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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.')

CONDUCTED BY  
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AND  
RICHARD TAYLOR, F.L.S., F.G.S.

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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 æconomiâ 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.

CHARLES C. BABBINGTON, Esq., M.A., F.R.S., F.G.S.,  
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1844.



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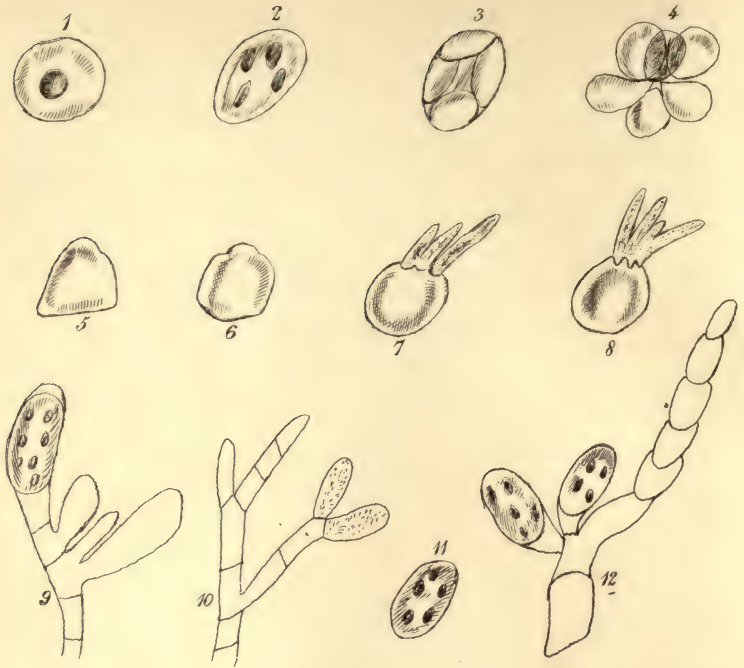
#### ERRATUM IN VOL. XII.

Page 454, line 5, for "follow at the first moult after the admission of the male. She," &c., read "follow. At the first moult however after the admission of the male, she," &c.

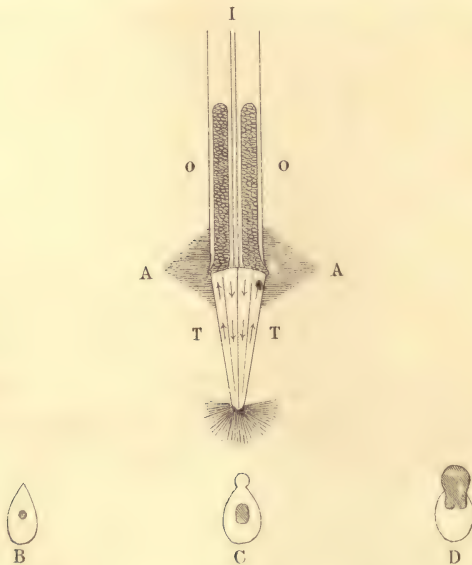
#### ERRATA IN VOL. XIII.

Page 111, line 25 from top, for "the cephalic segment is widened like that of *Serolis*," read "the cephalic segment is widened like that of *Spheroma*, whilst the eyes approach the median line as in *Serolis*."  
 272, line 10 from top, for "Its differences from *D. Dillenii* may be thus briefly stated," read "Its differences from *D. fuscescens*," &c.  
 313, line 11 from bottom, for "Had *Talegalla* been Rasorial," read "Had *Talegalla* been Raptorial," &c.





Marine Algæ.



Structure of Sagitta.



# THE ANNALS

AND

## MAGAZINE OF NATURAL HISTORY.

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“ ..... per litora spargite muscum,  
Naiades, et circum 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 conchyliis succo.”  
*Parthenii* Ecl. 1.

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No. 81. JANUARY 1844.

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I.—*Observations on the Structure and Propagation of the genus Sagitta.* By CHARLES DARWIN, F.R.S., V.P.G.S.

[With a Plate.]

THE species of this genus are remarkable from the simplicity of their structure, the obscurity of their affinities, and from abounding in infinite numbers over the intra-tropical and temperate seas. The genus was founded by MM. Quoy and Gaimard\*; three species have been figured and described by M. A. d'Orbigny, and lately Prof. E. Forbes has added a species to the British fauna, and has given many particulars regarding the structure of the genus. Scarcely any pelagic animal is more abundant: I found it in lat. 21° N. in the Atlantic, and again off the coast of Brazil in 18° S.; between latitudes 37° and 40° S., the sea, especially during the night, swarmed with them. They generally appear to swim near the surface; but in the Pacific, off the coast of Chile, I obtained specimens from a depth of four feet. They are not confined exclusively to the open ocean, as supposed by M. d'Orbigny; for near the shore of Patagonia, where the water was only ten fathoms in depth, they were very numerous.

All the individuals which I caught had two pair of lateral fins,

\* *Annales des Sciences Naturelles*, tom. x. p. 232. M. d'Orbigny's observations are given in his grand work (*Mollusques*, p. 140). Prof. E. Forbes four years since made his first communication on this genus before the Wernerian Society, and a second one at the Meeting of the British Association for the present year.

but I do not suppose that they all belong to the same species : those obtained in lat.  $37^{\circ}$  to  $40^{\circ}$  S. appear certainly to be the *S. exaptera* of D'Orbigny ; and the few following observations, which relate chiefly to their propagation, apply, when not otherwise stated, to this species. M. d'Orbigny and Prof. Forbes have provisionally placed this genus amongst the nucleo-branch mollusca ; but the evidence is hardly conclusive.

*Head.*—The linear-lanceolate head, which is of a transparent, gelatinous and adhesive texture, is separated from the body by a distinct neck. The head when not in action is slightly flattened and of a truncate-conical shape ; when in action its basal part assumes a semilunar or horse-shoe form, in the concavity of which lies the longitudinally-folded mouth. On each arm of the fleshy horse-shoe, a comb, formed of eight strong, curved, slightly hooked claws or teeth, is attached. The animal when lively is constantly clasping these bristle-like teeth together, over its mouth ; when clasped together, and the head in a state of inaction, they appear to be situated much nearer to the mouth than when their fleshy bases are expanded in action. The middle teeth are the longest ; besides their clasping action and the power of movement in their fleshy bases, each separate tooth can move itself laterally further from or nearer to the adjoining ones. The mouth opens on the oblique surface of a part projecting up, between the two fleshy arms. Close to the mouth there are two other rows of exceedingly minute teeth, which have not been noticed by other observers, and which I discovered only with a lens of high power. These two rows of little teeth project inwards and transversely to the two great upright combs of teeth ; so that when these latter are clasped over the mouth the minute teeth cross them, thus effectually preventing any object from escaping which might be caught by the longer curved teeth. I could not see any vestige of eyes or of tentacula.

*Locomotive organs.*—The animal moves quickly by starts, bending its body. The two pair of lateral fins and that on the tail lie in the same horizontal plane : viewed with a lens of small power they appear formed of a delicate membrane, but under a lens of  $\frac{1}{20}$ th of an inch focal distance they appear to consist of excessively fine transparent rays, touching each other, like the barbs of a feather, but not, as it appeared to me, actually united by a membrane. The tail, besides being used as a locomotive organ, serves as a means of attachment ; for the animal when placed in a basin of water sometimes adhered by its tail so firmly to the smooth sides, that it could not be detached by a considerable agitation of the water. Out of the innumerable specimens which I procured, I never saw one fastened by its teeth to the ova

of pelagic animals, or to other bodies, as M. d'Orbigny has observed in some of his species.

*Internal viscera.*—Within the body, in the same plane with the longitudinally folded mouth, there is a flattened tube or cavity, which in the specimens obtained in lat. 18° S. I observed had the power of contracting and enlarging itself in different parts, and within it there was a distinct peristaltic movement. Within this cavity in the *S. exaptera* I could clearly discern in the posterior half of the body a delicate vessel, which I presume is the intestine, for it appeared to terminate on one side of the body at the base of the tail. I could discover no vestige of a nucleus, of branchiæ, of a liver, or of a heart. In some exceedingly young specimens, however, just liberated from the egg, there was a distinct pulsating organ (as will hereafter be mentioned) in the anterior part of the body.

*Propagation.*—The state of the reproductive system varies much in animals caught at the same time. Taking a specimen with this system in a high state of development, the tail, or the tapering part of the body into which the intestinal tube does not penetrate, is seen to be longitudinally divided by an exceedingly delicate partition, and to be filled with a pulpy finely-granular matter. The column of matter on each side of the central division also *appears* (but whether really so I do not know) to be divided, making altogether four columns, as is shown in the diagram. The whole of this matter is in a state of steady and regular circulation, something like that of the fluid in the stems of the *Chara*. The matter flowed upwards in the two outer columns, and downwards towards the point of the tail in the two middle columns. The circulation in the up-flowing columns was most vigorous on their outer sides; and in the down-flowing columns on their insides, that is, on each side of the central partition: this would be accounted for, if we might suppose that the two surfaces of the central partition were covered with cilia, vibrating in a direction opposite to that in which other cilia situated on the inside of the membrane forming the tail were also vibrating. The stationary condition of the granular matter between the two streams, travelling in opposite directions, perhaps gives the appearance of the partition on each side of the central one. The circulation at the base of the tail was twice as rapid as it was near the apex: where most rapid I found that a granule travelled over the  $\frac{1}{20}$ th of an inch on the micrometer in five seconds; allowing for the slower rate in other parts, I calculated that in an individual, the tail of which was  $\frac{5}{20}$ ths of an inch in length, a granule performed its entire circuit in about six minutes. I could distinctly follow the granules descending one column, turning the angle, and again ascending. In specimens with the reproductive

system in a lesser stage of development, the tail contained very little granular matter; and in proportion as this was less in quantity, so was the circulation less and less vigorous: in some specimens no granular matter, and perhaps, consequently, no circulation, was visible.

When the tail is filled with vigorously circulating matter two large *cul-de-sacs* or gut-shaped ovaries are invariably present, extending, as represented (*o o*) in the diagram, from the base of the tail along each side of the intestinal tube. These are filled with ova, which in the same animal are in different stages of development, and vary in length from  $\frac{1}{100}$ th to  $\frac{1}{50}$ th of an inch; their shape is pointed oval (Plate I. fig. B), and they are attached by the pointed end in rows to the sides of the ovaries: those of full size are detached by a very slight touch. When the ovaries contain many eggs nearly perfect (but not at other times), a small conical and apparently perforated protuberance can be seen on each side (*A A*) of the body, through which without doubt the eggs are expelled. In different individuals the ovaries are of different sizes and the eggs in different stages of development: before any of the eggs are perfected the ovaries are merely filled with granular matter; but this is invariably of a coarser texture than that within the tail. The ovaries when not containing granular matter are contracted into a very small size\* (*B*). In great numbers of specimens taken in latitude  $18^{\circ}$  S. and between  $37^{\circ}$  and  $40^{\circ}$  S., I invariably observed that there existed a close relationship between the quantity of circulating matter within the tail and the size of the ovaries; from this circumstance, and from the similarity of the granular matter in the ovaries, before any of the eggs are perfected, with that in the tail, except that the granules are in this latter part of less size, I think it almost certain that the granular matter is first formed within the tail, and that it then passes into the ovaries, where it is gradually developed into ova. I could not, however, trace any opening from the one part into the other, but at the bottom of each ovary there was a space, where a closed orifice might have been situated.

A well-developed egg presents, when liberated by a touch from a torn open ovary, the appearance represented at (*B*) in the diagram. The egg is transparent, and contains within it an exceedingly minute globule. Twice on one day and once again a week afterwards, I clearly observed the following curious phænomenon take place: the apex of the egg, a few minutes after having been liberated from its attachment, began and continued to

\* I also remark in my MS. notes, that the granular matter within the tail is sometimes contracted into small kidney-shaped bodies; I cannot help suspecting that I ought in every case to have written that the ovaries were contracted into this form.

swell, and soon assumed the form shown by (C). Whilst this was going on, the small internal globule also appeared to be swelling, and at the same time the transparent fluid with which the ovum and its enlarged apex were charged, became more and more opaque and granular. The apex continued enlarging until it became of nearly the same size with the ovum from which it proceeded; and as this took place, all the granular matter was slowly expelled from the original capsule into the newly-formed one, in a manner which seemed to show that it was effected by the contraction of a lining membrane as represented at (D). Directly that this was completed the two balls slowly separated; one being left a mere empty husk, and the other consisting of a spherical mass of granular matter, within which a minute globule could be discovered. I presume that this was the same globule as seen within the egg in its first state (as at B), and that the appearance of its swelling was caused by the transparent fluid round it being first converted into granular matter. I have reason to suppose from what follows that this little globule contains only air. The whole phenomenon was effected in about ten minutes; and in one case I watched the entire process without taking my eye from the microscope.

On the 27th and 29th of September 1832, we passed\* through the same tract of sea (off Bahia Blanca on the coast of northern Patagonia) where twenty-five days previously I had observed such great numbers of the *S. exaptera* with their ovaries distended with eggs, and I now found infinitely numerous ova floating on the surface. They were in different states of maturity; those least developed presented a sphere of granular matter contained within a larger spherical case. In the next stage the granular matter collects in a linear manner on one side of the inner sphere, and projects slightly beyond its outline; it then soon forms a distinct prominent rim, extending round two-thirds of the circumference of the inner sphere. This prominent rim is the young animal; a fine vessel is seen extending within its entire length, and one extremity enlarges into a head: the tail is first liberated from its attachment on the surface of the inner sphere, and lastly the head: the young animal, when thus released, lies in a curved position within the outer case, with the inner sphere, on the circumference of which it was developed, pushed on one side, and its function apparently ended. The central intestinal vessel is now much more distinct: an excessively fine membrane-like fin is discernible round the end of the tail; and the young animal being liberated from the outer spherical capsule, progresses by a

\* I may add, that in the beginning of April, off the Abrolhos, on the coast of Brazil, in lat. 18° S., numerous specimens of a four-finned *Sagitta* had their ovaries filled with eggs apparently ready to be expelled.

starting movement like that of a full-grown *Sagitta*. At the anterior extremity, near the head, a pulsating organ can be distinctly seen. The ovum in all these stages contains a minute globule, which causes it to float on the surface of the water, and apparently is formed of air: I presume that it is the same globule with that seen in the egg, when first released from the ovary. The change in the floating ova from the state in which the inner sphere consists of granular matter without any trace of a young animal to the succeeding states must be rapid; for on the 27th of September all the ova were in this first state, whilst on the 29th the majority contained partially developed young ones. These floating ova were  $\frac{1}{4}$ th of an inch in diameter, whereas the spherical balls of granular matter which I saw expelled from their pointed oval cases were barely the  $\frac{1}{30}$ th of an inch in diameter; but as the eggs within the ovaries were of different sizes, according to their states of maturity, we might expect that their growth would continue after having been expelled from them. I will conclude by expressing a hope that these few observations on the propagation of this curious genus may aid more competent judges than myself in ascertaining its true affinities.

#### EXPLANATION OF PLATE I.

I. Intestinal tube.

o o. Ovaries.

A A. Apertures of the ovaries, and lateral fins.

T T. Tail divided into four columns of circulating granular matter, the course of which is shown by the arrows.

B. Egg just liberated from the ovary.

C. Egg in first state of change.

D. Egg in a succeeding state.

II.—*On the Marine Algæ of the vicinity of Aberdeen.* By G. DICKIE, M.D., Lecturer on Botany in the University and King's College of Aberdeen.

[With a Plate.]

IN the present and subsequent communications it is proposed to enumerate the marine Algæ which have been found in the vicinity of Aberdeen, and also to record such observations on their structure as may seem of most interest.

Although no great merit attaches to mere local lists, still such are not to be entirely rejected as useless, more especially when we consider their utility to those whose attention is directed to the geographical distribution of plants, a very interesting and important branch of their history.

All the species to be mentioned have been collected on the Kincardineshire coast, the southern part of the Aberdeenshire

coast being for the most part sandy ; the rocky part commencing only on the north side of the estuary of the Yethan, a distance of about sixteen miles from Aberdeen.

The part of the Kincardineshire coast which has been examined is chiefly composed of granite and gneiss ; it is much exposed to the action of heavy seas, and presents few sheltered coves or even calm pools of any extent, and hence probably we may account for the absence of some of the more delicate species. I regret that my records of the temperature of the sea at this place are so few and little trustworthy as to be undeserving of record.

The arrangement given in Harvey's 'Manual of the British Algæ' will be followed, although his divisions, founded on the colour of the seeds, are not strictly applicable in all cases.

#### MELANOSPERMÆ.

*Halidrys siliquosa*, Lyngb.—Both varieties of this plant occur in considerable quantity ; it is invariably found in pools, mostly at high-water mark, and is generally, or more probably always submersed.

Before proceeding to notice the species of *Fucus* occurring here, it will be requisite to direct attention to the fructification of this genus, more especially in reference to Dr. Montagne's paper in the 'Annales des Sciences Naturelles,' October 1842 ; in which work that profound cryptogamist has published observations on his new genus *Xiphophora*, and in connexion with it has discussed at considerable length the question, whether the *Fucaceæ* may not have two modes of propagation ?

In Harvey's work the fructification of the *Fucoideæ* is defined as "consisting of spherical clusters of opaque seeds, imbedded in distinct gelatinous receptacles, and finally escaping by pores ;" of *Fucus* more particularly it is said, that "the receptacles contain tubercles imbedded in mucus, and discharging their seeds by conspicuous pores."

On dissecting these so-called tubercles in different stages, more especially in the earlier, it will be found that they are in reality small sacs, or inflexions of the surface of the frond, having distinct walls composed of condensed cellular tissue and each opening by a small orifice, and having a close resemblance to the perithecia of a *Sphaeria*, or the so-called anthers of *Marchantia*. From the walls of the sacs originate numerous jointed filaments, in some cases simple, in others branched ; the apices of many of these protrude from the orifices of the sacs, and present no great obstacle to the emission of the seeds, but prevent the entrance of any small body from without. Dr. Montagne's account of the structure of *Xiphophora* corresponds exactly with this : the sacs he calls *conceptacles*, and compares the filaments to paraphyses.

In the sacs containing *simple* filaments and at their bases, we find the seeds properly so called. These Montagne calls *basisperms*, from their position in relation to the filaments, and in order to distinguish them from the other kind of fructification. The seeds are usually imbedded in a gelatinous secretion. In some *conceptacles* we find *branched* filaments which are also jointed, and in the upper articulations of which we observe the other kind of reproductive bodies called *acrosperms* by Montagne, the microphytes of De la Pylaie, alluded to also by Meneghini, and figured by Lyngbye (Montagne, *loc. cit.*). It must not be supposed, however, that the acrosperms are invariably contained in the terminal joints of the filaments; the term is, however, sufficient to express the general difference in position of the two kinds of bodies, in relation to the filaments.

On the surface of the frond in many of the *Fucoidea* are numerous pores, from which issue, as Greville remarks, "little tufts of filaments, the use of which has not been discovered." These I believe to be *barren conceptacles*; both the barren and fertile are in reality mere inflexions of the surface of the frond. The nature of the fructification in *Asperococcus* appears to be in favour of this opinion; in the *A. fistulosus* we have in reality the *basisperms* and *simple filaments* of a *Fucus* completely exposed, there being no inflexion of the surface.

Turner states that Reaumur considered the tufts of fibres arising from the pores on the frond as corresponding to the anthers of Phænogamous plants.

*Fucus vesiculosus*.—This species is abundant, and particularly near high-water mark and at estuaries. Dr. Montagne has only found *basisperms* in three specimens which he examined. It however possesses also *acrosperms*, the two kinds occurring on different plants.

*F. ceranoides*.—In this vicinity it is only found at the mouths of the Dee and Don, and also some distance up these rivers. It in some instances makes a close approach to *F. vesiculosus*, and is probably only a variety of it, produced by the action of fresh or brackish water. Like the former species also, it possesses both kinds of reproductive bodies, which are found on the same plant, but on different fronds.

*F. nodosus*.—This species is found in great profusion. Montagne and Pylaie have only found on it *acrosperms*, Lyngbye detected *basisperms*; Turner says that both occur in the same conceptacles. I have found both, but on different plants, and have been unable to confirm Turner's observations.

*F. serratus*.—Abundant. This species possesses both kinds of reproductive bodies on the same plant, but on different fronds.

*F. canaliculatus* is very common; for the most part an occa-



sional moistening with sea-water is all that is necessary for the development of this species, and hence it is mostly found at high-water mark. Dr. Montagne has found both kinds of fructification in the same receptacle. The basisperms in the course of their development undergo several changes: these may be easily traced in *F. serratus* and *F. canaliculatus*. In the former we first observe large cells with several nuclei in their interior; these rapidly increase in size; the parent cells now appear compound and in course of time disappear, the young cells becoming free. Figs. 1, 2, 3, 4 in Plate I. represent these stages in the species alluded to. In *F. canaliculatus* the young cells are not so numerous as in the former case.

Some time ago a few experiments were made for the purpose of ascertaining the mode of germination in the last species. A considerable quantity of its seeds were placed on slips of glass, to which they readily adhered; these were kept immersed in sea-water, which was renewed every four or five days. The experiments were conducted in a room at a moderate temperature, and in the month of December. In about three weeks the seeds were found to have undergone a change of form; from triangular with rounded angles they had become spherical. In the next stage a slight swelling was observed on many of them, and at a more advanced period there issued at this place several minute transparent filaments, never exceeding four in number from the same seed; one or more of these had usually made greater progress than the others. In their interior was seen a granular matter of a pale yellow colour. The observations were interrupted at a more advanced stage, when the filaments appeared to have become coherent at their bases. By careful examination under the microscope, it was found that each seed consists of two coats, the inner the most delicate of the two and containing a granular matter; the filaments appeared to be prolongations of it, and to have burst the outer and stronger membrane.

Figs. 5, 6, 7, 8 represent the germination at different periods. The receptacles containing the acrospermal conceptacles, generally when newly collected, have an orange-yellow colour, and after some hours an orange mucus exudes from the pores, which on examination with the microscope will be found to consist of acrosperms. The cell in which each of these bodies is included is for the most part so transparent, that it is difficult to detect the presence of any enclosing membrane, more especially if viewed in a drop of sea-water, the medium which ought always to be used in examining the structure of marine species. On placing them in fresh water the containing cell is seen to burst, and the enclosed acrosperms are expelled with considerable force. Each body is composed of a simple membrane containing small

granules which are usually regularly arranged. There is some difference in their form at different stages, as well as in the different species of *Fucus*. Figs. 9, 10, 11 represent those of *F. vesiculosus*; fig. 12 those of *F. nodosus*.

The presence of these bodies being so constant, it is not unreasonable to suppose that they perform some important function. Those who believe that impregnation is necessary in cellular plants, in the same sense at least as in the higher tribes, may probably consider that they are representatives of the anthers, and perform similar functions.

A few attempts were made for the purpose of ascertaining if they would germinate, by treating them in the same way as the *basisperms* of *F. canaliculatus* already mentioned. The experiments failed, and the difficulty seems to be to preserve the water at a proper and uniform temperature, for, owing to the delicacy of their structure, they are easily affected by changes. I believe, however, that they afford one means by which the Fuci are propagated, for the reason that the structure of the reproductive organs of *Alaria*, *Laminaria*, &c. is essentially that of *acrosperms*: this will be more particularly alluded to in a subsequent paper. The true species of *Fucus* may be considered as *heterospermous*, and it will be shown afterwards that other genera are *basispermous* and others *acrospermous*.

[To be continued.]

### III.—*Descriptive Catalogue of the Zoophytes from the Crag.*

By S. V. WOOD, Esq., F.G.S.

MR. RICHARD COWLING TAYLOR, in a very valuable paper upon British "Antediluvian Zoology and Botany," communicated to the 'Magazine of Natural History' in 1830, was, I believe, the first to draw attention to the variety and interesting forms presented by the Corals of the Crag, and many very good figures are given by him in the above periodical, but unaccompanied by generic or specific characters.

In the following Catalogue I have endeavoured to furnish a list of these Polypifera, which are principally derived, as might be expected, from the deposit that has been termed *par excellence* "Coralline" Crag. This formation in the neighbourhood of Orford presents a close analogy to some of the coral reefs now forming, being composed almost entirely of corals, and sufficiently indurated to serve as a building-stone.

