loss of

*The Rev. Robert Francis Bree*, who became a Fellow of the Linnean Society in 1815, and was placed on the List of Associates in 1827. He died at his residence in the New Kent Road on the 28th of January in the present year, at the age of 66.

*David Don, Esq.*, Professor of Botany in King's College, London, and Librarian of this Society, of whom an account will be found at pages 397 and 476, vol. viii.

*Mr. Charles Edward Sowerby* (son of the late James Sowerby, and brother of James De Carle and George Brettingham Sowerby, who still survive to maintain the reputation of the family name,) was principally known as a naturalist by the smaller and cheaper edition of the 'English Botany,' which he superintended and which is now nearly completed. He died on the 7th of the present month.

The President also announced that ten Fellows and three Associates had been elected since the last Anniversary.

At the Election which subsequently took place, the Lord Bishop of Norwich was elected President; Edward Forster, Esq., Treasurer; John Joseph Bennett, Esq., Secretary; and Richard Taylor, Esq., Under-Secretary. The following five Fellows were elected into the Council in the room of others going out, viz. The Right Hon. the Earl of Beverley; John Alexander Hankey, Esq.; John Miers, Esq.; Roderick Impey Murchison, Esq.; and Alfred White, Esq.

#### ENTOMOLOGY IN AMERICA.

"An Entomological Society, somewhat like your 'Club,' has lately been formed in this country. It was projected by Dr. Morris of Baltimore, and contains at present only five members, or six including me; but I am too distant from the others to be considered as a resident or immediate member. They are now at work on a Descriptive Catalogue of our native Coleoptera, which it is expected will be finished by the 1st of January, when it will probably be sent to me for revision. Mere catalogue names will not be considered as any authority; all the species which cannot be identified by works in our possession will be named and characterized as new. Many synonyms



may hereby be added to nomenclature ; but this independent course is the only one to be pursued under existing circumstances."—*Extract of a Letter from Dr. T. W. Harris of Harvard University, to Mr. E. Doubleday.*

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## OBITUARY.

On the 23rd of November, at the Cavalry Barracks, Leeds, at the early age of 25, Daniel Cooper, Esq., Assistant-Surgeon to the 17th Lancers, (which regiment he had only joined about two months,) of a sudden attack of *phlebitis* (inflammation of the veins). Although death is the heir-loom of mortality, and the terminus of all earthly beings, yet such is the frailty and short-sightedness of our nature, that we are apt to view its effects in some cases with more commiseration than in others, and conclude that the period of bereavement is most distant, when it is within a few short hours of arriving. We see individuals in mature life, and aged labourers in the field of science, removed from amongst us with a sort of feeling that such is the ordinary course of nature ; but when those in the spring-time of their existence, whose fondest hopes and anxious expectations appear just upon the point of being realized,—whose early labours and projected investigations to ensure honourable distinctions at future periods are so suddenly blighted and snatched away,—we feel utterly unable to comprehend the inscrutable dispensations of Providence, though so constantly reminded of the mutability of everything human, and are left to console ourselves with the cherished hope that the labours of the wise and good will not be in vain, nor their example without influence ; but as they depart hence others of like mind will step into their place, and the cause of science and knowledge continue to advance, notwithstanding the successive removals of its ardent and lamented supporters. The decease of our contributor and friend Mr. Cooper forcibly illustrates these observations : from his earliest years he had been zealously devoted to scientific investigations, but cultivated more especially botany and conchology ; soon after the formation of the Microscopical Society of London, he originated and conducted the *Microscopic Journal*, in which he was latterly joined by Mr. Busk, of the Hospital Ship, Dreadnought. Mr. Cooper was a Member of the Royal College of Surgeons, of the Microscopical and Botanical Societies of London, and Associate of the Linnæan Society ; formerly Assistant in the Zoological Department of the British Museum ; Lecturer on Botany at the Theatre of Anatomy and Medicine, Webb Street, Borough ; Curator of the Botanical Society ; author of the '*Flora Metropolitana*,' &c. His amiable disposition, gentlemanly deportment, and readiness to afford assistance to any one engaged in practical investigations, endeared him to all who had the pleasure of his acquaintance, and most to those who knew him best. He attended a review on the 18th, was a corpse on the 23rd, and was interred with military honours on the 28th inst.

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