Among the corals of the crag we are presented with as great anomalies as among the Mollusca; recent species strictly British being associated with genera wholly unknown in a living state, as for example, *Fascicularia* and *Theonoa*. Although inferences re-

specting the temperature of the coralline-crag sea must be highly conjectural where such incongruous forms are associated, I should still be disposed to adhere to the opinion I have already expressed as to the probability of its approximating that of the coast of Portugal. A current of water like that which now rolls through the Gulf of Florida may have introduced *Pyrula*, *Pholadomya*, *Lingula* and other tropical forms, or these genera, at the time of the coralline crag being deposited, might have been the only living representatives of a tropical fauna otherwise extinct.

The fauna of the red crag must, I think, be regarded as indicating a temperature much lower than that which existed during the deposition of the coralline crag. The general characters of its Polypifera agree with those of our own seas, for I consider my red-crag specimens of *Theonoo* and *Fascicularia* to have been introduced into this deposit from the underlying coralliferous beds. The greater part of my red-crag corals are attached to the mouths of univalves or the interior of bivalves.

I have not as yet seen any corals from the mammaliferous crag.

Though many of the crag polypidoms are in a very perfect condition, others, particularly among the *Escharidæ*, from various causes, have undergone structural alterations which render their correct determination often a matter of great difficulty. *Flustra membranacea*, for example, is generally found with nothing but the bare walls of its cells remaining, and other species have had prominent parts entirely removed; these alterations are wholly independent of that change which takes place in the external covering of the cells during their progress to maturity, so ably pointed out by M. Edwards in his essay upon the *Escharidæ*, and which may be seen in various cells on the same specimen.

The following are from my own cabinet except where otherwise expressed.

Class ZOOPHYTA.

Fam. LAMELLIFERÆ.

Balanophyllia, n. g.

Polypidom permanently fixed, simple, exterior striated longitudinally; disc stellated, with a central style; lamellæ radiating in trios, converging to a point at the circumference.

This differs from *Caryophyllia* in the tripartite arrangement of the lamellæ, and from *Dendrophyllia* in not being dendroidal.

Cor. Crag.	Red Crag.	Recent.
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1. *Balanophyllia calyculus*, n. s.

Sutton.	
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"Polyp. subcylindrical; disc subovate, cup-shaped, with an elongate central style; lamellæ radiating and fasciculated, sides of lamellæ finely granulate, exterior rugosely striate."—*Mag. of Nat. Hist.* vol. iii. 1830, p. 272. f. 60. d.

The disc of this coral is partially bisected by a central style, around which are arranged twelve rays, each ray composed of three lamellæ, which converge to a point as they approach the circumference. In the intervals formed by the divergence of these rays are placed twelve other rays also tripartite, and the smaller spaces between the terminations of these twenty-four rays are each bisected by a single plate. One in every three of the thirty-six lamellæ attached to the style is elevated above those contiguous to it. From the extreme rarity of unmutilated specimens, I am unable to state whether the number of rays be constant in this species, but its form varies so greatly that I should presume some variation in the number of its parts to be very probable. It is occasionally much depressed, the base spreading to more than twice the diameter of the disc; sometimes it is a reversed cone, the disc exceeding the base tenfold, such variation appearing to depend upon its place of attachment; it often occurs much elongated, generally single, never branched, though occasionally three or four individuals are grouped together.

The lamellæ appear promiscuously arranged where the disc is much injured, which is generally the case with crag specimens. The species is also found in the tertiary formation of Touraine: a specimen in my possession, from this locality, has a portion of a thin periostracum remaining upon the exterior.

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|---|-------------------|------------------|----------------|
|   | <i>Cor. Crag.</i> | <i>Red Crag.</i> | <i>Recent.</i> |
| 1. <i>Fungia semilunata</i> , Lamk. ( <i>2nd edit. Hist. des An. sans Vert.</i> vol. ii. p. 371). |                   |                  |                |

Iken. | |

I am only acquainted with two specimens of this species, one in the cabinet of Mr. Bunbury, and the other in the possession of Mr. Wm. Colchester.

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|---|--|--|--|
| 1. <i>Turbinolia Milletiana</i> , <i>De France (Dict. des Sci. Nat.</i> vol. lvi. p. 93. <i>Turbinolia</i> —? <i>Taylor, Mag. Nat. Hist.</i> vol. iii. p. 272. f. 60. c). |  |  |  |
|---|--|--|--|

Sutton. | Sutton. |

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|---|--|--|--|
| 1. <i>Cladocora cariosa</i> , <i>Lonsdale MS.</i> ( <i>Madrepora cariosa</i> , <i>Goldf. Pet.</i> t. 8. f. 8; <i>De Blainv. Dict. des Sci. Nat.</i> t. 60. p. 355). |  |  |  |
|---|--|--|--|

Ramsholt. | Sutton. |

### Class BRYOZOA.

#### Fam. CRISIADÆ.

- |  |                   |                  |                |
|--|-------------------|------------------|----------------|
|  | <i>Cor. Crag.</i> | <i>Red Crag.</i> | <i>Recent.</i> |
| 1. <i>Crisia eburnea</i> , Lamx. ( <i>Expos. Méth. de Pol.</i> p. 6; <i>Johnston, Brit. Zooph.</i> p. 262. pl. 31. f. 3, 4). |                   |                  |                |

Sutton. | ..... | Britain.

- |   |  |  |  |
|---|--|--|--|
| 2. — <i>luxata</i> ? <i>Flem.</i> ( <i>Johnston, Brit. Zooph.</i> p. 262. pl. 31. f. 5, 6). |  |  |  |
|---|--|--|--|

Sutton. | ..... | Britain.

Only one fragment, which however differs from the description at the above reference. My specimen has the tubes alternate, depressed, suborbicular; surface rugose, probably porous; the cells are not adnate, but distant from each other rather more than the diameter of the tubes.

Fam. TUBULIPORIDÆ.

- |  | <i>Cor. Crag.</i> | <i>Red Crag.</i> | <i>Recent.</i> |
|--|-------------------|------------------|----------------|
| 1. <i>Fascicularia aurantium</i> , <i>M. Edw.</i> ( <i>Lyell's Elements</i> , p. 304. edit. 1838, var. <i>a</i> ; <i>Taylor, Mag. of Nat. Hist.</i> vol. iii. 1830, p. 272. f. 61; <i>id.</i> var. <i>β.</i> f. 63). | Aldbro'.          | Sutton.          |                |

Abundant in the coralline crag. A specimen in my possession measures six inches and a quarter in diameter.

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|--|-----------|---------|--|
| 1. <i>Theonoa</i> ? <i>globosa</i> ( <i>Blumenbachium globosum</i> , <i>Koenig, Icon. Foss.</i> pl. 5. f. 69. <i>Theonoa cristata</i> , <i>M. Edw. MS.</i> <i>Taylor, Mag. Nat. Hist.</i> vol. iii. 1830, p. 273. f. 64 & 65). | Sudbourn. | Sutton. |  |
|--|-----------|---------|--|

In its young state this coral is of a discoidal form with a very short pedicel of attachment; it then resembles a reversed specimen of *Polyporus*, and rarely attains half an inch in diameter. The upper surface exhibits the openings of numerous subpolygonal tubes which are most abundant towards the margin; these tubes converge towards the pedicel as a common centre, and their direction may be sometimes traced along the under surface, which is smooth and entire. The polygonal form of the tubes is probably the result of lateral compression.

The mode of increase appears to be by gemmules formed upon or near the margin of the disc; as these enlarge, their horizontal extension is interrupted by the mutual approximation of their edges, which consequently bend upwards, except at the points furthest from the centre of the disc upon which they are formed; and here, as there is nothing to prevent the free extension of the gemmules, they project beyond the parent disc, and in a slightly downward direction: each disc is thus twisted into a triangular or subquadrangular form, producing a sort of depressed compartment by the union of the under surfaces which project around in the form of a crest. In this manner the shape presented by the adult coral is ultimately produced, and is either hemispherical or subglobular, according to its place of attachment. This polypidom has sometimes a radius of more than two inches.

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|---|-----------|--|--|
| 1. <i>Heteropora dichotoma</i> , <i>De Blainv.</i> ( <i>Man. d'Actinol.</i> p. 417. <i>Ceriopora dichotoma</i> , <i>Goldf. Pet.</i> t. 10. f. 9. var. <i>β.</i> <i>d—f</i> ). | Ramsholt. |  |  |
|---|-----------|--|--|

What I conceive to be the young state of this coral is a small

attached hemispherical body, consisting of a congeries of tubes radiating from a common centre. This increases cylindrically and branches; a longitudinal section then displays the tubes, arising at the first centrally with a vertical direction, but afterwards bending suddenly at nearly a right angle to reach the exterior; a transverse section would consequently divide the tubes throughout a portion of their extent longitudinally, while in the centre of the branch it would cut them transversely. The tubes are subpolygonal with circular openings, many of which are nearly closed, owing probably to the more extended lives of some of the polypes.

This polypidom attains a height of several inches.

*Cor. Crag.*                      *Red Crag.*                      *Recent.*

2. *Heteropora septosa* (var. *a.* polymorpha; var. *β.* pustulosa).  
    Sudbourn. | . . . . . | Britain.

Polypid. boletiform, irregular, sometimes investing; pores irregular.

One fossil specimen invests an *Emarginula*, and corresponds with a recent British species in my possession upon an *Arca lactea*.

Var. *β.* is globose and pustuliform; pores irregular, large and small, subpolygonal; a section shows rows of tubes long and straight, with transverse partitions like those in *Chatetes*.

1. *Diastopora meandrina*, n. s.

Sutton. |                      |

Polypid. globosely foliaceous; foliations anastomosing or meandering with two layers of opposite cells; cells tubular, slightly raised, or rather strongly inclining towards the plane of axis, irregularly quin-cunxial; aperture orbicular; surface granular; radius one inch and a half.

Sect. *a.* adnate.

*Cor. Crag.*                      *Red Crag.*                      *Recent.*

1. *Tubulipora obelia*, *Johnston* (*Brit. Zooph.* p. 269. t. 30. f. 7, 8).  
    Sudbourn. |                      Sutton. |                      Britain.
2. — *patina*, *id.* (*Brit. Zooph.* p. 267. t. 30. f. 1—3).  
    Sudbourn. |                      Sutton. |                      Britain.
3. — *serpens*, *id.* (*Brit. Zooph.* p. 268. t. 30. f. 4—6).  
    Sudbourn. | . . . . . |                      Britain.
4. — *palmata*, n. s.  
    Sudbourn. |                      Sutton. |

Polypid. adnate, divergent; branches enlarging, palmate, truncate; surface rugose, porous, with numerous dwarfish tubular cells, increasing in number (as it diverges) from one or two to seven or eight.

Extent of polypidom three-eighths of an inch.

5. — *repens*, n. s.

Sutton. |                      Sutton. |

Polypid. adherent by a narrow base, linear, dichotomously or irre-

gularly branched; upper surface studded with tubular curved cells irregularly quincunx, seldom more than three tubes in the width of each branch.

Polypidom spreading one inch, diameter of branches  $\frac{1}{20}$ .

Sect.  $\beta$ . free.

	<i>Cor. Crag.</i>	<i>Red Crag.</i>	<i>Recent.</i>
6. <i>Tubulipora</i> ? <i>intricaria</i> , n. s.			
	Sutton.		
7. — ? <i>arborea</i> , n. s.			
	Sutton.		
8. — ? <i>agaricia</i> , n. s.			
	Sutton.		

The above three species do not strictly belong to this genus, but I have placed them here provisionally until better specimens and more information be obtained respecting them.

1. *Idmonea disticha*, *De Blainv.* (*Retepora disticha*, *Goldf. Pet.* t. 9. f. 15).

Sutton. | |

1. *Discopora hispida*, *Flem.* (*Brit. An.* p. 530; *Johnston, Brit. Zooph.* p. 270. t. 30. f. 9—11).

Sudbourn. | Sutton. | Britain.

1. *Alecto gracilis* ? *M. Edw.* (*An. des Sci. Nat.* 1838, tom. ix. t. 16. f. 2. *Alecto* — ? *Woodward, Geol. of Norf.* t. 4. f. 16. Chalk).

Sutton. | |

My only specimen is not in good preservation.

*Filicella*, n. g. (*filum*, a thread, and *cella*).

*Gen. Char.* Cells filiform, distinct, adnate, united at the extremities; dichotomous aperture subterminal, not projecting.

1. *Filicella anguinea*, n. s.

Ramsholt. | |

Repent, snake-like, elongated, subcylindrical, or rather club-shaped, tubulous, glossy, united at the extremities, adnate, dichotomous; aperture oval, rather depressed, subterminal.

I propose this genus for the reception of a very minute zoophyte from the coralline crag which much resembles *Alecto*, but differs in being more elongated, less cylindrical, and with its peritreme even with the cell; it does not adhere by an expanded side like *Alecto*, but is filiform throughout, the cells are more distinctly separated, and are but slightly attached (laterally) to the surface of the interior of an *Echinus*. The cell is compact, smooth, not porous. This is the smallest zoophyte I am acquainted with, being scarcely visible to the naked eye.

Dimensions, one-fifth of a line in length; diameter of the widest part near the mouth of the cell about the eighth part of its length, and this twice the width of the lower portion adjoining its cognate cell. The annexed drawing was made with the camera lucida.



*Filicella anguinea.*

	<i>Cor. Crag.</i>	<i>Red Crag.</i>	<i>Recent.</i>
1. <i>Hornera reteporacea</i> , <i>M. Edw.</i> ( <i>An. des Sci. Nat.</i> vol. ix. t. 10. f. 2).	Sutton.	Sutton.	
2. — <i>striata</i> , <i>M. Edw.</i> ( <i>An. des Sci. Nat.</i> vol. ix. t. 11. f. 1).	Sudbourn.		

The figure above referred to must have been made from an old specimen in which the intermediate pores are closed up; when young and perfect, the superior surface is striated and porous between the cells.

Fam. ESCHARIDÆ.

	<i>Cor. Crag.</i>	<i>Red Crag.</i>	<i>Recent.</i>
1. <i>Retepora cellulosa</i> , <i>Johnston</i> ( <i>Brit. Zooph.</i> p. 297, vignette no. 46. p. 283; <i>M. Edwards</i> , 2nd edit. of <i>Lamarck</i> , tom. ii. p. 276; <i>Lamouroux</i> , <i>Exp. Méth. des Polyp.</i> pl. 26. f. 2).	Sudbourn.	Sutton.	Britain.

The crag coral corresponds with the British var., and may probably be distinct from that found in the Mediterranean, whose meshes are much larger. This latter is also supposed by *M. Edwards* to be distinct from the one quoted by him as from the Indian Ocean.

1. <i>Eschara monilifera</i> , <i>M. Edw.</i> ( <i>An. des Sci. Nat.</i> vol. vi. pl. 9. f. 1).	Ramsholt.	Sutton.	
2. — <i>pertusa</i> , <i>M. Edw.</i> ( <i>An. des Sci. Nat.</i> vol. vi. pl. 10. f. 3).	Sudbourn.		
3. — <i>Sedgwickii</i> , <i>M. Edw.</i> ( <i>An. des Sci. Nat.</i> vol. vi. pl. 10. f. 5).	Sudbourn.		
4. — <i>incisa</i> , <i>M. Edw.</i> ( <i>An. des Sci. Nat.</i> vol. vi. pl. 9. f. 2).	Sudbourn.		

I have not seen this species.



- |   | Cor. Crag. | Red Crag. | Recent.  |
|---|------------|-----------|----------|
| 5. <i>Eschara foliacea</i> , <i>Johnston (Brit. Zooph. p. 297. t. 40).</i>  | Sutton.    | .....     | Britain. |
| 6. — <i>porosa?</i> <i>M. Edw. An. des Sci. Nat. vol. vi. pl. 11. f. 7.</i> | Sudbourn.  |           |          |

The cells of this are found open.

1. *Ulidium Charlesworthii* (*Meliceritina Charlesworthii*, *Ehrenb. Melicerita Charlesworthii*, *M. Edw. An. des Sci. Nat. vol. vi. pl. 12. f. 19*).

Sutton. | |

*Melicerta* has long been used as a genus in the class Crustacea, *Meliceritum* in Acalepha. *Melicerita* as stated by Ehrenberg is not correct. *Meliceritina* is objectionable, as the *ina* is generally used for a family termination. I therefore propose the name *Ulidium* (*οὐλίδιον*, a scar), from its close connexion with *Eschara*.

1. *Cellaria fistulosa* (*Tubularia fistulosa*, *Linn. Cellaria salicornia*, *Lamx. Exp. Méth. des Polyp. p. 5. Farcimia fistulosa*, *Flem. Brit. An. p. 534*).

Sutton. | Walton Naze. | Britain.

Articulations cylindrical; cells elongato-rhomboidal, immersed; sides elevated, sharp; larger opening transversely lunate, unarmed; smaller opening above transverse, semilunate; surface of cells porous.

The cells occasionally vary in shape upon different articulations of the same specimen, like those represented by Ellis, *Coral. pl. 23. D.*, some being of a subhexahedral form with nearly parallel sides. The lower part of the larger opening (the operculum) is elevated in the centre, projecting outwards; this in the fossil is occasionally separated into denticulations: the smaller opening above is generally transverse, sometimes lunate, and often orbicular in worn specimens. In those most perfect the smaller opening is a narrow transverse fissure close to the partition, as may be seen in dead specimens of the recent species, and is probably accidental in all. Fragments of this fossil are abundant, but the articulations are generally separated.

2. — *crassa*, n. s.

Sutton. | Sutton. |

Articulations ovate; cells rhomboidal, immersed, plain; sides elevated, sharp; aperture transverse, sublunate.

The cells in some are hexagonal, and the aperture appears as if armed with four teeth, two proceeding from the upper edge pointing downwards, and two from the lower, more obtuse, pointing upwards; these are probably produced from decomposition: the smaller opening above the mouth varies in shape, being sometimes orbicular, sometimes lunate, and is also in all probability accidental.

- |   | <i>Cor. Crag.</i> | <i>Red Crag.</i> | <i>Recent.</i>   |
|---|-------------------|------------------|------------------|
| 1. <i>Lunulites alveolatus</i> , n. s.  | Sutton.           | Sutton.          |                  |
| Polypid. cupuliform, convex above, concave beneath, thick; cells radiating in straight lines, open?, subquadrate; margin without denticulations; surface beneath striated and porous? |                   |                  |                  |
| 2. — <i>Owenii</i> , Gray ( <i>Spicilegia Zoologica</i> , p. 8. t. 3. f. 15).   | Sutton.           | . . . . .        | Coast of Africa. |

FAM. CELLEPORIDÆ.

- |   |   |           |          |
|---|---|-----------|----------|
| 1. <i>Cellepora pumicosa</i> , Johnston ( <i>Brit. Zooph.</i> p. 273. t. 32. f. 1—3).                                   | Sutton.                                 | Sutton.   | Britain. |
| Var. <i>α. irregularis</i> .  |   |           |          |
| Var. <i>β. globularis</i> .   |   |           |          |
| Var. <i>γ. pustulosa</i> .  | This always envelopes a univalve shell. |           |          |
| Some specimens of <i>irregularis</i> are pierced the entire length, as if originally grown upon the stem of a sea-weed. |   |           |          |
| 2. — <i>cellulosa</i> ( <i>Scyphia cellulosa</i> , <i>Goldf. Pet.</i> t. 33. f. 12).                                    | Sutton.                                 |           |          |
| 3. — <i>ramulosa?</i> Johnston ( <i>Brit. Zooph.</i> p. 274. pl. 32. f. 4).   | Sutton.                                 | . . . . . | Britain. |
| 4. — <i>coronopus</i> , n. s.   | Ramsholt.                               |           |          |

Polypid. dichotomously branched; branches subcylindrical, tapering, terminations not compressed.

- |   |           |              |          |
|---|-----------|--------------|----------|
| 1. <i>Lepralia variolosa</i> , Johnston ( <i>Brit. Zooph.</i> p. 278. t. 34. f. 4). | Sutton.   | Walton Naze. | Britain. |
| 2. — <i>ciliata</i> , Johnston ( <i>Brit. Zooph.</i> p. 279. t. 34. f. 6).          | Sudbourn. | . . . . .    | Britain. |

The spines are gone, but there are five short tubes (which I presume to be their remains) occupying about two-thirds of the peristome.

- |                                |           |         |  |
|--------------------------------|-----------|---------|--|
| 3. — <i>puncturata</i> , n. s. | Sudbourn. | Sutton. |  |
|--------------------------------|-----------|---------|--|

Polypid. discoidal, radiating; cells subcylindrical, convex, porous and granular, with generally six rows of punctures; aperture transverse, sublunate, bordered and edentate, with an open? ear-like process on each side of the mouth.

On various shells.

- |                               |           |  |  |
|-------------------------------|-----------|--|--|
| 4. — <i>umbonella</i> , n. s. | Sudbourn. |  |  |
|-------------------------------|-----------|--|--|

Polypid. discoidal, radiating; cells depressed, subtrapezoidal, slightly granular, separated by one row of large oblong perforations, two or three on each facet; aperture transverse, sublunate; operculum worn into denticulations; a prominent umbo below the aperture.

On a *Terebratula*.

- |   | <i>Cor. Crag.</i> | <i>Red Crag.</i> | <i>Recent.</i> |
|---|-------------------|------------------|----------------|
| 5. <i>Lepralia abstersa</i> , n. s.   |                   | Walton Naze.     |                |
| Polypid. ramose; cells elongato-ovate, ventricose, smooth; aperture subterminal, subcircular, depressed.  |                   |                  |                |
| One specimen on a <i>Pholas</i> .   |                   |                  |                |
| 6. — <i>catena</i> , n. s.  | Sutton.           |                  |                |
| Polypid. cateniform; cells ovate, costated; costæ five, lateral one terminal; aperture suborbicular, armed; three teeth?  |                   |                  |                |
| One specimen on an oyster.  |                   |                  |                |
| 7. — <i>geniculata</i> , n. s.  | Sutton.           | Walton.          | Mediterran.    |
| Polypid. discoidal, radiating; cells ovate, slightly granular, obtusely costated, lines of punctures between the costæ radiating; aperture semiovate, bordered, armed with five denticulations.   |                   |                  |                |
| On various shells.  |                   |                  |                |
| The denticulations have disappeared, leaving so many short tubes. This is identical with a recent species brought from the Mediterranean by Mr. E. Forbes.  |                   |                  |                |
| 8. — <i>pyriformis</i> , n. s.  | Sudbourn.         |                  |                |
| Polypid. radiating; cells elliptical at the upper part, or rather pear-shaped; aperture transverse, semiovate, unarmed.   |                   |                  |                |
| On a <i>Terebratula</i> .   |                   |                  |                |
| 9. — <i>mammillata</i> ( <i>Cellepora mammillata</i> , <i>De Blainv. Man. d' Actinol.</i> p. 444).  | Sutton.           |                  |                |
| Polypid. adnate; cells subconical, rugose; aperture terminal, suborbicular; peritreme thickened and armed with five long and sharp spines, occupying three-fourths of the anterior portion, one obtuse spine at the posterior part; base of the cell punctured. |                   |                  |                |
| On various shells and pebbles. Named by De Blainville but not described.  |                   |                  |                |
| 10. — <i>unicornis</i> ? <i>Johnston MS.</i> ( <i>Lepralia coccinea</i> , <i>Johnston, Brit. Zooph.</i> p. 278. pl. 34. f. 1—3, bad).   | Sutton.           | .....            | Britain.       |
| The aperture of this has vestiges of spines.  |                   |                  |                |
| The ovarian capsule above the aperture, observable in many specimens of this genus, will occasionally alter the shape of the aperture, and is itself sometimes worn into an opening.  |                   |                  |                |
| 1. <i>Catenaria dentata</i> , n. s.   |                   | Walton Naze.     |                |
| Cells slender, ovato-lanceolate; aperture oval, margin dentate.   |                   |                  |                |
| Specimen attached to a <i>Pholas</i> . It is dichotomously and divari-  |                   |                  |                |

cately branched, emitting a cell sometimes from both sides, at others only from one; it somewhat resembles *Hippothoa lanceolata*, Gray, 'Zool. Misc.' 35, but differs in having the margin of its aperture armed with eight or nine long denticulations curving inwards. When magnified, the surface of the cells appears finely granulated.

- |  | <i>Cor. Crag.</i> | <i>Red Crag.</i> | <i>Recent.</i> |
|--|-------------------|------------------|----------------|
| 1. <i>Flustra distans</i> , <i>Johnston</i> ( <i>Flustra Peachii</i> , <i>Couch</i> , <i>Cat. of Zooph. of Cornwall</i> ). |                   |                  |                |
|  | Sutton.           | Sutton.          | Britain.       |

Identified by Dr. Johnston.

- |   |         |         |          |
|---|---------|---------|----------|
| 2. — membranacea, <i>Johnston</i> ( <i>Brit. Zooph.</i> p. 287. t. 37. f. 1—3). |         |         |          |
|   | Sutton. | Sutton. | Britain. |

This is generally found with the cells open and nothing but the partition-walls remaining. Specimens from the coralline crag are however occasionally met with quite perfect, showing the form of the mouth and with the obtuse spines at the corner of the cells.

3. — coriacea, *Esper*.

Sudbourn.			
-----------	--	--	--

Identified by Dr. Johnston.

4. — trifolium, n. s.

Sutton.			
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Polypid. adnate, discoidal, radiating; cells elongato-hexagonal; surface rugose; centre depressed; aperture irregularly tripartite, unarmed.

On various shells.

5. — holostoma, n. s.

Sutton.			
---------	--	--	--

Polypid. adnate; cells radiating, irregular, bordered; centre depressed; surface rugose; aperture subcircular, unarmed.

The cells in form somewhat resemble those of *F. flabelliformis*, Lamx., 'Expos. Méth.' p. 113. pl. 76. f. 11—13, but it is an encrusting coral, and the interior of the cells are not parallelograms, and the aperture not so central. On various shells.

These last two are probably altered forms.

- |   |         |         |          |
|---|---------|---------|----------|
| 1. <i>Membranipora pilosa</i> ? <i>Auct.</i> ( <i>Johnston</i> , <i>Brit. Zooph.</i> p. 280. pl. 34. f. 10—12). |         |         |          |
|   | Sutton. | Sutton. | Britain. |

The perforation through the hollow base is visible, but there are no denticles remaining, and as such I consider it a doubtful identification.

- |   |         |       |          |
|---|---------|-------|----------|
| 2. — membranacea, <i>Johnston MS.</i> ( <i>Flustra tuberculata</i> , <i>Johnston</i> , <i>Brit. Zooph.</i> t. 34. f. 9. <i>Flustra membranacea</i> , <i>Müller</i> , <i>Zool. Dan.</i> <i>Flustra unicornis</i> , <i>Flem. Brit. An.</i> p. 536). |         |       |          |
|   | Sutton. | ..... | Britain. |

Fam. ORBITULITIDÆ.

1. *Orbitulites coscinodiscus*, n. s.

Sutton. |

Polypid. discoidal, smooth, flat; cells concentric, linear, and radiating in straight lines.

The cells differ in form and arrangement from those of *Orb. complanata*.

Ord. CARNOSA.

Fam. ALCYONIDIADÆ.

Cor. Crag.

Red Crag.

Recent.

1. *Alcyonidium circumvestiens*, n. s.

Sutton. |

Sutton. |

Polypid. enveloping univalve shells, surface papilliform and rugose.

This covering attains a thickness of more than half an inch, and can be partially removed in layers; in some instances the univalve is entirely absorbed. Not restricted to one species of shell.

Class AMORPHOZOA.

1. *Grantia compressa*, Johnston (*Brit. Sponges*, p. 174. pl. 20. f. 1).

| Walton Naze. |

Britain.

Three very minute specimens, found by Dr. Johnston adhering to the interior of a shell.

Class LITHOPHYTA.

1. *Nullipora*.

Sutton. |

|

IV.—On the existence of *Branchiæ* in the perfect state of a Neuropterous Insect, *Pteronarcys regalis*, Newm., and other species of the same genus. By GEORGE NEWPORT, Pres. Ent. Soc. &c.\*

HAVING been favoured by Mr. Barnstone with a specimen of that magnificent Neuropterous insect, *Pteronarcys regalis*, captured by himself in the high latitude of 54° on the Albany river, North America†, and preserved in spirit, I have been agreeably surprised at finding in the perfect state of this species a series of thoracic branchiæ, a condition of the external respiratory organs that is usually met with only in the preparatory larva and pupa states of insects. The persistence of external branchiæ in a winged insect, fitted in every other way for flight in the open atmosphere, like other species of the order to which it belongs, is an anomaly that requires a close attention to its habits to explain. This is the only genus, so far as I am aware, in which the branchial form of the respiratory organs, so common in the larva and pupa of the

\* Read at the meeting of the Entomological Society, December 4, 1843.

† It was brought by Mr. Barnstone with a large collection of Canadian insects which he had recently captured, and has since presented to the British Museum.

Neuroptera, is retained in the perfect state. On first observing these organs, in the specimen received from Mr. Barnstone, I was disposed to regard them only as an accidental occurrence; but I have subsequently detected the remains of them in every dried specimen I have had an opportunity of examining; and also in the pupa of the same species, in which, however, they are somewhat more developed. They are of the tufted or filamentous form of branchiæ. They consist of eight pairs of branchial sacs, from the exterior of which proceed numerous elongated, setose filaments, which together form a thick tuft on each sac. These branchiæ are situated, as described by Pictet in the larva state of *Nemoura cinerea*, Pictet, over the proper spiracular orifices or entrances to the great longitudinal tracheæ of the body, at the inferior lateral parts of the thorax and basilar segments of the abdomen. The first pair of sacs is in the tegument of the neck, between the head and prosternum; the second and third pairs, each of which is composed of two tufts, between the prosternum and mesosternum, behind the coxæ of the first pair of legs; the fourth and fifth between the mesosternum and metasternum, behind the coxæ of the second pair of legs; and the sixth pair behind those of the third pair of legs, at the junction of the thorax with the abdomen. The seventh and eighth pairs, formed each of single tufts, are attached more laterally, the seventh to the first, and the eighth to the second basilar segments of the abdomen. These latter branchiæ correspond in situation in the segments to that of some apparently closed or obsolete spiracles at the sides of the succeeding segments. The situation of the branchiæ themselves is thus as anomalous as their existence in the perfect insect. In most instances branchiæ are arranged along the sides of the abdominal segments of the larva, and are often employed to assist in locomotion; but they cannot be of use for this purpose in the larvæ and pupæ of these *Perlida* which move by means of large and powerful limbs. In *Pteronarcys* the two posterior pairs of legs of the pupa have the tibiæ densely ciliated, for swimming, like those of the *Dyticida*, so that the delicate filamentose branchiæ can afford little, if any, assistance in this function. The structure of the filaments themselves differs also from that of the filamentose branchiæ of the *Sialida*, in which these organs are said to be quadri- or quinque-articulated, and are employed as organs of locomotion. In *Pteronarcys* they are simple unarticulated filaments. Each filament is soft, delicate and gradually tapered from its base to its extremity, and ends in a slightly obtuse point. Internally each filament is traversed longitudinally by a tracheal vessel, which becomes, like the filament itself, more and more slender, and at last divides into two branches, which may be traced to the extremity of the filament; but I have not been able

to discover any orifice in the extremity of the filament itself, nor any direct communication whatever between the external surface and the ramifications of these tracheæ, and I doubt much whether any such direct communication exists.

M. Pictet has found that branchiæ are attached to the thorax of the *larva* in all the species of *Perla* excepting *P. virescens* and *P. nigra*, which circumstance seems to indicate some difference in the habits of these species. Now a like difference exists between the pupa of *Pteronarcys regalis* and that of *Perla abnormis*, Newm., which latter insect has not these branchiæ; and Mr. Barnstone, who has most assiduously observed the habits of these species, informs me that he found the first living constantly in the water at the bottom of streams, but the latter was always hidden in clefts of water-logged timber, the trunks of trees and other places on the banks, and that he has usually found the cast-off exuviæ of the pupa "under stones along the banks of rivers." This difference in the habits of the pupæ leads to further inquiry in regard to those of the perfect insects. *P. regalis* he states is a nocturnal species, being mostly found hidden by day under stones or in damp places, and coming abroad on the wing only at night-fall. Has this habit any reference to the persistence of the branchiæ, and the mode in which the aëration of the fluids is effected? or are these persistent branchiæ merely accidentally retained organs, the functions of aëration being performed by other means? The existence of three pairs of orifices on the sternal surface of the thorax seems at first to favour this latter conclusion; but it yet remains to be shown that these orifices have any communication with the tracheæ, since they are placed in the middle of the sternal portion of each of the segments, between the coxæ, situations in which spiracles do not usually exist. This question, therefore, I leave for the present for closer anatomical investigation.

In regard to the function of aëration being performed by these branchiæ in the perfect insect, I may remark, that it is of little consequence to the preservation of animal life whether aëration of the fluids of the body be effected *directly*, by means of air received *into* the body in lungs, or in spiracles and tracheæ, or *indirectly*, by means of water or vapour, that holds air intermixed with it, through the agency of external branchial organs, in which case the air is brought into contact with the fluids through the surface of these organs in water equally well as in the open atmosphere, when air is taken *into* the body through the spiracles. The function of branchiæ, or aquatic organs, is equally well performed in the open air as in water, so long as the air is charged with a sufficiency of fluid to preserve these organs in a healthy state.

Some circumstances connected with the respiration of larvæ

distinctly show this to be the case, and also have reference to the apparently anomalous persistence of branchiæ as respiratory organs in *Pteronarcys*. Mr. Westwood in his 'Modern Classification of Insects\*' has quoted, as a remarkable circumstance connected with the respiration of the *Sialidæ*, an observation made by M. Pictet, "that one of these larvæ lived fifteen days in the earth before it changed to the pupa, being," he remarks, "the only instance of an insect furnished with external respiratory organs respiring the ordinary atmospheric air." I cannot perceive, however, what our worthy friend, or M. Pictet, from whom he quotes the fact, has discovered so exceedingly wonderful in this circumstance. There is nothing more remarkable in this fact, than in that of the common caterpillar of the Sphinx remaining unchanged in its cell in moist earth for many days before it enters the pupa state. The truth is, that as the period of change approaches, the respiration of the larva is reduced to its minimum, and is almost entirely suspended; consequently the medium in which the insect is placed, whether it be water, or air saturated with that fluid, as it necessarily must be in a cell of moist earth, is as well fitted for branchial respiration as water itself. That the functions of branchiæ are fulfilled under these circumstances, I need but, in proof, direct attention to the known fact that Crustacea will continue to respire in the open air for an indefinite length of time, so long as their branchiæ are kept moist by fluid retained beneath the folds of the thorax. In closing these remarks I again refer to the question, have the habits of *Pteronarcys* any reference to the branchial structures in the perfect insect? My own opinion inclines strongly to the affirmative. The *Pteronarcys* shun the open day, during which they remain secluded beneath stones or in damp places, where the air is charged with moisture. They come abroad at night, and are constantly in the neighbourhood of streams and rivers, in which localities also the air is saturated with moisture. Under either of these circumstances the branchiæ may be sufficient for all the purposes of aëration.

I may also further observe, that branchiæ appear to be a well-marked generic character of these insects, although hitherto overlooked. In the dried specimens they become shrivelled, and are almost lost; but I have had the satisfaction of detecting the remains of them in the original specimens described by Mr. Newman, and now in the collection of the Entomological Club. They are in so shrivelled a condition as to have been easily overlooked; and would not, probably, have at all been recognised were they not first seen in this recent and well-preserved specimen in spirit †.

\* Vol. ii. p. 50, note.

† The specimen preserved by Mr. Barnstone in spirit was exhibited at the meeting.



The species in which these branchiæ exist in the perfect state are *Pteronarcys regalis*, *P. biloba*, *P. proteus*, and also in an undescribed species brought by Mr. Doubleday from New York, and now in the same collection.

V.—*A List of Lichens gathered in different parts of Wales, principally in the neighbourhood of Barmouth, with a few casual observations upon some of the species.* By the Rev. T. SALWEY.

THE species common everywhere are omitted, unless marked by some peculiarity of growth. All the habitats, except where it is otherwise specified, are in the neighbourhood of Barmouth.

*Bæomyces roseus.* Hill above the half-way-house between Barmouth and Dolgelley.

———— *rufus.* Walls and rocks. I have gathered this so finely developed upon decayed turf as to look like a different plant.

———— *placophyllus.* Rocks above Corwen: this habitat was first pointed out to me by Mr. Borrer; top of Snowdon, and in fruit at the top of Cader Idris, Mr. Ralfs.

———— *anomalus.* On rocks at Crafnant near Llanbedr, and above Gwastad-annos; on a rock below the Tannery, Mr. Ralfs.

*Calicium.* I have only met hitherto with a few of the common species of this genus in Wales.

*Opegrapha saxatilis.* Not uncommon on mortar and hard sandstone: on an old building at Llanaber by the side of the turnpike-road.

———— *dendritica.* On old trees at Cors-y-gedol. Two or three curious varieties of this occur upon trees at Holyland near Pembroke.

*Verrucaria leucocephala.* On old oaks at Wyunstay.

———— *levata.* In the stream at Cors-y-gedol and below Cwm Bychan.

———— *maura.* Upon stones on the shore at Barmouth, principally on the south side of the ferry, and on rocks upon the Mowddach.

———— *crysiboda.* Arddog.

———— *viridula.* On a rock below the Tannery, Mr. Ralfs.

———— *muralis.* On old mortar. Pont Ysgethin, Pont Fadog, &c.

*Endocarpon miniatum*, with its varieties: common.

———— *leptophyllum.* Llyn Bodlyn, Llyn Howel, &c.

———— *pulchellum.* Common: Ty Gwyn, &c.

———— *late-virens.* Common on the tops of the hills.

———— *smaragdulum.* Common on walls; on the wall near the third milestone on Dolgelley-road, and above Aber-Artro.

———— *sinopicum.* Abundant in several places on the rocks by the side of the turnpike-road between Barmouth and Dolgelley; Bod Owen, Borthwnog, &c.

*Pertusaria ceuthocarpa.* Rocks and walls: above the Harlech turnpike at Barmouth.

*Pertusaria crassa.* Upon an old tree at Ty Gwyn; on an old ivy-tree in Cheriton churchyard, Pembrokeshire.

*Thelotrema lepadinum.* In great perfection upon old trees at Cors-y-gedol. It grows also upon rocks at Llyn Bodlyn, the only instance I know of its growing upon stone.

———— *melaleucum.* Upon trees at Holyland near Pembroke.

*Lepraria Iolithus* \*. Very finely upon stones about Cors-y-gedol.

*Variolaria lactea.* In great perfection about Barmouth.

———— *terricola.* Cwm Bychan, Pont Fadog, &c.

*Urceolaria Acharii.* This usually grows upon stones occasionally submerged, as in rivulets and at the edge of lakes; but I once found a very beautiful specimen upon a wall in a very high and dry situation, so finely developed in all its parts, that I could for some time scarcely persuade myself it was not a new lichen.

*Lecidea atrata.* Craig Drwg: very scarce.

———— *atro-alba.* Rocks at Llyn Bodlyn.

———— *fusco-atra.* Rocks about Barmouth.

———— *cechumena*,  $\beta$  *athrocarpa.* Rocks behind the Union-house at Corwen.

———— *petræa.* } Common.

———— *confluens.* }

———— *lapicida.* Rocks above Gwastad-annos and Llyn Bodlyn.

———— *prominula.* Rocks about Barmouth.

———— *parasema* (not *elæochroma*, with which it has been confounded). Upon beech-trees near the House at Crafnant, Cors-y-gedol, &c.

———— *sanguinaria.* Upon rocks and old gate-posts: not uncommon.

———— *viridi-atra.* Walls and rocks: an obscure and puzzling lichen.

———— *geographica.* } Common.

———— *silacea.* }

———— *Æderi.* }

———— *flavo-virescens.* }

I once found *Æderi* in a remarkably high state of development upon a mass of stone, which, upon breaking it, was found to be principally copper ore, to which circumstance undoubtedly the alteration of the plant was owing.

———— *scabrosa.* Not uncommon, but seldom found in a good state: Aberhamfrac, &c.

———— *uliginosa.* On the road-mud thrown on the top of the wall

\* I have inserted a species of the genus *Lepraria* because British authors have hitherto, as far as I am aware, agreed in retaining this genus. I should be glad however to see not only this genus, but also *Variolaria*, which is almost equally unsatisfactory, rejected altogether from an *Enumeratio Lichenum*. Whether Fries is right in considering them as the decaying remains of more perfect Lichens, or other authors as the commencement of Lichens which require only more favourable circumstances to become more fully developed, I will not venture to decide, though my own opinion leans to the latter view of the question. The genus *Isidium* is perhaps equally unsatisfactory and ought also to be rejected.

between Aberhamfrac and the cut through the rock by the first milestone.

*Lecidea simplex.* Not uncommon: Pont Fadog, &c.

———— *rivulosa.* Very common.

———— *albo-atra.* A very variable lichen.

———— *Lightfootii.* On birch-trees at Rhaidr-Dû.

———— *pulverea.* Cwm Bychan, Hendreforion, Ty Gwyn, Cae Pellaf, &c. This is decidedly different from *incana.* The apothecia are invariably black and of a bright horny substance, which swells remarkably in wet weather.

———— *incana.* In fruit at Crafnant and elsewhere.

———— *sulphurea.* Common.

———— *expallens.* In fruit upon a rock at Gelli Rhûd.

———— *coronata.* Common.

———— *pezizoides.* Woods at Crafnant.

———— *cornea.* Upon oaks at Wyunstay.

———— *ferruginea.* Common upon stones and trees: a very variable plant.

———— *icmadophila.* Very finely and in great abundance on the western slope of the Rhinog Vawr.

———— *microphylla.* In fruit at Crafnant, Hendreforion, Cae Pellaf, &c.

———— *marmorea.* Common.

———— *polytropa.* } Not uncommon upon walls in very high situa-  
 ———— *intricata.* } tions. I am not quite satisfied that these are  
 not different states of the same plant.

———— *canescens.* Common in fruit about Llanaber, Llandewi, &c.; very finely so in the lane leading down from Llandewi church to the sands.

———— *lucida.* Common, but rare in fruit.

———— *macula.* Common about Barmouth.

———— *fuliginosa.* Not uncommon: very fine above Gelli Rhûd.

———— *geomæa.* Llyn Howel: very scarce.

———— *coniops.* Aber-Ty-Gwyn.

———— *stellulata.* On stones on the shore at Barmouth, and upon a wall inside the sand-banks.

———— *Salweii.* Common on the hills about Barmouth, but rare in fruit: in fruit at Gelli Rhûd, Drws-y-nant, and on the Breiddin hills, Montgomeryshire.

*Lecanora exigua.* Aber-Ty-Gwyn.

———— *coarctata.* A lichen, which my friend Mr. Borrer has referred to this, grows upon a rock below the Harlech turnpike at Barmouth, and upon the wall between Borthwen and Aberhamfrac. The shields, which are about the size of those of *atra* or *glaucoma*, are, both in a wet and dry state, of a pale diluted red without any border. In wet weather they attract the eye at some distance. I should be inclined to consider this plant at least, if not the normal state of *coarctata*, as a *Lecidea*. It is so remarkably unlike any other state of *coarctata*, that, familiar as I am with the Protæan character of many of the Lichens, I confess that I can scarcely

persuade myself that the plant in question is the *Lecanora coarctata* of 'Eng. Bot.'

- Lecanora squamulosa*. Walls about Barmouth : not common.  
 ——— *glaucoma*. Common : an extremely variable lichen.  
 ——— *thelostoma*. Llyn Bodlyn.  
 ——— *ventosa*. Common.  
 ——— *Hæmatomma*. Common. A singular variety of this lichen grows upon the rocks above Barmouth ; the shields are raised upon podetia-like elevations of the crust, giving the plant the appearance of a minute *Scyphophorus*.  
 ——— *Turneri*. On trees at Hendreforion, &c. Perhaps not distinct from *tartarea*.  
 ——— *atro-rufa*. On the top of Rhinog Fâch.  
 ——— *muscorum*. Dolwraiggiog, Rhinog Fâch, &c.  
 ——— *elegans*. Aber-Ty-Gwyn, &c.  
 ——— *fulgens*. On rocks at Lydstep and Stackpole Court, in Pembrokeshire.  
 ——— *albo-flavida*. Common, but barren, on rocks about Barmouth.  
 ——— *gelida*. Common, but not with apothecia.  
*Parmelia globulifera*. In great perfection in the woods, particularly about Cors-y-gedol.  
 ——— *caperata*. Ditto; but not common in fruit.  
 ——— *conspersa*. Common.  
 ——— *scortea*. Scarce about Barmouth ; Cader Idris, Mr. Ralfs ; upon trees in the grounds at Holyland near Pembroke.  
 ——— *Borreri*. Not common : in fruit near Cors-y-gedol ; frequent in Pembrokeshire, but barren.  
 ——— *saxatilis*.  
 ——— *omphalodes*. } Very common.  
 ——— *proboscidea*. Common upon old walls about Barmouth, but rarely met with in fruit. I have gathered however very fine specimens in that state at Gelli Rhûd, Drwys-y-nant, and upon the walls of the turnpike-road between Dolgelley and Friog.  
 ——— *perlata*. Common, but rare in fruit. Beautiful specimens in that state are however occasionally met with.  
 ——— *lævigata*. Rare in fruit.  
 ——— *sulcata*. Not uncommon.  
 ——— *reticulata*. On trees at Nannau, first discovered there by Mr. Ralfs.  
 ——— *herbacea*. Grows very finely in the avenue at Cors-y-gedol.  
 ——— *erosa*. On walls and old buildings about Barmouth ; in fruit on an old building at Llanaber : first pointed out to me there as distinct from *stellaris* by my friend the Rev. John Gisborne of Derbyshire.  
 ——— *lanuginosa*. Common, but always barren.  
 ——— *Clementi*. On an old stone building at Llanaber, discovered there by Mr. Borrer.  
 ——— *cæsia*.  
 ——— *affinis*. } Common.  
 ——— *conoplea*. Not uncommon. From long acquaintance with

- this plant, I am inclined to think with Acharius that it is distinct from *affinis*, though not allowed to be so by British authors.
- Parmelia speciosa*. On stones at Llyn Bodlyn: first discovered in the neighbourhood of Barmouth by my friend Mr. Ralfs, who found one or two specimens on the rocks above the town.
- *incurva*. Not very common: lane between Glan Mowddach and Bodowen, Moelfre, &c.
- *Fahlunensis*. Rocks above Llyn Cae on Cader Idris, pointed out to me by Mr. Ralfs.
- *aquila*. Common on the rocks near the sea.
- *plumbea*. Common on trees and rocks. A singular variety of this plant (the  $\gamma$  *plumbea* of Taylor) grows upon the North Rocks at Tenby, where it hangs in large loose thin masses, slightly attached only here and there at the edges.
- *aleurites*. A variety of this plant, having the same relation to its normal state that the var.  $\gamma$  *plumbea* has to the normal state of that species, is found upon an isolated mass of rock in the meadow above Dolwraiggiog leading up to Cwm Bychan.
- *ambigua*. In fruit in the woods at Crafnant, also in that state upon pales in the park at Powis Castle in Montgomeryshire.
- *sinuosa*. Upon stones in the higher hills about Barmouth, but not in fruit; on birch-trees at Rhaidr-Dû.
- *physodes*. In fruit in Cwm Bychan.
- *diatrypa*. Common, but barren. A single specimen in fruit was found by Mr. Ralfs in 1839 upon the rocks above the Tannery.
- *isidioides*. Upon trees at Crafnant, 1835; on a single tree near Tyn-y-Groes, Mr. Ralfs.
- *cartilaginea*, Swartz. On a single mass of rock in Llyn Bodlyn.
- Sticta pulmonaria*. Common. I have found this plant with all the shields quite black, both old and young. It is not uncommon in this and other species for the shields to turn black with age, but in the case alluded to the young shields were perfectly black as well as the old ones.
- *scrobiculata*. Common, but not usually in fruit.
- *limbata*. Common, but always barren.
- *fuliginosa*. Common. It is occasionally met with in fruit, as by myself upon walls and rocks in damp situations in the woods at Garth, and in similar situations at Capel-curig and Bettws-y-Coed, and by Mr. Ralfs in the lane leading up from the Towyn turnpike-road to the top of Cader Idris.
- *sylvatica*. Common, but always barren. There is a *Sticta* (allied to *sylvatica*?) in a wood between Arddog and Ynysfaig covered with blue mealy soridiæ. It is perhaps a distinct species intermediate between *sylvatica* and *scrobiculata*.
- Collema nigrum*. Not common, being principally confined to limestone rocks.
- *cristatum*. On the wall opposite the stables at the Cors-y-gedol Arms.

*Collema Burgessii.* Woods about Barmouth and Dolgelley, Garth, Crafnant, &c.

—— *nigrescens.* Common, but usually barren; very finely in fruit upon trees at Stackpole Court in Pembrokeshire.

There is a large spreading foliaceous *Collema*, of a looser habit and of a dull tawny green colour, found not uncommonly in the woods in Wales, and has been gathered also by Mr. Borrer in Sussex. Dr. Taylor refers it to *nigrescens*, but it is very different from the usual state of that plant.

—— *flaccidum.* Common upon wet rocks and trees, but barren.

—— *crispum.* Common.

—— *dermatinum.* On limestone rocks at Stackpole Court, Pembrokeshire.

—— *tremelloides.* On wet rocks above the Tannery, and above the Harlech turnpike-gate at Barmouth, but not in fruit.

—— *lacerum.* In fruit at Garth Issa.

—— *myriococcum.* I have a single specimen of this plant gathered on the limestone rocks at Lydstep in Pembrokeshire.

—— *velutinum*, Ach. Occasionally met with on trees. Dr. Taylor refers this to *nigrum*.

—— *ceranoides.* Rocks at Tenby and Lydstep, Pembrokeshire.

—— *muscicola.* Common, but not in fruit.

*Solorina saccata.* Clogwyn-y-Garnedd, Snowdon.

*Peltidea venosa.* By the side of a brook on the Glyder Vawr, Mr. Ralfs.

I consider this as distinct from *spuria*.

—— *scutata.* In fruit at Cors-y-gedol, &c.

—— *horizontalis.* Not uncommon.

—— *aphthosa.* Very finely amongst the stones by the borders of lakes, as Llyn Bodlyn, &c.

—— *spuria.* Ynysfaig.

It is stated by Hooker in the 'Eng. Fl.' that *rufescens* scarcely differs except in hue from *spuria*, whilst he says of this (*spuria*) that it appears as distinct as any. Acharius, who in his 'Lich. Un.' had made *spuria* a variety of *canina*, has in his 'Syn.' united these two. Dr. Taylor, a high authority on such points, has done the same; and I am inclined to agree with them that *spuria* is only a starved and diminutive state of *canina*; but I cannot persuade myself that *rufescens* and *canina* are the same. Dillenius (103. xxvii. p. 203, Edinb. ed. 1811) makes *rufescens* to differ from *canina*, principally in the following particulars:—

1st. In the thallus being somewhat thicker, more rigid and smaller; in being divided into narrower and deeper segments; and in the margins being inflexed, sinuated and crisp.

2ndly. In the colour, which in *rufescens* is darker, and when dry is reddish.

3rdly. In the under part of the thallus being more villous, and with blacker, shorter and more curled roots. Dillenius speaks of *rufescens* also as being more common than *canina*, which corresponds also with my own experience.

*Gyrophora polyphylla.* Common.

*Gyrophora erosa.* Hills above Barmouth; hill to the left of Bwlch-y-llan above Cell-fawr.

———— *cylindrica.* Not uncommon on the higher hills.

———— *murina.* I have a single specimen of this plant gathered (I believe upon the Glyder) in 1824, but neither I nor my friends Messrs. Borrer and Ralfs, who have since looked for it there, have been able again to find it. My plant is identical with a French specimen of Persoon's given me by Mr. Borrer, except that the French plant is not quite so coarsely granulated on the upper surface.

———— *pellita.* Hills above Barmouth; hill to the left of Bwlch-y-llan above Cell-fawr; Craig Drwg.

———— *pustulata.* Not uncommon: usually grows on flat sloping rocks which are occasionally wet.

*Cetraria sepincola.* Not uncommon.

———— *glauca.* Common.

*Borrrella ciliaris.*

———— *tenella.* Grows very beautiful in many places.

———— *furfuracea.* On trees at Nannau.

———— *flavicans.* Common on the rocks above Barmouth: grows in the greatest luxuriance, clothing the stems of the trees in large patches at Llawrenny in Pembrokeshire.

*Evernia prunastri.* In fruit at Cae Pellaf.

*Ramalina fraxinea, fastigiata, scopulorum* and *farinacea.* } Common.

*Usnea florida.*

———— *plicata.* Grows occasionally a foot or more long in some of the woods.

———— *barbata.* Woods at Bettws-y-Coed, Carnarvonshire.

*Alcetoria jubata.* Common.

*Cornicularia tristis.* Rhinog Vawr, Rhinog Fâch, &c.

———— *aculeata.* Amongst stones on the high hills, Bwlch-y-Rhiwgur, &c.

———— *lanata.* Cader Idris.

*Isidium lutescens.* } On old oaks.

———— *coccodes.* }

———— *Westringii.* On walls: Gor-llwyn, Gwastad-annos, &c.

———— *microsticticum.* On walls and rocks.

———— *paradoxum.* In great beauty about Barmouth.

———— *corallinum.* Common.

*Sphærophoron coralloides.* } Common.

———— *compressum.* }

*Stereocaulon paschale.* Common.

———— *botryosum.* Llyn Howel, Llyn Bodlyn, &c.

———— *cereolus.* Cader Idris; on the wall leading up from Hendreforion to Moel Diffws; Llyn Gwernon, Mr. Ralfs.

*Cenomyce vermicularis.* Cader Idris.

———— *uncialis.*

———— *rangeferina.*

———— *pungens.*

———— *furcata.*

- Cenomyce caspititia*. Not common.  
 ——— *sparassa*. Common.  
 ——— *alcicornis*. } I join these two together, as I confess my-  
 ——— *endiviæfolia*. } self unable to distinguish them; the tufts  
 of hair at the edges of the frond (the main difference depended on)  
 appear to me not sufficient to keep them distinct. In a specimen  
 of *alcicornis*, which I have from the *Unio Itineraria* of Strasbourg,  
 and which, according to the character of the plant, ought to have  
 marginal tufts of hairs, I can distinguish none. If the true *al-*  
*cicornis* always has tufts of hairs, I have never gathered it. The  
 plant without them, and which I suppose therefore would be called  
*endiviæfolia*, is not common about Barmouth, though occasionally  
 met with. It grows in great beauty upon the rocks at Lydstep in  
 Pembrokehire, but rare in fruit.  
 ——— *cervicornis*. I never met with this in so beautiful a state  
 as at Llyn Howel.  
 ——— *pyxidata*. Common.  
 ——— *verticillata*. Scarce: rocks to the south of Gwastad-  
 annos.  
 ——— *fimbriata*. Not common.  
 ——— *radiata*. Rhinog Fâch.  
 ——— *cornuta*.  
 ——— *gracilis*.  
 ——— *filiformis*.  
 ——— *deformis*. Not common.  
 ——— *coccifera*.  
 ——— *bellidiflora*. Moel Diffws.  
*Pycnothelia papillaria*. Scarce: Gelli Rhûd.

VI.—*Notes on Mr. Blyth's List of Birds from the vicinity of Calcutta.* By H. E. STRICKLAND, M.A.

THE 'Annals of Natural History' have seldom contained ornithological papers of greater value than that by Mr. E. Blyth in the Nos. for August and September of the present year. While observations on the habits of the commonest British birds have been published and republished till the subject is quite exhausted, we are wholly ignorant of the food, habits, nidification and anatomy of the majority of foreign species. The zoological treasures of India have been till within the last ten years most unaccountably neglected, and in many cases our knowledge on the subject was worse than none, it was incomplete and inaccurate. A better day has now dawned; British officers in India have discovered that by studying the wonders of tropical nature they may get through the day more pleasantly than by indulging in indolence, and consequently the natural history of that country will ere long be as thoroughly investigated as that of the British Isles.

The appointment of a well-qualified zoologist like Mr. Blyth,



versed in the literature of zoology and a good observer of facts, to the curatorship of the Asiatic Society's Museum at Calcutta, has been a fortunate event for Indian natural history. Much had indeed been effected by the labours of Franklin, Sykes, Jerdon, Elliot, Hodgson and others, but their observations were in many cases *unreduced*, and we look to Mr. Blyth to correct their synonymy and to incorporate their facts into the exact systems of modern zoology.

In India, however, the best zoologists lie under a disadvantage from the want of scientific works, while their fellow-labourers at home are equally inconvenienced by the scarcity of authenticated specimens from India, so that many doubts arise in connexion with the identification of species. In order to the clearing up of some of these, I subjoin such remarks and queries as have occurred to me in perusing Mr. Blyth's paper, and shall feel grateful to him or any other zoologist who can throw light upon them.

No. 1 of Mr. Blyth's list (Annals, vol. xii. p. 90) for *alexandrinus* read *alexandri*.

3. *Paleornis bengalensis*; the earliest legitimate name for this is *P. cyanocephalus* (Lin.).

6. Does Mr. Blyth here imply that the Hobby of Bengal is really the *Falco subbuteo* (and not *F. aldrovandi*, as he supposed in Journ. As. Soc. Beng. vol. xi. p. 161), or does *F. aldrovandi* also inhabit Bengal?

In the Journ. As. Soc. Beng. vol. xi. p. 789, Mr. Blyth says that the *Falco bengalensis*, Briss., of India is distinct from the so-called *Hierax* (it should not be written *Ierax*) *cærulescens* of Java and the Malay countries. If this be so, the Indian bird is the true *Falco cærulescens* of Linnæus (founded on Edwards, pl. 108), and the Malay species might be called *Hierax malayensis*. An exact description of the Indian bird is desirable, as most of the specimens in our museums are Malayan.

9. The "*Astur*" *dussumieri*, as well as the Australian *A. approximans* and *A. cruentus*, belong unquestionably to *Accipiter* and not to *Astur*, as is evident on comparing them with the types of these two genera. I consider *A. dussumieri* to be the *Falco badius*, Gm. (Brown, Ill. Zool. pl. 3), and the latter specific name should therefore be used.

16. *Spizaëtus niveus* belongs to the genus *Limnaëtus*, Vig. The true *Spizaëtus* of Vieillot is an American genus.

(The *Spizaëtus albogularis*, Plyth, Journ. As. Soc. Beng. vol. xi. p. 456, is the *Asturkieneri*, Geoff. St. Hilaire in 'Magazin de Zoologie,' ser. 1. pl. 35. It will now stand as *Limnaëtus kieneri* (Geoff.).)

23. "*Hyptiopus*, Hodgson (olim *Baza*, Hodgson)." Mr. Hodgson having defined and published a number of new genera with *Latinized Indian* names attached, was afterwards led to disapprove of these names and to substitute words of classical origin in their place. I must venture to remark upon this point that such a change was quite unnecessary, and it would have been far better not to have

made it. It is true that *in the first instance* it would have been preferable to have given classical instead of barbarous names to these genera, but the latter having been first published to the world, they must, according to the principles of zoological nomenclature now generally adopted by European naturalists, be permanently retained, and the improved classical names must sink into synonyms. (See Report of British Association on Zoological Nomenclature, *Rule 1*, and *Recommendation A.*) I trust therefore that the zoologists of India will, for the sake of uniformity with their European brethren, employ the *first* set of names proposed by Mr. Hodgson in preference to the *second*.

25. *Vultur leuconotus*; this I presume to be the same as *V. indicus* of Temminck (Pl. Col. 26) and Col. Sykes. Two other Indian vultures are recorded, viz. 1. *V. bengalensis* of Gmelin, Latham and Sykes, and 2. *V. indicus*, Lath. (nec Tem. ?), figured in Sonnerat's *Voy. Ind.* vol. ii. pl. 105, and said by Temminck to be the young of *V. kolbi*. Does Mr. Blyth recognise these two as distinct from *V. leuconotus* ?

32. Is the *Upupa minor* of India identical with that from the Cape ? The latter exhibits two states of plumage, viz. 1. with back, belly and vent deep rufous, and two-thirds of the secondaries from the base pure white; 2. back and belly dusky rufous, vent white, and the white portion of the secondaries divided across by two black bars. This last is said by Lichtenstein and Wagler to be the young of the other. Do the Indian specimens present both these states of plumage ?

33. *Merops indicus* should be called *M. viridis*, Lin.

38. The species described as allied to *Halcyon smyrnensis* is the *H. gularis* (Kuhl) (*H. ruficollis*, Sw. *A. melanoptera*, Tem.) described by Brisson as inhabiting Madagascar and the Gambia, but both these habitats are probably erroneous, as specimens were brought by Mr. Cuming from the Philippine Islands.

39. The "*Ceryle rudis*" of India is I believe distinct from the true *rudis* of Europe and Africa, to which *Ispida bicincta*, Sw., is now referred. (See *Ann. Nat. Hist.* vol. vi. p. 418, vol. xii. p. 220, where I have proposed the name *C. varia* for the Indian species.)

42. *Bucco viridis* of Gmelin ("6½ inches long") cannot be the *B. caniceps*, Frankl. ("10 inches long.")

43. Is not *Picus strictus* the same as *P. goensis*, Gm. (*P. peralaimus*, Wagl.) and *P. guttacristatus*, Tickell ?

44. Is not *Picus bengalensis* the same as *P. aurantius*, Lin. ?

52. For *Cuculus niger*, Latham, read *C. niger*, Lin. (*C. orientalis*,  $\gamma$ , Lath.) The bird so designated by Mr. Blyth (which is the *C. tenuirostris*, Gray, and *C. flavus*, Jerdon,) cannot however be the true *C. niger* of Linnæus, which is described as entirely glossy black, the beak orange, with its margin undulated. If it were not that the latter species is said to be only 9 inches long, I should suppose that it referred to *Eudynamis orientalis*.

53. *Oxylophus edolius* should be denominated *O. serratus* (Sparrm.).

55. There is so much confusion among the oriental species of *Centropus*, that Mr. Blyth would do a service by sending a descrip-

tion, with measurements, of the species which he intends by *C. philippensis*. Is it the same as the *C. bubutus*, Horsf.; the *C. castaneus*, Buchanan; the *C. pyrrhopterus*, Jerdon; and the *C. castanopterus*, Pearson? N.B. He may have already settled these points in his monograph in Journ. As. Soc. Beng. No. 46, which I have not yet seen.

56, 57, 58. Are all these typical *Caprimulgi*?

61. *Corvus macrorhynchus* of Wagler, from New Guinea, Java and Sumatra, is described as 21 inches long, and therefore cannot be the Indian *C. culminatus*, which is only 14 inches long.

62. What are the ordinary dimensions of *Corvus splendens*? Col. Sykes states its length at 18 inches, but I have a specimen which is only  $14\frac{1}{2}$ .

64, 65. The two species *Gracula religiosa* and *indica* are correctly distinguished. *G. religiosa* appears not to inhabit India, but Java, Sumatra, and, according to Mr. McClelland, Assam. The precise habitat of *G. indica* seems to be as yet undetermined, though Lesson states it is from Java, and Cuvier from India.

70. *Pastor caniceps* should be called *P. malabaricus* (Gm.), and Mr. Jerdon should give a new name to the white-headed species which he called *P. malabaricus*.

(I may remark that *Trichostoma rostratum* and *affine*, Blyth, are synonyms of *Malacopteron magnum* and *cinereum*, Eyton.)

76. *Orthotomus benneti* should be called *O. longicauda*. I consider it to be the *Motacilla longicauda* and *sutoria* (imperfectly described) of Gmelin, *Sylvia guzuratta*, Lath., *Orthotomus sphenurus*, Swains., and *Sylvia ruficapilla*, Hutton.

77. The affinities of the genus *Iora* are at present very undecided, and if the Indian ornithologists would supply some information as to the anatomy, food, habits and nidification of these birds, it would be very desirable.

79. *Geocichla rubecula* of India is clearly the *Turdus citrinus* of Latham. *G. rubecula* of Gould from Java is perhaps a distinct species, as it is said to have the tarsi  $1\frac{1}{2}$  inch long, while in my specimen of *G. citrina* they are barely  $1\frac{1}{4}$  inch.

92, 93. The Australian genus *Dasyornis* is now proved to be the type of the prior genus *Sphenura*, Licht.; and these Indian birds, if really identical in generic characters with the Australian, must assume the latter name.

96. The *Siphia leucura* is said by Mr. Blyth, in Journ. As. Soc. Beng. vol. xi. p. 791, to be the *Muscicapa leucura* of Latham, but not of Gmelin. This is an error, as both authors give that name to the same species, which Latham says is from the Cape; but as the description agrees sufficiently well with the Indian bird, he was probably mistaken in the habitat.

101. Mr. Blyth's positive assurance confirms what I had long suspected, that the *Muscipeta indica* and *castanea* of authors is the sub-adult male *M. paradisi*. Am I right in supposing that the short-tailed specimens with black throats are still younger males, and that

the very young males as well as the females at all ages are rufous, short-tailed, and with gray throats?

106. *Pericrocotus princeps* is the *Turdus speciosus* of Latham, and should retain the latter specific name.

109. I have little doubt that the so-called "*Graucalus papuensis*" of India is distinct from the true *papuensis* of New Guinea; and if Mr. Blyth will send an exact description of the Indian bird, perhaps the point can be decided.

111. Having referred to Col. Sykes's original specimen of his "*Ceblepyris cana*," I find that it is not the true *C. cana* (which is a Madagascar bird), nor is it the male of *C. fimbriatus*, as supposed by Mr. Jerdon. In fact it is not a *Ceblepyris* (*Campephaga*) at all, but a *Lalage*, Boié, though with a stronger beak than the type of that genus. The total length is  $7\frac{1}{4}$  inches, beak to gape 11 lines, wing 4 inches 1 line, tail 3 inches 4 lines, tarsus 10 lines; head, neck, breast, beak and legs black; back and middle rectrices gray; belly and vent grayish white; wing-covers and quills black, with gray edges; lateral rectrices black, broadly tipped with white. If previously undescribed, I would call this species *Lalage sykesi*.

112. The *Lanius* referred to is, I suspect, the *L. cristatus* of Linnaeus and *L. superciliosus* of Lath., in which case (the former name being *decidedly* erroneous, as the bird is *not* crested,) the species might retain the name *superciliosus*.

116. *Cometes krishna* should be termed *Chibia hottentotta* (Lin.). (*Corvus hottentottus*, Lin., a name expressive of its black plumage.)

118. Mr. Blyth, in the Journal of As. Soc. of Bengal, vol. xi. p. 169, has distinguished four species of *Dicrurus* (*Edolius*, Cuv.) with the outer rectrices long and spatulate, but their synonymy seems to require some correction. It appears to me they should stand thus:—  
1. *D. paradiseus* (Lin.) (being *certainly* the *Cuculus paradiseus*, Lin., *E. cristatellus*, Blyth; and *probably* *E. malabaricus*, Horsf., and *E. retifer*, Tem.). 2. *D. malabaricus* (Lath.) (Sonn. Voy. Ind. vol. ii. pl. 111; *E. rangoonensis*, Gould; *D. retifer*, Jerdon). 3. *D. grandis* (Gould) (*Lanius malabaricus*, Lath. Syn. i. pl. 108, copied by Stephens, vol. xiii. pl. 47, but not the true *L. malabaricus* described by Latham from Sonnerat; *Chibia malabaroides*, Hodgs.). 4. *D. remifer* (Tem.) (*possibly* *E. malabaricus*, Horsf.). It is the first of these which Mr. Blyth intends by his No. 118.

119, 120, 121. The genus *Dicrurus* is still in a state of great confusion, notwithstanding the valuable but too concise notice by Mr. Blyth in Journ. As. Soc. Beng. vol. xi., and it is especially desirable that exact descriptions and measurements of the Indian species should be published, without which it is impossible for European zoologists to understand them. The true *Lanius cærulescens*, Lin., (founded on Edwards, pl. 56; *Lanius fngah*, Shaw;) is described by Brisson as  $7\frac{1}{2}$  inches long, beak to gape 8 lines, depth of fork in the tail 8 lines. As the belly is said to be white, it is probably an immature bird, referable, I conceive, to *Dicrurus æneus*, Vieill., *D. æratus*, Steph. (both names founded on Levaill., pl. 176), *Chaptia muscipetoides*,

Hodgson, and *Melisseus aneus*, Blyth, in which case the permanent title of that species (if it deserves generic separation from *Dicrurus*) would be *Chaptia cærulescens* (Lin.). From want of a description, I cannot identify the species termed *cærulescens* by Mr. Blyth. The *Dicrurus fmgah* of Mr. Blyth (*balicassius* of Indian authors but not of Linnæus, and commonly called "King Crow,") is, I apprehend, the true *Dicrurus macrocercus* of Vieill. (*Muscicapa biloba*, Licht.; *D. indicus*, Steph.), as that is said to inhabit India, and to have the fork of the tail  $2\frac{1}{4}$  inches French ( $2\frac{1}{2}$  English) deep. If this be so, the *D. macrocercus*, Blyth, should be called *D. annectens*. Is the latter the *macrocercus* of Jerdon?

122. *Ixos* (more properly *Pycnonotus*) *cafer*. Two, if not three, species have hitherto been confounded under this name, viz. 1. the true *P. cafer* (Lin.),  $8\frac{1}{4}$  inches long, the whole head, neck and upper breast black, from South Africa. 2. *P. hæmorrhousa* (Gm.) (*Muscicapa hæmorrhousa*, Gm., *Ixos pseudocafer*, Blyth), from Ceylon and South India; and 3. *P.* — ? (*Ixos cafer*, Blyth), from North India, a description of which is wanting. Is this last the *Hæmatornis pusilla*, Blyth, Journ. As. Soc. Beng. vol. x. p. 841?

124. *Pitta brachyura*; I presume Mr. Blyth intends the species so called in Gould's 'Himalayan Birds,' possessing a black beak, white throat, and red vent. But the true *Corvus brachyurus* of Linnæus is from the Moluccas, and is described with a brown beak, black throat, and fulvous vent, so that the Indian bird wants a specific name. A third allied species is the *P. abdominalis*, Wagl. (Edwards, pl. 324), with yellowish beak, white throat, a white line over the eye, and red vent, otherwise like the other two, said to inhabit Ceylon, and perhaps also Southern India. This last seems to be the same with the *Pitta malaccensis* (Scop.), *superciliaris*, Wagl., Sonn. Voy. Ind. pl. 110.

125. Mr. Swainson describes his *Oriolus hodgsoni* as smaller than *O. melanocephalus* of India, which agrees with my own observations of the latter species. I would ask—1st, does any such bird as *Oriolus melanocephalus* (distinct from *O. monachus*, Gm. (*O. capensis*, Sw.) and *O. brachyrhynchus*, Sw. W. Af., in both which the primary coverts are tipped with white,) really inhabit Africa? and 2ndly, if so, is it distinct from *O. melanocephalus* of India? If both these questions be answered in the affirmative, this African species must have a new name, for the name *melanocephalus* was originally given to the black-headed oriole of Bengal.

126. Col. Sykes's name *Oriolus kundoo* was prior to *O. aureus*, Jerdon, and though applied to the female only, yet it does not thereby lose its claim to be retained for the species. Moreover the name *aureus* is pre-engaged by Linnæus for another species of true *Oriolus*.

128. *Motacilla lucopsis* is the *M. leuzoniensis* of Scopoli.

139. *Pyrrhulauda crucigera* is the *Alauda grisea* of Scopoli, and should retain the latter specific name.

143. The correct designation of the *Amaduvat* would be *Estrilda* (not *Amadina*) *amandava* (Lin.). It is a desideratum to ascertain

the precise original habitats of many birds of this group which are so commonly kept in cages.

144. *Spermestes nisoria*; the specific name of this species should be *punctulata* (Lin.); it is not a *Spermestes*, that genus being defined by Swainson with the "tail short, even." Col. Sykes makes it the type of his genus *Lonchura*, which name being pre-occupied, Mr. G. R. Gray has changed it to *Oxycerca*. But I can see no generic difference between it and *Amadina*, Sw., as typified by *A. fasciata* (Gm.), and I therefore call the species *Amadina punctulata* (Lin.).

145. Mr. Blyth gives no authority for his name *Spermestes melanocephala*, but he probably refers to the *Lonchura melanocephala* of M'Clelland.

147. From Mr. Blyth's description in Journ. As. Soc. Beng. vol. xi. p. 601, there seems no doubt that this is the *Emberiza fucata*, Pall. (*E. lesbia*, Temm., but perhaps not of Gm.)

148. This is not *Erythrospiza rosea*, but *E. erythrina* (Pall.), as I have proved by comparing specimens of the latter from Siberia in my own collection with Mr. Blyth's description in Journ. As. Soc. Beng. vol. xi. p. 461.

149. Boié's name *Phyllornis* is said to be prior to *Chloropsis*. What are the anatomy, structure of tongue, food, and habits of this genus? Till this question is answered, it is impossible to say whether those authors are most correct who class it among the short-legged thrushes (*Pycnonotinae*), or those who refer it to the suctorial family *Meliphagidae*.

152. *Diceum erythronotum* should be called *D. cruentatum* (Lin.).

153. *Diceum tickelliae* is perhaps the *Certhia erythrorhynchus* (Lath.). What is the colour of the beak in *D. tickelliae*?

154. *Vinago militaris* is probably intended for the species so named in Gould's 'Himalayan Birds,' which is I believe the true *militaris* of Temminck, but which ought to be called *phanicoptera* (Lath.). The *Vinago militaris* of Mr. Jerdon is a very distinct and unnamed species, smaller than the true *militaris*, the beak much weaker, the lower belly bright yellow, and *all* the tail-feathers plain gray above. I would call it *Treron jerdoni*, as a deserved compliment to Mr. Jerdon's labours.

155. *Vinago bicincta*, Jerdon, I take to be the same as *Treron* (*Vinago*, Cuv.) *vernans* (Lin.) (*Columba purpurea*, Gm.), in which case its range would extend from India through Sumatra and Java to the Philippine Islands. The *Vinago unicolor* of Jerdon is perhaps the female, but we want more information respecting the changes of plumage which the different species of *Treron* undergo. Almost every species presents individuals with a plain green plumage, devoid of the purple or orange colours of the perfect bird. Are these adult females, or young males? or are they in any instance distinct species?

157. There is no doubt that the "*Columba risoria*" of Indian authors is the true *Turtur risorius* (Lin.) (*T. erythrophrys*, Sw.), extending thence through N. Africa to Senegal. The S. African *T.*

*vinaceus* (Gm.) (*T. semitorquatus*, Sw.) is distinct. Major Franklin mentions two varieties in India, differing only in size: do these constitute two species?

161. The wild pigeons mentioned by Mr. Blyth as procured in the London markets, and combining the spotted wings of *Columba anas* with the white rump of *C. livia*, must be regarded as immature birds of the latter species. The Indian species is quite distinct from both, distinguished, besides the *barred* wing and *gray* rump, by its black beak, and by the metallic green feathers entirely surrounding the neck. It seems to be the variety of *anas* indicated by Wagler as found by Eversman in Tartary. As this species has never received a name, I would propose for it that of *Columba intermedia*, as indicating its relation to the two well-known species above mentioned.

163. *Francolinus gularis*; I presume Mr. Blyth here intends the *Perdix gularis* of Temminck, but as he mentions no authority for the name, this is only a conjecture. Has Mr. B. recognised the *F. lunulatus*, Less. *Traité d'Orn.*, with "the back chestnut, the fore-neck brown, both spotted with black and white, belly cinnamon, spotted with black, from Bengal"?

166. The proper specific name of *Coturnix textilis* is *coromandelica* (Gm.).

167. *Coturnix philippensis* should be termed *C. chinensis* (Lin.).

175, 176, 177. The determination of the white Egrets from different parts of the world is so difficult, that I would request Mr. Blyth to publish exact descriptions and measurements of the three Indian species here indicated, together with any synonyms which he has ascertained.

187. *Argala*; this genus should be termed *Leptoptilus*, Less.

189. Here again we are in want of a description of the Indian bird, in order to determine whether it is identical with the true *Mycteria australis* of New South Wales, or, what is more probable, a distinct species, called by Latham *Mycteria asiatica*.

193. *Ibis macei*; the proper specific name of this is *melanocephalus* (Lath.).

196. Is the identity of this bird with *Ædicnemus crepitans* of Europe clearly ascertained? Mr. Gould says, in *Proc. Zool. Soc.* vol. ii. p. 51, that *Æd. crepitans* does *not* inhabit India.

198. The group *Lobivanellus*, Strickl., typified by *L. goensis* (Gm.), is very distinct from the true *Pluvianus*, Vieill., of which the type is *P. ægyptius* (Lin.).

199. The *Charadrius bilobus*, Gm., wants the hind toe, and consequently belongs to my genus *Sarciophorus*, not to *Lobivanellus*. Lesson describes two species, *Charadrius myops* with orbital, and *C. bilobus* with frontal (or more properly *loral*) wattles, but possibly the former may be a younger state of the latter, in which the orbits are also expanded and membranous.

208. It is customary to call the Indian Greenshanks *Totanus glottoides*, but I have specimens from Madras agreeing in the most minute particulars with the true *glottis* of Britain. The *T. glottoides* of the Himalaya may be distinct, but I suspect it represents only the winter plumage of *T. glottis*.

212. Is this certainly the *Totanus glareola* of Europe, or is it the *T. affinis* of Horsfield, which is said to be 10 inches long, and is therefore probably distinct?

223. Mr. Hodgson mentions a variety of *Scolopax gallinago* with 16 rectrices. This is probably the *S. brehmi* of Europe.

224. *Scolopax heterura*; the earliest specific name is *stenura*, Tem.; it is *S. horsfieldi*, Gray, and probably also *biclavus*, Hodgson.

231. Is the "*Porphyrio smaragnotus*" of Indian naturalists certainly the same as the true *smaragnotus*, Tem., of S. Africa, or is it the *P. indicus*, Horsf. (*P. smuragdinus*, Tem.) of Java?

Page 230. The *Anous tenuirostris* of Mr. Blyth is probably the same as *Sterna tenuirostris*, Tem. Pl. Col. 202, from W. Africa.

Page 231. I had long suspected that *Ninox lugubris* (*N. nipalensis*, Hodgs.) was synonymous with *Strix hirsuta*, Tem.; but Mr. H. described his bird as wholly unspotted above, while in *S. hirsuta* there are large white patches on the scapulars. Granting, however, these names to belong to one species, I should hesitate in referring it to the species very vaguely described by Raffles as *S. scutulata*, unless there be evidence that the Indian species has also been procured in Sumatra.

All naturalists who may consult the valuable paper which has given rise to the above criticisms will join with me in hoping that Mr. Blyth may long be enabled to continue his zoological labours. The impulse which has at last been given to the study of Indian zoology will speedily clear up the doubts which still attach to the subject. I would especially recommend to the naturalists of India to identify the numerous species of birds described by Latham from the drawings of Lady Impey and others, many of which have not been subsequently recognised. Unfortunately the original drawings of Lady Impey were sold by auction at her death, and I have never been able to trace into whose possession they passed, so that there is now no other clue to follow than the brief descriptions made by Latham from those drawings. Still these descriptions will in most cases enable an Indian ornithologist to recognise the species and correct its synonymy; a process which, in the present state of the science, tends almost as much to its advancement as the discovery of new species. Another desideratum in the ornithology of India is the investigation of many of the species described by Lieut. Tickell in the Journ. As. Soc. Beng. vol. ii. p. 569. The following species there described are not sufficiently ascertained, and any information as to their exact generic characters or synonyms will be acceptable: *Falco lathamii*, *Strix dumeticola*, *S. candidus*, *Muscicapa tyrannides*, *M. cærulea* (apparently not *M. cærulea*, Gm.), *Motacilla luzonia*, *M. cantator*, *Sylvia longicaudata*, *Motacilla affinis*, *M. dumeticola*, *Turdus lividus*, *Emberiza sylvatica*, *Fringilla agilis*, *Emberiza olivacea*, *Caprimulgus albonotatus*, *Hirundo coronata*, *Columba agricola*. The 'Voyage aux Indes Orientales' of Sonnerat also contains several undetermined, though determinable, species of Indian birds, to which Scopoli in his 'Deliciæ Floræ et Faunæ Insubriæ, Ticino, 1786,' assigned one set of systematic Latin names, and Gmelin subsequently gave another.



VII.—*Contributions to the Entomology of the Southern Portions of South America.* By G. R. WATERHOUSE, Esq., Assistant Secretary and Curator to the Zoological Society, &c.

THE Marquis de Brême having learnt through the Rev. F. W. Hope that I was particularly interested in the Heteromera of the southern parts of South America, kindly brought a portion of his collection containing the *Nyctelidæ* to England and placed it in my hands, that I might make such notes as I required, and at the same time requested me to publish so much as I thought desirable. Availing myself therefore of this kindness and liberality, I will commence my 'Contributions' &c. by making some observations on the species of the genera *Nyctelia* and *Entomoderes* as they stand in Dejean's catalogue,—the collection of Heteromericus beetles belonging to the Marquis de Brême now comprising Dejean's specimens of that group.

Sp. 1. *Nyctelia Luczotii*, Buquet, is now a member of M. Guérin's genus *Gyriosomus*, and is figured in the 'Iconogr. du Règ. Anim.' (Ins. pl. 28. f. 5.), and the parts of the mouth, &c. are figured (under the name *Gyriosoma curvilineata*) in Guérin's 'Mag. de Zool.' class ix. pl. 103. fig. 2.

2. *Nyct. erythropus*, Lacord.

3. ——— *ebenina*, Lacord.

These two are undoubtedly in my opinion varieties of one species, the former differing from the latter *only* in having red instead of black legs; I possess specimens in which the legs are pitchy. They constitute the genus *Epipedonota* of M. Solier, who considers them specifically distinct. See 'Ann. de la Soc. Ent. de France,' tome v. p. 342.

4. *Nyct. senex*, Lacord., also belongs to the genus *Epipedonota*, and I very much doubt its being distinct from *Ep. ebenina*. In the collection there is but one specimen, and that deformed. Its chief characters may be thus expressed:—

*Epipedonota atra*; thorace latiore quam longo, plano, rugis longitudinalibus, ad latera obliquis, notato; elytris thorace latoribus, singulorum striis tribus supra; interstitiis distincte convexis, his duabus externis irregulariter transverso-sulcatis; carina laterali obtusa.—Long. corp.  $9\frac{1}{2}$  lin.; lat.  $5\frac{1}{8}$  lin.

In the form of the thorax this species agrees with *Ep. ebenina*, and in the sculpturing there is scarcely any difference; the lateral oblique grooves on the thorax are rather more distinct and regular.

5. *Nyct. cristallisata*, Lacord. A good species, in my opinion, and belongs to the genus *Epipedonota*. Its characters are:—

*Ep. atra, nitida*; thorace latiore quam longo, rugis longitudinalibus irregularibus et ad latera rugis brevibus transversis notato: elytris

thorace latioribus valde rugosis ; rugæ plerumque transversæ ; singulorum supra costis duabus elevatis.—Long. corp.  $9\frac{1}{2}$  lin. ; lat. 5 lin.

*Descrip.*—Head punctured in front, with some strongly waved transverse rugæ on the disc, and behind with minute confluent punctures. Thorax less than half as broad again as long, flat (or rather slightly concave), covered nearly throughout with longitudinal folds, the usual transverse rugæ at the sides being very short. Elytra covered with distinct rugæ throughout ; each elytron with two moderately elevated costæ, the second or outermost being the most distinct ; suture not elevated ; the rugæ between the suture and the first rib or keel very irregular ; between the first and second costæ, and between the latter and the lateral keel, they are transverse, and for the most part curved and waved ; they are strongly marked, but less regular than the transverse folds in *Ep. ebenina*.

6. *Nyct. monilis*, Lacord. This is the species which I regarded as a variety of *Ep. ebenina*, and noticed as such in my account of the species of *Nyctelidæ* brought home by Mr. Darwin (see ‘Proceedings of the Zool. Soc.’ for December 1841, p. 118). Lacordaire’s specimens agree with Mr. Darwin’s in having the white zigzag lines on the elytra ; they are rather smaller than the typical *ebenina*, the transverse grooves between the costæ on the elytra are less strongly marked, and the tarsi are apparently more slender. I am not however yet satisfied that it is a distinct species.

7. *Nyct. andicola*, Lacord. This, with the *N. crenicosta* of Guér., is grouped under the generic title of *Auladera* by M. Solier, and is described in the ‘Annales de la Soc. Ent. de France,’ tome v. p. 834.

8. *Nyct. desertorum*, Lacord.

9. — *serva*, Lacord.

10. — *caraboides*, Lacord.

14. — *picta*, Lacord.

15. — *Dejeanii*, Lacord.

These belong to M. Solier’s genus *Mitragenius*, of which the type is the *N. Dejeanii*. I cannot follow M. Lacordaire in regarding these species as all of them distinct. There appear to me to be but three species at most. *N. Dejeanii* and *N. serva* are very probably distinct, but *N. desertorum*, *N. caraboides* and *N. picta* I think should certainly be grouped under one specific title.

*N. Dejeanii* is described by M. Solier in the vol. of the French Society’s Transactions already quoted. The colour of the epidermis covering the elytra is very remarkable, and is described by M. Solier as “d’un cuivré pâle,” terms which did not convey to me the tint which I found upon seeing the specimens. I should

term it *gray with cupreous reflections*. I will proceed to point out the characters of the remaining species.

*N. serva*, Lacord.

Nyct. (Mitragenius) ater; thorace subquadrato, antice emarginato, supra paulo convexo, plicis minutis longitudinalibus notato: elytris oblongo-ovatis, supra convexis, singulorum supra costis duabus parum elevatis absque costis intermediis tribus indistinctis.—Long. corp.  $7\frac{3}{4}$  lin.; lat.  $3\frac{2}{5}$  lin.

This species resembles the *N. Dejeanii*, but is of a narrower and more elongated form. Although both Lacordaire's specimens are black, in one of them there are traces in parts of the cupreous gray epidermis, which in *Dejeanii* covers the elytra. The head is finely punctured: thorax nearly quadrate, more than one-third broader than long; the anterior angles prominent and acute, the posterior nearly right angles but slightly acute; the sides nearly straight, or but indistinctly rounded; the surface slightly convex, and covered with very fine longitudinal striæ (still finer than in *N. Dejeanii*); a space along the outer margin is very nearly smooth. Elytra oblong-ovate, pointed behind, and with the surface convex; each elytron with two longitudinal costæ, narrow and but little elevated, and besides there is a very indistinct ridge in the interspaces. The costæ are scarcely as distinct as in *N. Dejeanii*.

11. *Nyct. multicosta*, Guérin. Now a member of M. Solier's genus *Callyntra* (see *loc. cit.*). Described by M. Guérin in his 'Mag. de Zool.'

12. *Nyct. rustica*, Dej., is very closely allied to the *Epipedonota rugosa* of my paper in the 'Proceedings of the Zool. Soc.' quoted, and might even be an extreme variety. It differs in being considerably smaller (length 7 lines, width  $3\frac{1}{4}$  lin.), and has the sculpturing more coarse; the two costæ of the elytra are much stronger, and the very strong rugæ on the elytra, though irregular, are for the most part transverse, especially between the outer longitudinal ridge and the lateral keel. The legs, antennæ, tip of the labrum and palpi are red.

13. *Nyct. Jugletii*, Buquet. This I have very little doubt is the *N. crenicosta* of Guér. (see 'Mag. Zool.'), which belongs to M. Solier's genus *Auladera*.

16. *Nyct. mamillonea*, Lacord. Placed by Solier in his genus *Psectrascelis*, and described by him in the paper before quoted.

17. *Nyct. discicollis*, Lacord. Also belonging to M. Solier's genus *Psectrascelis*, and described by that author.

18. *Nyct. lævipennis*, Dupont, is the *Nyct. pilipes* of Guérin,

'Mag. Zool.' *Psectrascelis pilipes*, Solier, *l. c.* I am not aware that M. Dupont has characterized this species.

19. *Nyct. Klugii*, Buquet, is *Psectrascelis glabratus* of Solier (*l. c.*). The latter name must of course stand, unless M. Buquet should have previously described this species with the name attributed to him by Dejean. I have been unable to find that he has.

20. *Nyct. vestita*, Lacord. *Cerostena vestita*, Solier, *l. c.*

21. *Nyct. deplanata*, Lacord. *Cerostena deplanata*, Solier, *l. c.*

22. *Nyct. plicatipennis*, Lacord., is the *Nyctelia transverso-sulcata* of my paper in the 'Proceedings of the Zool. Soc.' for Dec. 1841, p. 106.

23. *Nyct. nebulosa*, Buquet. *N. picta*, Klug. This species is in several of our cabinets, but I am not aware whether it is described under either of the above names. The characters are as follows:—

Atra, tomentosa : thorace brevi, lateribus rotundatis, supra convexo, postice macula fuscescenti-alba : elytris ovatis postice acuminatis, quoad latitudinem thorace fere coequalibus, supra convexis, nigro alboque variegatis, atque costis duabus elevatis.—Long. corp.  $7\frac{1}{4}$  lin. ; lat.  $3\frac{3}{4}$  lin.

Var.  $\beta$ . elytris fuscis, marginibus albis vel fuscescenti-albis, dorso albo-variegato.

*Nyctelia nebulosa* appears to me to be allied to *Cerostena*, but it does not associate perfectly with any of M. Solier's subdivisions. From *Cerostena*, which is on the whole the nearest, it differs in not having the posterior tibiæ dilated at the extremity, a character which appertains likewise to *Psectrascelis*; but in this latter genus there is considerable difference, both in the sexes and in the species, as to the degree of dilatation of the tibiæ: of *Cerostena* I have but one specimen, but probably the sexes vary in the same way. The antennæ in the insect under consideration if extended back would reach rather beyond the base of the thorax, and they are moderate as to thickness; the joints are moniliform and not elongated, nor so slender as in *Cerostena*. The labrum is transverse and emarginated in front, but less deeply than in the genus last mentioned; the mentum is transverse, contracted behind and truncated in front; the labium is very narrow in the antero-posterior direction, and emarginated in front; the palpi are short, and the terminal joint of each palpus is swollen at the extremity. The legs are moderate, covered with pubescence; the posterior tibiæ are slightly curved.

This species is described and figured by Erichson under the name *Nyctelia decorata* (see 'Act. Acad. Cæs. Leop.' vol. xvii.

Suppl. p. 336), a name which must stand, unless the species be described either by Klug or Buquet, and that previous to 1834, the date of Erichson's paper.

24. *Nyct. picipes*, Dej., is the *N. nodosa*, Lat., and *N. brunripes* of the same author. *Nyctelia nodosa*, Solier. The only true *Nyctelia* known to the last-mentioned author when he restricted the genus. Should it be true, as M. Solier states, that this species is found both in Chile and at Buenos Ayres, it would afford an exception to a general rule, not only that the same species do not occur on both sides of the Andes, but that the restricted genus *Nyctelia* (now containing to my knowledge no less than twenty species, seventeen of which are described in the 'Proceedings' quoted) is confined to the west side of that range of mountains. I know that the *N. nodosa* is found at Maldonado La Plata, Bahia Blanca and Mendoza; but though I have seen several very extensive collections from Chile, I have not found that species in them. I think there must be some accidental error in the labelling of the specimens placed in M. Solier's hands.

#### GENUS ENTOMODERES, Solier.

M. Solier characterizes but one species of this genus, the *Ent. Erebi*. Three others are enumerated by Dejean, viz. :—

##### *Entomoderes Draco*, Lacord.

*Ent. niger*, et epidermide sordida quasi limosa obtectus : thorace angulis anterioribus productis, posticis obtusis, et postice ad latera profunde emarginatis, exinde angulo oriente abrupto acuto et retrorsum spectante, superficie dorsali costis duabus asperis longitudinalibus et parallelis : elytris subovatis, superne leviter convexis et tuberculis crebre obsitis, carina laterali tuberculis parvis irregulariter gemmata.—Long. corp. 10 lin. ; lat.  $5\frac{1}{4}$  lin.

*Ent. Draco* is covered throughout with a substance resembling mud. In the form of the thorax it approaches most nearly to *Ent. Erebi*, but there is no second prominent angle behind as in that species; the second angle being the posterior angle of the thorax, which is produced in a lateral direction: it is obtuse in the present species. The anterior angles of the thorax are very prominent: on each side of the disc are two considerably elevated longitudinal protuberances (larger than the corresponding protuberances in *Ent. Erebi*), and between these and the outer margin are two narrow curved protuberances; there is moreover a short central raised line on the hinder part of the thorax; the thorax is much contracted in front, and greatly dilated rather behind the middle. The elytra are formed as in *Ent. Erebi*, but they are flat above, excepting towards the apex, where they descend somewhat suddenly; they are destitute of the ridge which in that species runs parallel with the lateral costa: various irre-

gular tubercles are observable on the surface, and on the apical third are four (two on each and one above the other) which are larger than the rest; beyond these there are some small irregular rugæ, somewhat oblique but nearly transverse, which run in as it were from the lateral keel.

*Entomoderes cellulosus*, Lacord. Appears to me to be a small specimen of *Ent. Erebi*. Beyond the size, it differs only in having the network-like raised ridges on the elytra rather more strongly marked. Length 9 lin.; width  $4\frac{1}{4}$  lin.

*Entomoderes satanicus*, Lacord.

*Ent. niger*, infra fulvescenti-albo pulverulentus, partibus superioribus, at parce cinereo-pulverulentis, nisi apud elytrorum apicem, ibi pulvere notas duas per sulcum carinæ lateralis et marginem externum ductas, efficiente: thorace cum angulis lateralibus valde prominentibus, apice acuto, retrorsum extrorsum spectante, costis duabus superne et post has costa brevi centrali; elytris supra fere planis, cum tuberculis parvulis et lineis elevatis in modo irregulariter retiformi dispositis.—Long. corp.  $7\frac{1}{4}$  lin.; lat.  $3\frac{2}{3}$  lin.

Considerably smaller than either of the preceding species: covered throughout as it were with an ash-coloured dust; on the under parts and on the antennæ this powder-like substance hides the black ground-colour of the insect, but the upper parts are only partially hidden by it; it is more dense in parts; along the lateral keel it forms a grayish line, and on the apical portion of the elytra two irregular markings, one on each elytron commencing broad and dentated about the apical third of the elytron, and becoming gradually narrower to the apex. The thorax is very short, and the lateral projecting points are very prominent and acute, but, as in *Ent. Draco*, the posterior angles are not produced,—they are in fact right angles; the anterior angles are produced in the form of a narrow process rounded at the point; on each side of the central dorsal line, which is slightly raised on the hinder part of the thorax, are two raised lines as in *Ent. Erebi*, but they are rather more prominent than in that species. The elytra are sculptured as in *Ent. Erebi*, excepting that there is scarcely any trace of the first inner costa, which is observable in the basal portion of the elytra of that insect: the lateral keel is divided into two ridges by a longitudinal groove, and is very rough; towards the apical portion of the elytra, the keel is provided with acute tubercles.

Perhaps I should be rendering these notes more useful by adding a brief description of the *Ent. Erebi* (the type of the genus), and thus completing the characters of the species, so far as they are at present known.

*Entomoderes Erebi*, Lacord.

*Ent. niger*, vel piceo-niger; thorace supra costis duabus longitudi-

nalibus, et costa centrali in medio interrupta, angulis lateralibus acutis et retrorsum spectantibus; elytris cum costis duabus irregularibus a basi ad partem apicalem tertiam longitudinaliter ductis, costis duabus brevioribus basalibus, et cum lineis parvis punctisque elevatis crebre dispositis: elytrorum carina laterali et apice nunquam piceo-rubris, vel piceis.—Long. corp.  $10\frac{1}{2}$  lin.; lat.  $5\frac{1}{8}$  lin.

Black or pitchy black, and glossy; legs and antennæ pitchy: head rather coarsely punctured and somewhat rugose in parts, and with a transverse impression: thorax broader than long; the anterior angles produced; the sides much dilated, but at a short distance from the hinder margin, with a deep notch suddenly reducing the width of the hinder part of the thorax nearly to that of the fore part, and leaving to project in the form of an acute angle (the point of which is directed backwards) the dilated lateral margin; in this notch is a small triangular projection, which may perhaps be regarded as the posterior angle of the thorax, if we imagine that angle to be curved forwards and slightly upwards; the dorsal surface of the thorax is slightly convex, and has some scattered punctures; in the middle, behind, is a short and small longitudinally elevated ridge, and on the disc are two other ridges separated by a narrowish interspace which presents numerous small rugæ; on the fore-part of the thorax (which is emarginated) there is a fourth little keel. The elytra incline to an ovate form, and are considerably arched in the longitudinal direction; in the transverse direction the outline is but little arched: the lateral keel is notched in parts, and extends nearly to the apex of the elytra, sending out a small sub-apical brush: the surface is glossy and uneven, and at about one-third of the distance from the lateral keel to the suture is a longitudinal ridge which extends the base of the elytron, but is obliterated on the apical third; within this ridge are some irregular large shallow depressions and indistinct ridges; these depressions and minute ridges are confined to a space which would be included between the longitudinal rib and a second rib; but that second rib is obliterated, if we except a small portion at the base of the elytron, and a short minute keel in a line with the point of termination of the outer and more developed rib: the lateral margins of the elytra and the lateral keel are pitchy red: the red colour of the lateral keel is continued to the apical portion of the elytron, where it forms a broad and conspicuous mark.

This description is drawn up from a specimen brought from Mendoza by Mr. Darwin.

Besides the species of *Nyctelidæ* here noticed, the Marquis de Brême's collection contains a true *Nyctelia* (Solier) closely allied to the *Nyct. Westwoodii* of my paper: I propose to name it

*Nyct. Bremii.*

*Nyct. ater*, nitida; elytris profunde striatis interstitiis convexis, striis rugosis et obliquis.

I regret my notes on this species are imperfect; they however state that it greatly resembles the *Nyct. Westwoodii*, but may be distinguished by the striæ or grooves, with their convex interspaces, which are next the suture, being oblique and not longitudinal as in that species; the grooves are moreover less strongly marked, less regular, more numerous and rugose.

*Nyctelia macrocosta*, Guér., 'Mag. de Zool.'

This I strongly suspect will prove to be a local variety of my *Epipedonota rugosa*. Of *Ep. rugosa* Mr. Bridges sent very many specimens to England, all of which were perfectly black throughout; I was not prepared therefore to suppose they could be specifically identical with Guérin's *N. macrocosta*, an insect of which I had seen a description only, and which differs in having the legs and antennæ bright red, and the margins of the thorax, the lateral keel of the elytra, and the large costa on each elytron also red, but inclining to pitchy. The costæ are more strongly marked in the Marquis de Brême's specimens (which are all that I have seen) than in my *Ep. rugosa*.

As regards these differences, I may observe, that in the Marquis de Brême's collection, all the specimens of Guérin's *Nyct. multicosta* (genus *Callyntra*, Solier), have the legs and lateral keel of the elytra pitchy red, excepting one, and in this the keel is almost uniform in colour with the body; in four specimens of this species in my own collection the lateral keel is black, and one of them has the legs black, or very nearly so. Both of *Epipedonota ebenina* and *Nyctelia laevis* I possess black and red-legged specimens; similar varieties occur in the *Nyctelia nodosa*. In some cases the different varieties appear to be confined to particular districts\*.

In works on entomology the 'habitats' of the species are often

\* I recollect in conversation with the late most amiable, and I am sure much-lamented Dr. Natterer (who resided in the Brazils very many years, during which time he amassed an enormous collection of natural-history subjects), he expressed a strong opinion that several of the so-called species of South American monkeys were not specifically distinct, but that they constituted different races of the same species, confined to particular districts, animals which differed in colour *only*. He alluded *especially* to the genus *Myctes*, the species of which have so much puzzled mammalogists, and observed, that sometimes on different sides of the same river, animals of what he considered the same species differed in colour very materially. Dr. Natterer was one of the most careful observers I ever met with; and that he published so little of the mass of information he possessed relating to natural history, I perceived upon intimate acquaintance arose from over-caution,—from too great a fear of committing an error.



of necessity very vague, arising from the difficulty there exists of ascertaining the precise spot whence they were procured; thus I find *Chile* is the only habitat given for certain species,—undoubtedly for the most part found in that country,—but then Chile is a district of such enormous extent, especially of latitude, and the parts differ much in climate, and consequently in general features. Thus to the north, is a most dry and arid country, having scarcely any rain; generally sandy and stony, and abounding in *Cacti*; and in the south the opposite characters would apply, wooded (and in many parts with a most luxuriant vegetation), and abundance of rain. The northern arid district will include the provinces of *Coquimbo* and *Copiapo*, and the southern *Chiloe*, *Valdivia* and *Concepcion*. Lastly may be noticed the district which may be termed Central Chile, and which is intermediate in its characters; where there are periodical rains during the months of May, June, July and August, a tolerable abundance of trees in the valleys and low bushes on the sides of the mountains; it embraces *Valparaiso*, *Aconcagua* and *Santiago*.

With such a variety in the physical nature of this country, we can associate no general facts relating to the geographical distribution of the insects it contains, when the habitat of *Chile* only is given for the species; the following notes, kindly furnished me by Mr. Bridges, will therefore no doubt be acceptable, since they furnish the precise habitats of various Chilean, and some few extra-Chilian Coleopterous insects, and moreover contain observations on their habits.

1. *Megathopa villosa*, Eschsch.

*Hab.* Quintero, about ten leagues north of Valparaiso; buries itself in the ground, under recent cow-dung, to the depth of from four to eight inches.

2. *Phanæus imperator*, Guér.

*Hab.* Mendoza. Buries itself under cow-dung to the depth of about nine inches, making a perfectly round hole like *Copris lunaris*. Frequents the sandy fields near Mendoza, and is called by the natives 'Catanga.'

3. *Brachysternus viridis*, Guér.

*Hab.* Valparaiso. Makes its appearance as soon as the Lombardy poplars are clothed with leaves, and flies about these trees in the evening.

4. *Brachysternus castaneus*, Lap.

*Hab.* Valparaiso. Flies about in the evening, and often enters the windows of the houses when the candles are lighted.

5. *Polycaon Chiliensis*, Lap.

Found on shrubs in the province of Colchagua, South Chile.

6. *Physogaster tomentosa*, Guér.

Found in great abundance under stones near the town of Copiapo, North Chile.

7. *Praocis submetallica*, Guér.

Found on stems of shrubs (a species of *Coccoloba*), and on the ground under them, near Valparaiso.

8. *Praocis spinipes*, Lap.

*Hab.* Coquimbo. On stems of bushes.

9. *Nyctelia laevis*, Waterh.

Found on the east side of the Andes in Valle Hermosa, about nine leagues from the volcano of Peteroa, amongst herbage in dry sandy situations. This species hides itself during the sunshine, and makes its appearance in the evening; if the weather be dull it will crawl about in the day.

10. *Nyctelia transverso-sulcata*, Waterh.

*Habitat* believed to be the same as the last, but not quite certain.

11. *Psectrascelis pilipes*?

*Hab.* Los Zapos, north of the city of Coquimbo. Inhabits dry sandy districts. Common under stones, and frequently seen running about in the daytime.

12. *Epipedonota ebenina*, Lacord.

Found near the silver mines of Uspallata; runs about in the evening.

13. *Epipedonota affinis*, Waterh.

*Hab.* Province of Colchagua.

14. *Epipedonota rugosa*, Waterh.

*Hab.* Province of Colchagua.

15. *Gyriosomus Hopei*, G. Gray.

*Hab.* Dry sandy plains between the city and port of Coquimbo.

16. *Gyriosomus Whitei*.

*Gyr. ater, nitidus*: thorace transverso, lateribus paulo rotundatis, superne convexo, rugis irregularibus plerumque sublongitudinalibus, impresso: elytris ovatis, convexis, lineis obliquis albis ornatis.—Long. corp. (♂)  $8\frac{1}{2}$  lin.; lat.  $4\frac{1}{2}$  lin.; long. corp. (♀) 11 lin.; lat.  $6\frac{3}{4}$  lin.

This species (which I have named in honour of Mr. Adam White of the British Museum) is very variable in size, like others of the group; but the average size of the individuals is between that of *G. Hopei* and *G. Bridgesii*. It might at a glance be mistaken for either of these species; indeed I had not perceived that there were three species of this little division (all the individuals of which have the elytra adorned with numerous white lines) at the time that

I sent my descriptions to a recent number of the 'Annals.' Finding however in a specimen in my collection (one which had been brought home by Mr. Bridges) certain characters which I regarded as important, I requested to be allowed to re-examine Mr. Bridges' collection, and was immediately satisfied that it contained two new species allied to *G. Hopei*, and many specimens of both sexes of each, and although they have a common superficial resemblance they are easily distinguished. *G. Hopei* differs from the other two species in having the præsternum broader and not continued behind the line of the coxæ of the anterior pair of legs. In *G. Whitei* and *G. Bridgesii* the præsternum is contracted, keeled, pointed behind and produced beyond the coxæ. In the form of the thorax the present new species agrees most nearly with *Hopei*; that is, in having the sides, from the middle to the posterior angle, nearly straight and parallel, and in having the diameter, in the longitudinal direction of the insect, greater. The thorax in *Bridgesii* gradually widens from the apex to the base, and it is shorter than in *Hopei* and *Whitei*. The reflected margin of the thorax in *Whitei* is broader than in *Hopei*; in *Bridgesii* it is but indistinctly marked. Lastly, in *Bridgesii* the dorsal surface of the thorax has numerous strong rugæ—irregular, but for the most part longitudinal in their direction, and in this respect resembling *G. Luczotii*, but in this last-named insect the rugæ are rather stronger. In *G. Hopei* and *G. Bridgesii* the thorax is smooth, glossy in the former insect, but dull in the latter. The elytra are less convex in *Whitei* (much less so in the male sex) than in *Hopei* and *Bridgesii*, and the suture is but indistinctly keeled; in *Hopei* it is not keeled, and in *Bridgesii* it is strongly keeled. As regards the white lines which adorn the elytra there is a considerable difference. In *G. Hopei* and *G. Bridgesii* the white lines are almost entirely confined to the hinder half of the elytron; on the other portions there are white dots, excepting towards the scutellum: the number of white lines is usually five or six. In *G. Whitei* the lines are nearer together, and eleven or twelve, on each elytron, may be counted; they cover the elytra, with the exception of a dorsal patch, which is broad at the base of the elytra, and terminates in a point about the middle, or rather behind that part. In *G. Hopei* and *G. Bridgesii* the white lines are for the most part parallel with the suture, the exterior ones diverging but little: in *G. Whitei* they may be said to radiate from a point, and that point at, or near the scutellum. The legs in *Whitei* are decidedly more slender than in *G. Hopei*, and in this respect resemble those of *G. Bridgesii*. The antennæ, as compared with those in *Bridgesii*, differ in having the terminal joints less dilated. I may mention, that of the *G. Whitei* I have seen about a dozen specimens of both sexes, of *Bridgesii* more than double that num-

ber, and likewise examples of both sexes. Of *G. Hopei* I have seen many hundreds of individuals. The two last-noticed species were found together by Mr. Bridges, the *G. Whitei* was found in a different locality. The three species are in the collection of the British Museum, as well as the *Gyriosomus marmoratus* and *G. elongatus*, described by me (from the same collection) in the 'Annals and Magazine of Natural History' for October 1843, vol. xii. pp. 258—260.

17. *Gyriosomus Bridgesii*, Waterh.

Common in the vicinity of Coquimbo: like most of the species of *Nyctelida* it hides itself during the heat of the day and comes forth in the evening. It feeds upon the Malvaceous plants (genus *Cistaria*).

18. *Gyriosomus marmoratus*, Waterh.

*Hab.* Near Villa Vicuña, valley of Elqui, province of Coquimbo.

19. *Gyriosomus Luczotii*, Guér.

*Hab.* Vicinity of Coquimbo.

20. *Gyriosomus elongatus*, Waterh.

Found in dry sandy plains between Huasco and Coquimbo. Makes its appearance in dull weather.

21. *Scotobius rugulosus*, Guér.

Frequent in cellars of the houses of Valparaíso.

22. *Gonogenius brevipes*, Waterh.

Found (often in company with *Physogaster tomentosa*) under stones at Copiapo.

23. *Psammetichus crassicornis*, Waterh.

*Hab.* Near Huasco. Found under plants of the Cactus tribe, and under stones.

24. *Naupactus Bridgesii*, Waterh.

*Hab.* Uspallata.

25. *Ægorhinus phaleratus*, Erichs. Genus *Lophotus*, Schönh.

*Hab.* Valparaíso. Found on the trunks of trees, especially on the peach, apple and pear.

26. *Listroderes costirostris*, Schönh.

*Hab.* Coquimbo. Found on the stems of shrubs (*Helianthus thurifer*), generally close to the ground.

27. *Listroderes subcostatus*, Waterh., Proc. Zool. Soc. Dec. 1841.

From the Quebrada de Vergara, west side of the Andes, province of Colchagua.

28. *Listroderes pilosus*, Waterh., *l. c.*

*Hab.* Same as last.

29. *Adioristus punctulatus*, Waterh., l. c.

*Hab.* Same as last.

30. *Adioristus angustatus*, Waterh., l. c.

*Hab.* Same as last.

31. *Adioristus conspersus*, Waterh., l. c.

*Hab.* Same as last.

32. *Adioristus simplex*, Waterh., l. c.

*Hab.* Same as last.

*Obs.* Mr. Bridges found the above six species of *Listroderes* and *Adioristus* all in one spot, both under stones and under dung.

33. *Rhyephenes Incas*, Schönh.

*Hab.* Valparaiso. On trunks of trees.

The new species of *Gyriosomus* noticed in this paper were described in the 'Annals and Mag. of Nat. Hist.' for October 1843, vol. x. p. 258.

Besides these, Mr. Bridges' collection contains a new species of each of the following genera, viz. *Gonogenius*, *Psammetichus* and *Naupactus*, which I will proceed to describe. I may here observe, as regards two genera noticed in the foregoing pages, *Lophotus* and *Rhyephenes*, that the genus *Eublepharus* of MM. Gay and Solier\* is synonymous with the former, and the genus *Physothorus* of the same authors is synonymous with the latter. The *Eublepharus Rouleti*, Gay et Sol., is undoubtedly the same as the *Lophotus nodipennis*, Hope, previously described and figured in the first volume of the 'Transactions of the Ent. Soc. of London.' The *Eub. Germari* (G. et Sol.) is, I suspect, the *Artipus superciliosus*, Guér., Voy. de la Coqu.

Genus *Gyriosomus*. In addition to the characters already pointed out, I may notice that *G. Luczotii*, *G. Bridgesii* and *G. elongatus* have the præsternum contracted and produced backwards beyond the insertion of the femora, whilst in *Gyriosomus Hopei* and *G. marmoratus* the præsternum is broader and not produced backwards.

*Gonogenius brevipes*.

Gon. niger sub-obscurus; corpore plerumque pulvere fusco obsito: capite rugose punctato: thorace lateribus æqualiter rotundato, antice posticeque submarginato, angulis acutis; supra paulo convexo, punctis distinctis, irregulariter adspersis, impresso: elytris ovalibus, leviter convexis, punctato-striatis; interstitiis striarum, costatis, distincte punctatis vel rugosis: pedibus brevibus, crassis.—Long. corp. 6—8 lin.; lat.  $2\frac{3}{4}$ — $3\frac{3}{4}$  lin.

This species differs from the *Gonogenius vulgaris* in being rather shorter, in having the head narrower, the thorax shorter and not

\* See Annales de la Soc. Ent. de France, tome viii. p. 5.

cordiform, but with the sides evenly rounded from the base to the apex; the elytra have the interstices of the striæ not in the form of simple smooth ridges as in *G. vulgaris*, but either distinctly punctured or more generally rugose; and lastly, the legs are considerably shorter and stouter: the tibiæ are very angular, and the prominent angles are serrated.

*Psammetichus crassicornis.*

Psam. niger; capite thoraceque tuberculis minutis creberrime obsitis; antennis percassis: thorace dorso carina longitudinali, postice abbreviata, instructo: elytris ovatis, valde rugosis, costatis, costis denticulatis et rugosis.—Long. corp.  $8\frac{1}{2}$  lin.; lat.  $3\frac{1}{2}$  lin.

This species is about equal in size to, or perhaps generally rather larger than, the *Ps. costatus*, from which it is readily distinguished by the thickness of its antennæ; these organs are but little larger than in the *Ps. costatus*, but in thickness their bulk is double that of the antennæ in the insect last mentioned. The legs are rather stouter than in *Ps. costatus* (the tarsi distinctly so); the head and thorax are covered in the same way with small tubercles, but in the present species they are more minute and more crowded. The costæ on the elytra instead of being nearly simple ridges are very rough and strongly notched, presenting a distinctly serrated outline.

*Naupactus Bridgesii.*

Naup. ater, squamulis viridi-argenteis ornatus; corpore elongato: capite crebre punctulato postice rugoso, supra, rostroque canaliculatis: thorace rugoso et punctato, vittis tribus viridi-argenteo squamosis: elytris punctato-striatis dense viridi-squamosis, sutura, vittis duabus longitudinalibus, marginibusque denudatis: corpore subtus squamulis sordide albis adpersis: antennis pedibusque pilis albis obsitis.—Long. corp. 7 lin.

In general form this species most nearly resembles the *Naupactus rivulosus*; it is however considerably smaller than that insect. The head and rostrum are finely but thickly punctured, and the former is somewhat rugose behind; both have scattered bluish white scales: the thorax is rather broader than long, narrower in front than behind, has the sides slightly rounded, and is somewhat constricted near the base, so that the posterior angles are rather prominent and acute; the posterior margin is indistinctly waved, the surface uneven and rugose; above are three longitudinal broadish silvery green marks, and these are somewhat impressed as it were. The elytra are scarcely broader than the thorax at the base, thence to the middle the width is about equal, but from the middle to the apex the width decreases; the apex is rounded; they are punctate-striated, and the interstices are obscurely rugulose; the suture is raised and destitute of scales; the

second interstice is in part also raised, and forms an oblong slightly raised hump near the base of the elytron; this hump being destitute of scales presents a black mark; again the fifth interstice is strongly convex, excepting for a short distance from the base of the elytron; the sixth interstice is convex,—strongly so at the base of the elytron, and projects in the form of a rounded angle at the shoulder, but posteriorly the convexity of this interspace decreases; on the hinder half of the elytron it is flat: the convex portions of both the fifth and sixth interstices are denuded of scales, and so is the lateral margin of the elytron; so that as regards the colouring, the elytron may be described as silvery green, with the suture, a small oblong mark at the base, a semi-lateral mark extending from the base nearly to the apex, and the lateral margin black, if we except a small portion of the latter at the base of the elytron. Numerous longish pale hairs are observable on the apical portion of the elytra.

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VIII.—*Note upon Obisium orthodactylum (Leach).*

By ALFRED TULK, M.R.C.S., M.E.S.

So much yet remains to be learnt concerning the structure and habits of many of the inferior forms of Arachnida, that every observation tending to throw additional light upon them cannot but be regarded by the naturalist as deserving of record. Upon the internal edge of either claw of the chelicerae, in the above-named species of Pseudo-scorpion, we perceive, under the microscope, an immoveable pectinated appendage, of a delicate white colour and transparent texture: that upon the external claw, to nearly the middle third of which it is attached by about half the extent of its back, is the most prominent, and consists of fourteen slightly curved and obtuse teeth, which gradually increase in length from behind forwards, the posterior one differing from the rest in its rounded form and greater breadth. The internal, from not being implanted so directly upon the edge of the claw as the preceding, but deeper down towards its base, is less distinct, its extremity alone projecting so as to render visible four or five of its teeth, the remainder of which are with difficulty counted, though a careful examination has at length convinced me that their total number is the same as upon the other comb. The plane of position of the two claws, when the chelicerae are at rest, is obliquely downwards and outwards, so that the internal is placed most superiorly, and overlaps by its apex that of the external. The two combs preserve constantly this slanting direction towards each other. But, besides these organs, there arises from the front of a slightly elevated ridge upon the inferior surface of

the basal joint of the chelicerae, and near to the commencement of the claws, a tuft of long pinnate hairs, eight to nine in number, which converge together at their extremities to form a complete brush reaching almost to the middle of the claws.

I had often speculated upon the probable use of this peculiar contrivance, until upon more than one occasion, having placed the animal alive in a glass cell for examination beneath the microscope, I observed it very busily engaged in cleaning its long palpi, especially their didactyle forceps, by drawing them repeatedly between the claws of the chelicerae, the latter being freely rotated during the operation, so as to bring every part of these organs in contact with the combs and hairy tuft. The tarsi were cleaned also at the same time, by applying them against some scattered bristles which project inwards from the coxal joints. Before I had noticed the above facts, my attention had indeed been directed to these comb-shaped organs in *Obisium* by the very striking resemblance which they bore to the abdominal *pectines* of the scorpion; and now that we had conclusive evidence of their functions in the one, it became a question whether those of the latter might not perform some similar office. The uses which have been assigned hitherto to these parts in the scorpion by different writers, appear to me far from satisfactory. While their lamellated structure alone has induced some to regard them as external branchiæ, their situation near to the generative opening in both sexes has led others to view them as claspers during the act of copulation, by their plates mutually interlacing with each other; they have been regarded even as aiding in locomotion. It may be objected to the view which I am here disposed to take of their acting as *cleansers* to the palpi, tarsi and elongated portion of the abdomen, that their position is widely different in the true as contrasted with the Pseudo-scorpion; but need we be more surprised at this than that the poison-sac, which in one group of Arachnida is placed within the chelicerae, should in another be transferred to the opposite extremity of the body? Admitting then that such has been the case in the present instance, it may be understood why the combs of the scorpion and each of their separate teeth should be moveably articulated to compensate for the immobility of that part of the abdomen to which they are attached, while such a provision would, for obvious reasons, be unnecessary in the little *Obisium*.

There is a remarkable agreement, however, in many other points of external structure between these two animals which must not be overlooked, as they tend to support still further the above analogy. Treviranus has noticed the striking resemblance between the palpi and maxillæ of an allied genus *Chelifera* and those of the scorpion, and the comparison may be drawn more closely still between the



latter and *Obisium*. There is one point of importance which yet remains to be ascertained, and the more so from its having been taken as a primary character in the classification of the Arachnida,—the means by which the above animals respire. Treviranus has described two rows of puncta as occurring both upon the upper and under segments of the abdomen in *Chelifer*, which he regards as stigmata, but states also that he was unable to detect either tracheæ or pulmonary sacs in their situation. It is most probable therefore that they were merely impressed points, serving, as in others of the class, for the attachment of muscles. Be that as it may, I have been unable to discover any indications of such external openings in *Obisium*, or to arrive for the present at any satisfactory conclusion in regard to the existence of an internal respiratory apparatus; but I introduce these remarks here for the purpose of inquiring whether, if we knew the precise conditions under which the breathing of these animals was effected, it is then a function of sufficient value to be adopted in the arrangement of the Arachnida, since it has been already invalidated by the co-existence of pulmonary sacs and tracheæ in the genera *Segestria* and *Dysdera*; whether, in a word, until more is made out of the anatomy of *Obisium* to establish its further affinity to the *Scorpionidæ*, its present position among the Trachearia may not be regarded as a provisional one? As yet, I am strongly disposed to believe that subsequent facts will prove that the present and allied forms are the true dwindled acaudal representatives in this country of the gigantic and formidable species which infest the tropics.

1 Arthur Street, Gray's Inn Road.

IX.—Observations on *Fucus Labillardierii*, *Turner*. By the Rev. M. J. BERKELEY. *In a Letter to R. Taylor, Esq.*

MY DEAR SIR,

THE following extracts from a letter with which I have been favoured by Dr. Montagne relate to a subject of much interest as regards the physiology of Algæ, and are in themselves so excellent that they cannot fail to be acceptable to many of your readers. The plant to which they principally refer is *Fucus Labillardierii*, Turn., which was improperly referred by J. Agardh to *Suhria*, and has lately been raised to the rank of a genus, under the name of *Ctenodus*, by Kützing, on characters taken almost entirely from the structure of the frond, without reference to any peculiarities in the fructification. The genus *Calocladia*, Grev., founded upon an Alga supposed to be identical with Turner's plant, though in reality very different, is, it appears, the same with *Delisea*, Lamouroux. Mr. Harvey had ascertained the real

structure of Labillardière's Alga, respecting which he writes to me as follows:—"In a paper which I have had in MS. for the last three years, I have proposed *Fucus Labillardierii* as the type of a new genus, which I purposed to call *Seirospora*. Its fruit is altogether unlike that of any other *Floridea*, and more resembles that of a *Fucoidea* than anything else. It is a receptacle containing a number of cells, each communicating with the surface by a pore, and filled with linear four-jointed sporules!"

Having premised so far, I proceed to my extracts from Dr. Montagne's letter:—

"More than a year since I made an analysis of *Fucus Labillardierii*, of which my specimen left no room for doubt, as it came out of the herbarium of the illustrious traveller. I then discovered the singular disposition of the tetraspores, which has been also recognised, as you inform me, by Mr. Harvey. Soon after making this important discovery, I begged you to procure me, if possible, from Dr. Greville, conceptaculiferous individuals. I then told you that the theory of M. Decaisne must fall before the fact of tetraspores contained in conceptacula exactly after the fashion of real spores, and, what is equally curious, converging as the spores of *Fucaceæ*, from the periphery to the centre. I compared this singular disposition to what I found in my new genus *Nothogenia* (*Chondrus variolosus*, Prodr. Phyc. olim), a *Floridea* in whose conceptacula the true spores are also convergent. I had purposed to dedicate this new genus to Lenormand, who has done so much for science by his bountiful distribution of species in all parts of Europe, but my intention was arrested by the publication of this species under the name of *Ctenodus* by Kützing. After having described minutely the singular fructification of this Alga in my 'Cryptogamie du Voyage de la Bonite,' which is at this moment in the press, I immediately drew up the article *Ctenodus* for the 'Dictionn. Univ. d'Hist. Nat.,' which is on the eve of being published. I have copied both these articles for you, to make you completely master of a question of great interest. This is much increased by the Alga you have sent me from Dr. Greville. It confirms a doubt which I have thrown out under the word *Delisea* (which is not, however, printed at present), that *Calocladia*, Grev., does not differ from *Delisea*, Lamx. Dict. Class. The Alga, though received from Dr. Mertens, is most certainly not *Fucus Labillardierii*, Turn., but *Delisea fimbriata*, Lamx. There is the same conceptacular fructification as I have figured in my 'Cryptogamie des Canaries' under my genus *Asparagopsis*, and in my 'Cryptogamie de Cuba' under *Thamnophora*; but what will surprise you not a little is that I possess tetrasporic individuals whose tetraspores resemble those of *Ctenodus*, with this difference,—that they are not convergent,

but radiating from a basilar or axillary placenta. These plants agree indeed in external habit and in the form of the tetraspores, though not in their disposition, but their internal structure forbids their association in the same tribe. *Delisea*, by the structure of the frond and conceptacula, must be arranged with *Chondriaea*; and as *Ctenodus* cannot be arranged in any of the tribes hitherto established amongst *Florideæ*, I am compelled to form a distinct tribe for it, under the name of *Ctenodontées*, on which I purpose shortly to present a memoir to the Institute.

“The tetrasporic fruit consists of oblong or spheroidal, shortly pedicellate receptacles (*polythecia*) situated at the axillæ of the pinnules which fringe its branches. The most curious point is, that these receptacles contain not spores but tetraspores, altogether analogous to the compound sporidia of certain genera of Lichens, or even Fungi. I have no hesitation in asserting that this mode of fructification is of very high importance for science and very instructive. The interior disposition of the tetraspores is as follows:—The capituliform summit of the fructifying ramule (or, in other words, the receptacle,) is divided into peripheral, ovoid, or spherical cavities. In a vertical section passing through the axis five or six of these cavities are observed, and the number in the whole receptacle amounts perhaps to fifteen or twenty. These cavities have a great analogy with those of *Fucaceæ*, by the place the tetraspores occupy, by the form of these tetraspores (with the exception of their articulation), and, what is still more worthy of attention, by their convergent direction, which are accompanied by paraphyses, or, in other words, by abortive tetraspores. The question indeed would not be one of analogy but of perfect resemblance, if the spores were simple instead of being compound. Short continuous filaments converging towards their centre proceed from all points of the cavities, at least in the first stages of evolution, for in the adult state the portion of the cavity corresponding with the cortical stratum of the receptacle is unoccupied. The greater part of these filaments, which are clavate and branched at the base only, remain sterile and transparent (*paraphyses*); a few privileged individuals undergo a metamorphose of the granular line which occupies their axis, in virtue of which they become compound spores. At first simple and continuous, oblong and conformable to the tube of the thread which performs the functions of a perispore, the tetraspore is gradually furrowed by three transverse lines, by which at maturity it is divided into four spores. These separate, fall into the cavity, and probably are not dispersed before the decay of the receptacle, for I have not been able to find any pore which may serve as a natural outlet. In this singular fructification we see most evidently that the filaments in

which the tetraspores are developed are the termination and expansion of those which traverse the axis of the frond, and constitute its medullary stratum; a fact which contradicts in the most formal way the assertion of M. J. Agardh, 'Si denique vera sunt quæ de utriusque organi diversitate attulimus, nimirum utraque in eodem individuo nunquam obvenire, evolutionem utriusque esse plane contrariam, alterum vero exterioris strati productum,' &c. (Alg. Medit., p. 62.) On the other hand, it is easy to convince oneself, that from the beginning the compound spore is contained in a linear or slightly clavate filament, and that, though at first simple, it is by insensible degrees only that it is divided into four spores. These at length become free by bursting the common perispore in which they are formed. Would we consider these compound spores as simple spores formed in the endochrome of radiating moniliform filaments, as in the tribe *Sphaerococcoideæ*, I reply, that the assimilation in question not only appears contestable but is absolutely untenable, since the conceptacula of this last-mentioned tribe offer threads radiating from a sort of basilar or axillary placenta; but we have here a disposition exactly the reverse. I have indeed found something analogous in a *Floridea*, of which I have made a genus, under the name of *Nothogenia*. [Vide 'Ann. d. Sc. Nat.,' Oct. 1843; and plate 10. fig. 3. of the 'Cryptogamic Atlas of the Voyage to the South Pole.'] This Alga presents, like *Ctenodus*, filaments which converge from all points of the conceptacle towards its centre; but as these filaments are articulate and moniliform, the spores contained in each endochrome, of which they are a transformation, are simple and not compound spores; in other words, they are not tetraspores.

"We have then a *Floridea*, containing,—not in a single cavity but in a plurilocular receptacle, which I call *polythecium*, for each of these cavities is as it were an introverted *Næmathecium*,—compound spores accompanied by paraphyses, as the simple spores of *Fucaceæ*, or the compound spores or asci of Lichens and of various Fungi, which are isolated at maturity and fall into the middle of the cavity. This curious *Floridea* shows us then—1st, The profound analogy and, as it were, confluence of two kinds of reproductive bodies. 2nd, Their common origin (at least in the present Alga, contrary to the assertion of J. Agardh). 3rd, A second example in *Florideæ* of the convergent direction of the sporiferous filaments,—a direction hitherto supposed to be peculiar to *Fucaceæ*.

"These are the most important observations I have recorded, and you will at once see what bearing they have on the division into Aplospores and Chorispores. I do not recognise a specific difference in the two Algæ which Mr. Harvey has so kindly com-

municated at your solicitation. It would be curious, however, to establish the fact that this *Alga* has but one form of fructification: we should then have a perfect confluence and assimilation of the two kinds of fruits."

I shall only add, that Dr. Montagne showed me his sketches when I was with him last summer, at which time he had not the slightest notion that Mr. Harvey had made similar observations.

I am, my dear Sir, yours very faithfully,  
King's Cliffe, Dec. 15, 1843. M. J. BERKELEY.

#### BIBLIOGRAPHICAL NOTICES.

*Phycologia generalis; oder Anatomie, Physiologie und Systemkunde der Tange*, bearbeitet von F. T. Kützing. 4to, tab. 80. Leipzig, 1843.

FRIES remarked in his 'Systema Orbis Vegetabilis,' published in 1825, that the study of aquatic *Algæ* was in the same condition as that of *Fungi* a century, or that of *Lichens* half a century before. The characters were principally taken from outward form, without proper attention to differences of structure. It was certainly matter of great difficulty to obtain clear views of structure with the older microscopes, and the analyses by Sir W. J. Hooker given in Turner's 'Fuci,' which were admirable for the time, lost a great deal of their sharpness in engraving, and the greater part of the copies of that excellent work do not exhibit them so clearly as might be wished, the difference between early and later impressions being very considerable.

This opinion of the great Swedish mycologist appeared to many harshly expressed, but it was nevertheless not far from truth, as the labours of modern algologists have clearly demonstrated.

Attention has been drawn to the subject, more especially during the last two or three years, by the memoirs of Decaisne, Chauvin, J. Agardh, Montagne, &c.; and though these are in many cases accompanied by admirable analyses, a larger mass of illustrations was most desirable, which is exactly what the work of Kützing supplies.

The figures are admirably drawn and engraved by the author himself, and we can answer for their general correctness from having had the advantage of inspecting a large quantity of precisely similar analyses in the herbarium of Dr. Montagne. The engraving is so minute, that frequently it is really useful to examine it with the help of a lens. The illustrations are very various, entering into the most minute details of structure both of the frond and fruit, and where possible of the germination, and they present such a mass of facts and such valuable materials for students as perhaps were never before collected in a single volume.

It is exactly analogous to the work of Corda on *Fungi*, having the same excellences and the same faults. The text in most cases does not answer one's expectation so fully as the plates would promise. The arrangement on the whole is good and natural; the prefatory

remarks, which extend to a considerable length, relating to structure and other general matters, excellent ; but all that relates to characters, species, synonyms, literature, &c. by no means satisfies us.

The characters both of genera and species are very loosely drawn, without any clear notions, as it appears to us, of what a genus or species should be ; the synonyms are often incorrect or insufficient ; the phraseology new and needlessly complex ; but the main fault, in a work of such a general scope, is the very limited acquaintance which the author seems to have with French and English literature. The greater part of the discoveries for instance of Dr. Montagne, not to mention a host of other algologists, both in France and England, and those recorded mostly in works of easy access, are not so much as mentioned, and genera which have been characterized years since are treated as if they were but now extracted from the chaos. This is the more to be lamented, because no part of botany perhaps has suffered so much as algology, from the circumstance of writers, even such as Agardh, not being fully acquainted with the literature of the day ; in consequence of which a master-hand is requisite to produce a nomenclature, which would meet with universal approbation, at once consistent with the laws of priority and free from all spirit of partiality ; and this can only be done by the acknowledged excellence of some general work upon the subject, or by a special memoir undertaken with the express view of reconciling differences.

At the same time it is but just to state, that the author adverts himself to the difficulties under which he laboured in this respect in consequence of his being located where he had the advantage of a very limited library only, and doubtless some of these faults will be remedied in his future labours. The *Diatomaceæ* are not included in the work, but will form a distinct treatise, for which the author is preparing copious illustrations.

Notwithstanding the drawbacks mentioned above, there cannot be a doubt that the work will have a most beneficial influence upon science ; and it is not merely to the algologist that it will prove interesting, but to all who study the structure of plants. The cellular tissue is very various and abounds in points of interest ; there is even in some *Algæ* a close approach to the dotted cells, to which attention has been directed so much by Mohl and others.

The differences in the arrangement and development of the fructification are far more numerous than might be expected, and present characters as various as they are important, and fully justify the anticipation of Fries, put forth at the same time with the opinion which we before noticed as to the state of algology, that the fructification would in process of time afford the best and most natural means of arrangement.

One of the most interesting points afforded by the work is the means which it gives of judging of the correctness of Decaisne's theory of the identity of the spores and tetraspores in *Floridea*, and of the propriety of his division into Aplospores and Chorisporos. Our impression is, that in the end this will be found untenable ; but even should this be the result of mature judgement, we shall not think

that it will at all detract from the merit of Decaisne, or from the obligations which the algologist will owe to him. Not only in any case will his theory be regarded as most ingenious and as indicative of great powers of observation, but algologists will have to thank him, in combination indeed with one or two of his countrymen (not forgetting the younger Agardh), for showing how Algæ ought to be studied, and will acknowledge his title to be regarded as one of the prime leaders in the new school of algology.

*Synopsis Floræ Germanicæ et Helveticæ.* Auctore G. D. J. Koch.  
Editio 2. Pars I. 8vo. Frankfort, 1843.

This is the first portion of a new edition of Koch's extremely valuable 'Synopsis,' and we rejoice to add that the second and concluding part is in active preparation. The whole work has been carefully revised, and we find very numerous alterations and improvements, although we fear that some of the plants newly introduced as species will not sustain the rank to which they have been raised. This half of the volume extends to 452 pages, and, following the arrangement of the former edition, includes the natural orders as far as the middle of the *Compositæ*. Any recommendation of the work is quite unnecessary; it and its author are too well known to require it.

#### PREPARING FOR PUBLICATION.

*A History of the Fossil Insects in the Secondary Rocks of England.*  
By the Rev. P. B. Brodie, M.A., F.G.S. The author proposes to connect the results of his investigations in this interesting branch of fossil zoology, illustrating the text by numerous plates of the most characteristic specimens in his large collection of insect remains.

Subscribers' names will be received by the publisher, Mr. Lee, Bookseller, High Street, Cheltenham.

*The Ray Club.*—Under this name it is proposed to institute a Society for the objects explained in the following prospectus. Persons intending to become members are requested to forward their names and addresses, at their earliest convenience, to Dr. Geo. Johnston, Berwick-upon-Tweed, who has consented to act as Secretary until the feasibility of the project has been ascertained, and a Council appointed.

*Prospectus.*—I. The Ray Club shall have for its object the promotion of Natural History by the printing, and circulation among its members, of original works on Zoology and Botany; of new editions of works of established merit; of rare Tracts and MSS. which throw light on the history of these branches of science; and of translations of such foreign works as tend more directly to illustrate the Zoology and Botany of the British Islands.

II. Every subscriber of one guinea annually, payable in advance, to be a member of the Club, and to have a vote in the election of its office-bearers. The first payment to become due on the 2nd of February 1844.

III. The management of the Club shall be vested in a Committee or Council of thirteen members. The Secretary to be *ex officio* a member of the Council, and to be paid such amount of salary as to the Council may appear to be a fair remuneration of the trouble attached to the office.

IV. The annual subscription shall be deposited in a chartered Bank in the name of the Secretary and two members of the Council; and the fund shall be exclusively applied in publishing such works as the Council shall sanction.

V. The accounts of the receipt and expenditure of the Society shall be examined annually by two Auditors appointed by the Council,—the Auditors to be members of the Club who are not members of Council,—and their statement circulated among the subscribers.

VI. The Publications of the Club shall be confined to members only, excepting in cases where the Council may otherwise determine by a unanimous vote. When the work selected is original, an arrangement may be made with the author for extra-copies,—the Club being always secured against any charge for the same.

VII. The number of volumes to be printed annually must depend on the amount of subscriptions, and the size and nature of the volumes selected; but the Council will be directed to divide the fund as equally as possible in the printing of the Botanical and Zoological departments. At least one volume in Zoology and one in Botany should be published annually.

VIII. The works which the Club shall endeavour to print may be arranged under the following heads:—

(1.) Original works in Zoology and Botany, more especially such as illustrate the Natural History of Great Britain and Ireland.

(2.) A uniform edition of approved works which, when chronologically arranged, shall present a complete and perfect view of the progress of the Natural History of the British Islands. The works selected to be edited by competent individuals, who may add prefaces and notes where these may be thought necessary.

(3.) The collection of Memoirs, Essays, Tracts, &c., scattered in the Transactions of learned Societies and elsewhere, into convenient volumes, and on a systematic plan.

(4.) The MSS. preserved in the British Museum, and other public repositories, relating to the Natural History of Great Britain, &c.

(5.) A Systematic History of the Zoology and Botany of the British Islands.

(6.) A 'Systema Naturæ.'

(7.) A Descriptive and Systematic Catalogue of all printed books in Zoology and Botany.

N.B.—These rules, &c. are to be understood as provisional, and are intended only to give an idea of the objects for the accomplishment of which the Ray Club is projected. If the Club meets with that support from naturalists which it seems to merit, more efficient and better defined rules may be made by the Council, whose election will be in the hands of the members in general.



## ROYAL SOCIETY OF EDINBURGH.

The first ordinary meeting of the 61st session of the Society was held on Monday the 4th of December at 8 P.M.

Sir T. Makdougall Brisbane, Bart., President, in the Chair.

Professor Christison read a paper having the following title:—"On the Influence of various circumstances in Vegetation upon the Activity of Plants." Part II. The Umbelliferous Narcotics, of which the following is a summary:—

In the first part of this inquiry the author gave an account, in 1840, of some observations made by him as to the influence of season on the activity of the acrid plants of the natural family *Ranunculaceæ*, and of the narcotics belonging to the family *Drupaceæ*. In the second part now laid before the Society he proceeded to relate a series of experiments instituted by him with the view of determining the influence of season on the activity of the poisonous narcotic plants of the family *Umbelliferae*.

The plants belonging to this family are for the most part aromatic and stimulant, and destitute of poisonous properties. In four species only have narcotic properties been unequivocally recognised, viz. *Conium maculatum*, *Oenanthe crocata*, *Cicuta virosa* and *Æthusa Cynapium*; but these are universally held to be highly energetic.

1. The *Conium maculatum*, Common Hemlock. No accurate information is yet possessed as to the influence of season on the activity of this species; for all investigations on the subject are vitiated by the uncertain strength of its preparations, and the ignorance which prevailed till very lately as to the conditions required for securing their uniformity. The author has found by experiment, as Professor Geiger had already been led to conclude, that every part of the plant is poisonous,—the root, the leaves, and the fruit; and that the root is least active, the leaves much more so, but the fruit most active of all. The root is commonly held to be most active at Midsummer, when the plant is in full vegetation and coming into flower; but this belief is founded only on a single, and not altogether conclusive experiment made by Professor Orfila. The author found this part of the plant to be so feeble at all times, that its respective energy at different seasons could not be satisfactorily settled. The expressed juice of twelve ounces of roots had no appreciable effect on a small dog at the end of October or towards the close of June; but an alcoholic extract of six ounces at the beginning of May killed a rabbit in thirty-seven minutes when introduced into the cellular tissue. The leaves are commonly thought to be most energetic when the plant is coming into flower at Midsummer, and to be very feeble while it is young. The author finds it to be probable that the leaves are very active at Midsummer; but he has likewise observed, that they are eminently energetic in the young plant both at the beginning of November and in the month of March, before vegetation starts on the approach of genial weather; thirty-three grains of a carefully prepared alcoholic extract, representing one ounce and a third of fresh leaves, killed a rabbit in nine minutes when introduced into the cellular tissue. The fruit is most active when it is full-grown,

but still green and juicy; it then yields much more of the active principle Conia than afterwards, when it is ripe and dry. The author added, as a fact contrary to general belief, that he had found the ripe seeds of hemlock and an alcoholic extract of the leaves to sustain no diminution in energy by keeping, at all events for eight years.

2. *Ænanthe crocata*, Dead-tongue. This species is universally considered to be the most deadly of all the narcotic *Umbelliferae*. Many instances of fatal poisoning with its roots have been published during the last two centuries in the various periodicals of Europe. It has repeatedly proved fatal in two hours; and a portion no bigger than a walnut has been thought adequate to occasion death. Fatal accidents have occurred from it in England, France, Holland and Corsica. The root would seem from these cases to be the most active part; but few observations are on record as to the effects of the leaves, and none as to the fruit. The root appears from these cases to be very active in all seasons,—at least at the beginning of January, the end of March, the middle of April, June and August.

The author proceeded to inquire carefully into the effect of season upon this species, as it grows wild in the neighbourhood of Edinburgh; but he was surprised to find that every part of the plant in this locality is destitute of narcotic properties at all seasons. The juice of a whole pound of the tubers, the part which has proved so deadly elsewhere, had no effect when secured in the stomach of a small dog, either at the end of October, when the tubers are plump and perfect, but the plant not above ground, or in the month of June, when it was coming into flower; and an alcoholic extract of the leaves, and that prepared from the ripe fruit, had no effect whatever when introduced into the cellular tissue of the rabbit under the same conditions in which the common hemlock acts so energetically. By a comparative experiment he ascertained, that tubers collected near Liverpool, where one of the accidents alluded to above happened in 1782, acted with considerable violence on the dog; and he briefly noticed some experiments made at his request by Dr. Pereira with the *Ænanthe* of Wernich, showing that there also it is a powerful poison to the lower animals. Climate seemed to the author to furnish the only adequate explanation of these extraordinary differences; yet the plant grows in all parts of Scotland with great luxuriance.

3. *Cicuta virosa*, Water-hemlock. This species has been also held to be a deadly poison ever since an express treatise on its effects was published by Wepfer in 1716; and repeated instances of its fatal action have been observed since, and some of these very recently, in Germany. The root is the only part which has given occasion to accidents: it has proved fatal in two hours and a half. Nevertheless this plant too seems innocuous in Scotland, or nearly so, although, like the last species, it grows with great luxuriance. The juice of a pound of the roots, collected at the end of July while the plant was in full flower, produced no narcotic symptoms; and the only effects observed, namely efforts to vomit, might have arisen from the operation which is necessary to secure the juice in the stomach. An alcoholic extract of the leaves collected at the same time, and a simi-

lar preparation made with two ounces of the full-grown seeds while still green and juicy, had no effect whatever when introduced into the cellular tissue of a rabbit, except that inflammation was excited where the extract was applied.

4. The author has not yet had an opportunity of trying the effects of the fourth species, *Æthusa Cynapium*, or Fool's-parsley.

#### WERNERIAN NATURAL HISTORY SOCIETY.

The first meeting of the season of this Society was held in the College on Saturday the 16th of December, at 2 P.M.

Professor Jameson, President, in the Chair.

1. The first paper read was upon "The Temperature of the Firth of Forth, and on the Specific Gravity of its Water," by Dr. John Davy, F.R.S.L. & E.

After consideration, the Society resolved to institute measures whereby this interesting subject might be still further prosecuted.

2. The next communication was entitled "A Short Account of the Mode of Reproduction of Lost Parts in the Crustacea," with illustrative drawings, by Harry D. S. Goodsir, Esq., Conservator of the Museum of the Royal College of Surgeons, Edinburgh. The following is a short analysis:—

It has been long known that the animals belonging to this class have the power of reproducing parts of their body which have been accidentally lost. If one of the more distal phalanges of a limb be torn off, the animal has the power to throw the remaining part of the limb off altogether. This separation is found to take place always at one spot only, near the basal extremity of the first phalanx. The author has discovered that a small glandular-like body exists at this spot in each of the limbs, which supplies the germs for future legs. This body completely fills up the cavity of the shell for the extent of about half an inch in length. The microscopic structure of this glandular-like body is very peculiar, consisting of a great number of large nucleated cells, which are interspersed throughout a fibro-gelatinous mass. A single branch of each of the great vessels, accompanied by a branch of nerve, runs through a small foramen near the centre of this body, but there is no vestige either of muscle or tendon, the attachments of which are at each extremity. In fact, this body is perfectly defined, and can be turned out of the shell without being much injured.

When the limb is thrown off, the blood-vessels and nerve retract, thus leaving a small cavity in the new-made surface. It is from this cavity that the germ of the future leg springs, and is at first seen as a nucleated cell. A cicatrix forms over the raw surface caused by the separation, which afterwards forms a sheath for the young leg.

3. The third paper was "On the Dislocation of the Strata and Beds in the Coal-fields of Scotland," by James Robertson, Esq., Mining Engineer, with an extensive series of illustrative drawings. From the length of this valuable communication a portion of it only could be read.

## ZOOLOGICAL SOCIETY.

February 28, 1843.—William Horton Lloyd, Esq., in the Chair.

A letter from J. E. Gray, Esq., addressed to Mr. Waterhouse, was read, containing an account of two new species of Bats, a species of the family *Hystriidae*, and a new *Manis*.

The two specimens of Bats to which Mr. Gray's observations refer, are from Hayti, and were presented to the Society by J. N. Tweedy, Esq., Corresponding Member.

One, Mr. Gray observes, constitutes a second species of the genus *Chilonycteris*, which he had founded upon some specimens brought from Cuba by W. S. MacLeay, Esq.\*, and agrees in almost every particular with *Chilonycteris MacLeayi*, but differs from the three specimens of that species contained in the collection of the British Museum in being of a much darker colour, and in having the ears larger and rather narrower. The principal characters are as follows:—

*CHILONYCTERIS FULIGINOSUS.* *Chi. supra fuliginosus, fusco-tinctus, subtus fuscescens, gula femoribusque ad basin rufescentibus; auribus elongatis, attenuatis, acutis.*

	unc. lin.
Longitudo ab apice rostri ad caudæ basin ..	1 8
———— caudæ .....	0 10
———— auris .....	0 5 $\frac{3}{4}$
———— antibrachii .....	1 7
Alarum amplitudo .....	8 10

*Hab.* Hayti.

The second species, Mr. Gray remarks, is more interesting, since it proves to be a new genus, readily characterized by the size and structure of the ears, and the length of the tail. It agrees most nearly with the genus *Macrophyllum*, but differs from it in having the last joint of the tail produced beyond the edge of the large truncated interfemoral membrane; the tail in the species of the genus last mentioned only extending to the edge of the membrane. Another important difference consists in the large size of the ears and their union on the upper surface of the head—a character which is the more remarkable, since it affords an exception to the rule which has hitherto been general, viz. that the Bats with a simple nose-leaf (*Phyllostomina*), which are inhabitants of the New World, have the ears separate and confined to the sides of the head, whilst those found in the Old World have them united as in this genus from Hayti, which thus unites the Glossophagine genera of this tribe with the *Rhinopomæ* of India and Africa. The large size of the ears suggests for this genus the name

## MACROTUS.

Ears large, lateral, slightly plaited, united over the head by a rather high transverse membrane. Tragus elongate, acute; lobule broad and divided from the conch by a slight nick. Nose-leaf lanceolate, erect; the front margin distinct. Lower lip with a narrow, tri-

\* See Annals and Magazine of Natural History, vol. iv. p. 4.

angular, smooth-edged wart, grooved in front. Wings broad; thumb rather elongated; the first joint webbed. Interfemoral membrane large, truncated; the heel-bones long; feet free to the ankles; largest toes subequal. Tail elongate, tapering, enclosed in the membrane with the exception of the last joint, which is produced beyond the edge.

MACROTUS WATERHOUSII. *Macr. colore murino, abdomine pallidiore; prosthemate lanceolato.*

	unc.	lin.
Longitudo ab apice rostri ad caudæ basin . .	2	6
———— <i>caudæ</i> . . . . .	1	2
———— <i>auris</i> . . . . .	1	2
———— <i>pollicis</i> . . . . .	0	6½
———— <i>prosthematis</i> . . . . .	0	5
———— <i>antibrachii</i> . . . . .	2	2
———— <i>tibiæ</i> . . . . .	0	11
———— <i>calcaris</i> . . . . .	0	6

*Hab.* Hayti.

The interfemoral membrane, in this Bat, has a muscular band on each side, situated about one-third of the distance between the base of the tail and the heel-bone. The ears are rounded at the apex, and slightly hairy. The tragus is of an ovate-lanceolate form, has an acute tip, and a very indistinct notch near the base on the outer side.

Mr. Gray has since received specimens of this species from Jamaica, where it was discovered by Dr. Parnell; this and the two following species are indicated under the name here used in the recently published list of the Mammalia in the British Museum.

Mr. Gray next proceeds to make some observations upon a species of Porcupine in the collection of the British Museum. This animal is the *Hystrix subspinosus* of Lichtenstein, and has been described under that name by Kuhl. It however presents various important modifications in the structure of the skull and teeth, upon which Mr. Gray thinks it desirable to establish a new genus under the name of

CHÆTOMYS.

The body and limbs are covered with subequal, short, and rather flexible spines. The tail is of an elongate conical form, and provided with rings of square scales and scattered bristles.

The skull is short, and has broad, convex, swollen zygomatic arches, and the palate is contracted. The cutting teeth are rounded in front; the grinders are  $\frac{4-4}{4-4}$ ; each grinder of the upper jaw has two principal folded plates of enamel and a smaller transverse fold between them. The lower grinders are oblong, and the foremost of these teeth presents two roundish rings of enamel, each of which has an internal fold, and the hinder ring has moreover a small fold on the fore part of the outer side. Each of the other molars in this jaw is furnished with two sinuous folds on the inner side and one on the middle of the outer edge. Of this animal (which is from Brazil) a

figure will be found in the 'Abbildungen' &c. of the Prince de Neuwied.

The new species of *Manis* referred to in the letter is from Western Africa, and is at once distinguished, Mr. Gray observes, from the *Manis tetradactyla* (which it most nearly approaches) by its having the tail rather shorter—that is, about half as long again as the body—and double the number of series of scales on the body, and also by the scales being more acute, and furnished each with three sharp points. Two specimens of this species, of different sizes, are contained in the British Museum collection. It is named by Mr. Gray

*MANIS MULTISCUTATA.* *Manis caudâ corpore multum longiore; squamarum dorsalium elongatarum, tricuspidum, ad basin striatarum, seriebus 23.*

*Hab.* Western Africa.

Mr. Gould exhibited a new species of Australian Heron:—

*ARDEA RECTIROSTRIS.* *Ardea supernè fuscescenti-cinerea, capite et cristâ nigris; rostro magis recto atque robusto quàm in Ardeâ cinereâ.*

Crown of the head and crest dull black; back of the neck and all the upper surface brownish grey, passing into greyish white on the tips of the wing-coverts; secondaries, scapularies and tail-feathers dark grey; spurious wing and primaries greyish black; sides of the face and chin white; down the front of the neck an interrupted line of black, formed by each feather having an oblong stripe of black on the inner side of the stem near the tip, the marks becoming larger and paler in colour as they approach the chest, the same kind of marking continuing over the under surface, but the stripes very pale brown; under tail-coverts white; bill dark horn-colour, becoming nearly black on the culmen; feet greenish black.

Total length, 37 inches; bill, 7; wing,  $16\frac{1}{2}$ ; tail, 7; tarsi,  $6\frac{1}{2}$ .

*Hab.* New South Wales.

The above description is taken from a bird which appears to be immature; it has much the appearance of, and is nearly allied to, the Common Heron of Europe.

A communication from Mr. Hinds, containing descriptions of two new species of Shells, from the collection of Hugh Cuming, Esq., was then read.

GENUS *TRIPHORIS*, Deshayes, Hinds, Ann. Nat. Hist. vol. xi. p. 16.

*TRIPHORIS PAGODUS.* *Tri. (Ino) testâ cylindraced, elongatâ, acuminatâ, anfractibus 18–20, tricarinatis; carinis inæqualibus, inferiore multo maximâ, duobus superioribus parvis æqualibus; aperturâ quadratâ. Axis  $8\frac{1}{2}$  lin.*

The only specimen of this shell is dead and imperfect. It is, however, slightly mottled with brown, being most probably the remains of an uniform colour. It is rendered very distinct from any species hitherto described by the manner of its keeling. A faint elevated line would also appear to traverse the course of the suture.

*Hab.* Baclayon, island of Bohol, Philippines. Found under stones at low water.

TRIPHORIS COLLARIS. *Tri.* (*Mastonia*) *testá ovatá, acuminatá; anfractibus duodecim biserialim granulosis, serie inferiore paululùm maximá, margaritacéá, superiore pallidè fuscá; anfractu ultimo quadriseriatim subæqualiter catenato.* Axis 4 lin.

*Hab.* Island of Corregidor, Philippine Islands.

Found among coarse sand at a depth of six fathoms.

Many of these small shells have received an injury which has destroyed the mouth, and the present specimen has not escaped.

Descriptions of some new species of the Genus *Lima*, in the collection of H. Cuming, Esq., by G. B. Sowerby, Jun., were read.

LIMA CUMINGII, Nob. Thes. Conch. pl. xxii. f. 25. *Lim. testá tenui, parvâ, ventricosâ, obliquè ovato-subelongatâ utrinque ferè clausâ, ad marginem posticum subangulatâ, ad marginem ventralem subquadratâ; cardine brevi; auriculis obtusis; umbonibus inflatis; striis in medio duodecim elevatis, distantibus, ad marginem ventralem dentatis: colore albo.*

Long. 0·25; lat. 0·12; alt. 0·35.

*Hab.* Bolinao, Ins. Luzon Philippinarum. H. Cuming legit.

I have seen only one specimen of this very distinct small shell, which differs from *L. fragilis* (Chemn. t. 68. f. 650.) in being more ventricose, and having the margin nearly closed all round. In the latter respect it resembles *L. Loscombi*, Leach (*Bullata*, Turton).

Found in sandy mud: ten fathoms.

LIMA ANGULATA, Nob. Thes. Conch. pl. xxii. f. 39, 40. *Lim. testá obliquè ovatâ, ventricosâ, radiatim striatâ, utrinque paululùm hiante, ad marginem posticum angulatâ, ad marginem ventralem obliquè rotundatâ, propè umbones angustatâ; cardine brevi; auriculis parvis, posticâ acutâ: colore albo.*

Long. 0·90; lat. 0·60; alt. 1·10.

*Hab.* Panama. H. Cuming legit.

In form resembling *L. Loscombi*, from which it differs in having an hiatus on both sides, and a rather strong angle at the base of the posterior lateral margin. Collected at Panama, in sandy mud, at twelve to twenty fathoms.

The following descriptions of new species of *Cypræa* were communicated by J. S. Gaskoin, Esq.

CYPRÆA SAULÆ. *Cyp. testá oblongo-ovatâ, anticè subattenuatâ, fulvescente fusco punctulatâ, maculâ magnâ medianâ dorsali, maculisque parvis lateribus castaneis; basi subrotundatâ, pullescente; apertura angustâ, subflexuosâ, anticè latiusculâ; columellâ posticè subgibbosâ; dentibus prominulis albidis interstitiis aurantiacis; extremitatibus prominentibus subreflexis; marginibus prominentibus subangulatis; spirâ profundè umbilicatâ.*

Shell oblong-ovate, gradually attenuating towards the anterior end, quite smooth; of a very light fawn or light flesh-colour, dotted distinctly and irregularly with small chestnut-brown spots, with much

larger ones on both margins, and a remarkably large spot of the same colour about the centre of the *dorsum*: base rather round, of a very light reddish yellow colour: aperture rather narrow, slightly flexuous, somewhat wider towards the anterior extremity: *columella* rather gibbous at the posterior half of the shell; no columellar groove: teeth rather bold, whiter than the base, even, excepting those at the anterior end of the *columella*, where they are larger: *all* terminate externally on the *columella* in an even line at the edge of the aperture, and within, also in an even line, on the *columella*, except two or three at the anterior end, which advance a little more inwards; those on the lip are even, and extend a little over it, outwards; in number they are from sixteen to eighteen on the columellar side, fourteen to sixteen on the lip; interstices between the teeth and between the extremities more or less of an orange colour: extremities produced, the posterior curving towards the *columella*; the posterior outer beak longer than the inner, the anterior very slightly so: margins, the outer prominent, angular, more so towards the anterior extremity; the inner exists but on the anterior third of the shell, and is also prominent and angular; a groove across the anterior end, from the depression formed on either side by the projecting margins, and termination of the channel reflecting outwards: spire umbilicated, with a notch or groove on the columellar side, from a partial reflection of the posterior channel: internal colour light reddish brown. I have seen but four examples of this shell, two perfect and two decorticated. Axis,  $\frac{7}{8}$ ths; diameter,  $\frac{4}{8}$ ths of an inch.

*Hab.* Island of Corregidor, Bay of Manilla. Found in coarse sand and gravel at seven fathoms.

In the collection of H. Cuming, Esq.

*Decorticata* light brown colour; large darker spot in the centre of the *dorsum* well-marked; a brown spot on the outside of each anterior extremity; aperture much paler than in the perfect shell.

I know no species with which this elegant shell could be confounded; the remarkable, large, well-defined spot on the *dorsum*, the orange (more or less) coloration between the teeth and beaks, and its gradually attenuating graceful form, distinguish it from all others.

Mr. Cuming, whose valuable labours in the service of natural history were rewarded, *inter alia*, by the discovery of this shell, during their four years' continuance in the Philippine Islands, has requested me to name it after an amiable and liberal collector, Miss Saul, and it has afforded me much pleasure to comply with his wish.

CYPRÆA LEUCOSTOMA. *Cyp. testâ ovatâ, ventricosâ, fusco-cinereâ; lateribus maculatis, maculâ magnâ irregulari dorsali castaneâ, lineâ dorsali pallidâ percurrente; marginibus rotundatis crassis; extremitatibus posterioribus crassis prominentibus dextro præcipuè, anticis convergentibus; basi rotundatâ, albicante margine interno labii nonnunquam obtusè dentatâ, columellâ edentulâ.*

Shell ovate, gibbous, smooth; of a brownish ash-colour, spotted on each side with darker spots, the general ash-brown colour on the sides declining in intensity ultimately to whiteness; a large chestnut-brown, irregular, splashed, or dotted spot on the *dorsum*; in some



instances more confined and small; where the spot is deepest coloured and largest, the ground on which it is formed is nearly white; posterior part of the *dorsum* irregular, slightly tuberculated, dorsal line marked, nearly white (and in some instances appears both anteriorly and posteriorly to bifurcate), diverging anteriorly towards the columellar side: base white, roundish: aperture rather wide, flexuous, columellar groove on the anterior half of the shell; the porcelain covering on the gibbous portion of the *columella* extremely thin; *columella* smooth: teeth generally but slight denticulations; sometimes more perceptible on the lip: extremities, posterior, much produced, very obtuse, wide apart, columellar beak divergent; anterior, rather thick, converge at their points towards each other: margins round, light-coloured or white, spotted to the base; outer margin sometimes uneven, or somewhat nodulated: spire, in all the specimens I have seen, quite covered and obliterated: colour, internally, light grayish blue. Axis  $1\frac{7}{8}$  inch; diameter  $1\frac{2}{8}$  inch.

*Hab.* Mocha. In the collection of Mr. Gaskoin, Cuming, &c.

This shell approximates in general appearance to *Cyp. Mus*. Some years ago one of this species (*leucostoma*) came accidentally into my possession, which on comparison I found incompatible with *Mus*; and shortly afterwards another, which warranted the distinctive nomenclature. Mr. Sowerby has lately obtained five other specimens, and with them fortunately a knowledge of their locality, which I have quoted. These are now dispersed in the cabinets of Messrs. Harford, Cuming, Stainforth, Norris, and Miss Saul; two others are known to be in the cabinet of Mr. Owen at Manchester.

This species differs from *Mus* in being more gibbous; in the prominent and very blunted posterior extremities, the base and aperture being white; denticulations but very slightly indicated, or absent, and always white.

I have named this *leucostoma*, in contradistinction to that which it most nearly resembles, the *Cyp. Mus*, with its dark-coloured aperture.

Mr. Fraser exhibited and described a new species of Bat, belonging to the genus *Rhinolophus*, and four new species of Birds from Western Africa.

RHINOLOPHUS MARTINI. *Rhin. auribus magnis apud frontem inter se spatio angusto sejunctis; rostro fossâ oblongâ supernè, anticè quatuor appendiculis carneis, vix elevatis (duobus utrinque), tectâ: prosthemate nasali longitudinalitèr diviso; fossâ frontali posticè culmine semicirculari dense vellere induto, collimetatâ; caudâ longâ et cartilagine bifurcâ terminatâ; patagio ad pedes basim solummodò ducto: colore cinereo-fusco, subtùs canescente.*

	unc.	lin.
Long. tot. . . . .	3	5
Volatûs amplitudo . . . . .	10	0
—— latitudo maxima . . . . .	2	4
Antebrachium . . . . .	1	6
Auris . . . . .	0	9
Cauda . . . . .	1	7

*Hab.* Fernando Po.

This species of *Rhinolophus* is remarkable for having the complicated fleshy appendages of the muzzle divided in the longitudinal direction. Each half of this apparatus is composed of two leaflets, the margins of which are free, though but little elevated; the foremost of these is shaped somewhat like the human ear, and terminates in front in a small prominent lobe, which is situated over the opening of the nostril; the second or hindermost leaflet on each side approaches to a circular form. Upon separating these four leaflets a large pit is observable on the upper surface of the muzzle, and the hinder margin of this pit terminates in a nearly semicircular and slightly elevated fleshy ridge, which is densely clothed with fur. The ears are large, rounded at the extremity, but inclining to a pointed form, and separated from each other on the top of the head by a space of about two and a half lines in width; on the inner side, and towards the base, is a narrow oblique ridge: the tragus is about two and a half lines in length, narrow, rounded at the extremity, and somewhat dilated near the base on the outer margin. The wing and interfemoral membranes join the foot at the base; the latter extends to the extremity of the tail, which terminates in a bifurcated cartilage; numerous minute papillæ are observable on the margin of the interfemoral membrane. The general colour of the animal, in spirit, is gray-brown, but with an ashy tint on the under parts of the body, and is darker than that of the *Rhinolophus Hipposideros* of authors.

**GLAREOLA CINEREA.** *Glar. supernè cinerea, collo rufo, corpore subtùs albo rubro tincto, lined nigrâ pone nares oriente sub oculos et per plumas auriculares albas ductâ, caudâ tectricibus albis; reatricibus caudæ singulis notâ nigrâ versus apicem; remigum primarum pogoniis internis albis; secundariis albis apicibus nigris; rostri ad basim flavo, apice nigro.*

Long. tot.  $6\frac{1}{4}$  poll.; rostri,  $\frac{3}{4}$ ; alæ,  $5\frac{1}{2}$ ; caudæ,  $2\frac{1}{2}$ ; tarsi,  $\frac{7}{8}$ .

*Hab.* The mouth of the River Nùn.

In some specimens (probably the young) the black stripe on the side of the head, the rufous neck, and the red tinge on the under surface is wanting.

This species is nearly allied to *Glareola lactea* (Temm. Pl. Col. 399), but in that bird the black mark on the side of the head only extends from the nostril to the eye, whilst in the present species the black line passes under the eye and extends backwards and downwards over the ear. The *G. cinerea* differs moreover from the *G. lactea* in having a rufous neck; the rufous tint of the chest is more distinct, the back is of a deeper gray colour, and the legs, as well as the base of the bill, are yellow.

**ANTHUS GOULDII.** *Ant. supernè fuscus, subtùs pallidior tincturâ ferrugineâ, gulâ albâ, remigibus et tectricibus alarum ferrugineo-marginatis, caudâ corpore intensiore; reatrice externâ ferrugineâ; rostro pedibusque flavis.*

Long. tot. 7 poll.; rostri,  $\frac{5}{8}$ ; alæ,  $3\frac{5}{8}$ ; caudæ, 3; tarsi, 1.

*Hab.* Cape Palmas.

**ESTRILDA RUFOPICTA.** *Estr. supernè fusca, fronte, facie, gula, et pectore cum tectricibus caudæ vinaceis; hoc colore corpore reliquo inferiore, et caudæ supernè tinctis; alarum tectricibus inferioribus flavido-albis; guttis minutissimis perpaucis albis apud pectus; rostro rubro, culmine nigro.*

Long. tot.  $3\frac{3}{4}$  poll.; rostri,  $\frac{5}{8}$ ; alæ,  $1\frac{7}{8}$ ; caudæ,  $1\frac{5}{8}$ ; tarsi,  $\frac{1}{2}$ .

*Hab.* Cape Coast.

**IXOS INORNATUS.** *Ix. fuscus, capitis et caudæ colore intensiore; corpore subtùs sordide albescenti-fusco.*

Long. tot. 8 poll.; rostri,  $\frac{5}{8}$ ; alæ,  $3\frac{5}{8}$ ; caudæ,  $3\frac{1}{2}$ ; tarsi,  $\frac{5}{8}$ .

*Hab.* Cape Coast.

## MISCELLANEOUS.

### DESTRUCTION OF TREES BY SCOLYTUS.

M. ROBERT has written to the French Academy of Sciences respecting some observations which he had made on trees attacked by *Scolyti*, and on several elms in particular of the grand avenue of the Champs Elysées. "These trees," says he, "appear to be in a good state of vegetation; their leaves fall neither earlier nor quicker than those of the neighbouring trees which have been less damaged by the insects; and nevertheless, if the bark of the trunk be examined carefully, it will be seen that at about a metre from the soil a circular band of this bark, from two to three metres in breadth, is not only completely killed in consequence of the ravages of the *Scolytus*, but that the liber is also destroyed and converted into humus, and perhaps even the liburnum has begun to be altered."—*Comptes Rendus*, No. 20, p. 1146.

### DEMODEX FOLLICULORUM.

The following interesting notice is an abstract of a communication read by Mr. Tulk before the Microscopical Society, December 20, 1843:—

During the present month, Mr. Topping, the ingenious preparer of microscopic objects, showed me some remarkable parasites found by him in examining the contents of the pustules in a "mangy" dog, and which I at once recognised as belonging to the genus *Demodex* (Owen), which was first discovered, described and figured by Dr. Simon of Berlin as inhabiting the sebaceous sacs and hair follicles of the human skin. It would be difficult to determine whether the present parasite existed in a similar situation, as the animal was such a perfect mass of disease; but as the hairs had fallen off in most places, leaving the pustular and scabby surface of the skin exposed, it is not improbable that it had been developed within their follicles. These parasites were very abundant, sometimes as many as thirty to forty in a single drop of pus, among the globules of which their presence is readily indicated by an appearance of pale semitransparent lines, broad at one end and tapering to an obtuse point at the other.

Through the kindness of Mr. Erasmus Wilson I had an opportunity of comparing the above specimens from the dog with those of the human skin, to ascertain whether they constituted a distinct species. The differences however, chiefly of size, which existed between them,—and in this respect the human *Demodices* vary much even among themselves,—did not enable me to arrive at any definite conclusion, though the analogy of other parasites found on different animals would be in favour of their being regarded as separate species. I have preferred the generic name, *Demodex*, expressive of its habitat, given by Prof. Owen, to that of *Acarus* by Dr. Simon, or *Entozoon* by Mr. E. Wilson, as the former implies a relation to a tribe of Arachnida, not warranted certainly from the general form, the multi-articulate condition of the abdomen, and other details of the external anatomy; while that of *Entozoon* is objectionable from the term having been hitherto restricted to a class of parasites infesting the visceral cavities of other animals.

#### KENTISH BIRDS.

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

Margate, Nov. 1843.

GENTLEMEN,—Some time having elapsed since my last letter, I write to communicate what has fallen in my way during the summer. I have shot several Kentish plovers, and also procured some of the eggs, and the young in the downy state: they were taken on the shingle near Sandown Castle; also three specimens of the Wood Sandpiper, *Totanus Glareola*. These birds only visit us in the spring and autumn; they arrive with the other Sandpipers, but are found more inland by small running streams.

Woodcocks, *Scolopax*, have been very common about the commencement of the present month.

*Tringa subarquata*, or Pigmy Curlew, rather plentiful on Sandwich Flats about the 18th of October; they only staid for about two days, and were so tame that I brought down eleven in one shot.

The Purple Sandpiper, *Tringa maritima*; only a few of these birds have made their appearance this season, owing to the mildness of the weather, as about this time of the year we generally have them plentifully.

Little Stint, *Tringa minuta*, has been very common all along the coast; but more particularly about Sandwich haven I procured a great many.

A few of the Lesser Tern, *Sterna minuta*, have bred this year on the shingles about the North-shore station; I took a few of their eggs, but the parent bird I allowed to escape, hoping to see them another season in the same locality, for I am much pleased to see these little birds hawking and fishing only a few yards off, and to observe with what dexterity they dart under the water and bring up their prey, and bear it off to their strong-looking young, which have much the appearance of young hawks, moving about among the stones. When they can just begin to fly it is also very amusing to see the

parent birds guard them; if a dog by chance comes near them, they will dart and strike him very hard and drive him off the beach. On the 20th of August, being out shooting on Sandwich haven, my attention was drawn to a large bird sitting on a post or land-mark close to the mouth of the river. I got within about seventy yards, but did not succeed in bringing it down; I kept up a close pursuit the rest of the day, but could not get near enough for a second shot. Next morning, when I returned to the Flats, it was brought to me by one of the boys from the Coast-guard station, who had picked it up: it was a beautiful specimen of the Osprey. It is now in the Margate Museum, as most of the birds named here. On dissecting the bird it was wounded in the neck and had bled to death.

I am, Gentlemen, your obedient Servant,

8 Cecil Street.

S. MUMMERY.

DESCRIPTION OF TWO GREEN-STREAKED WRASSES (*LABRUS LINEATUS*,  
FLEMING).

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

Rooms of the Devon and Cornwall Natural History Society,  
Plymouth, November 7, 1843.

Irides and pupil green, with margins of orange. A very distinct velum suspended from the palate, and just within the mouth. Nape a little depressed. Upper jaw the longer. Operculum angular. Teeth large and sharp; no palatine teeth. Lateral line nearly straight, till near the posterior part of the dorsal fin, where it is deflected, and then passes direct and horizontally to the middle of the tail. Above, the fish is grass-green; below the same, with a mixture of yellowish tint. In the posterior part of the dorsal fin there is a slight disposition to mottles of brown.

Pectoral rays, 14; dorsal, 21 + 10; ventral, 1 + 5; anal, 3 + 8; caudal, 15. Length about 6 inches.

The specimens, of which the foregoing is some description, were captured by the hook and line, among the rocks in-shore at this port, during the past summer. I have known of previous captures in the same season, and am informed by the taxidermist to this Society, that he has taken as many as six in a day when fishing in our sound with the sea-line used for Chads. An excellent preserved specimen is in this Museum. What is the meaning of the epithet "streaked" and "lineatus," as applied to this species?

CAPTURE OF A SHORT SUN-FISH (*ORTHAGORISCUS MOLA*).

In the course of last summer (in August I believe) some fishermen, employed at the distance of half a mile from the town, near Mount Batten, were surprised by the appearance near the surface of a bulky visitor of the above species, and one of them at once put out a "gaff," to which the creature in its playful movements became almost immediately attached, the hook entering at its belly. It measured four feet from above, downwards, fins included; and three

feet from the mouth, backwards. On its upper jaw, just above the mouth, is a horny and semicalcareous irregular plate. On various parts of the body were specimens of the flat white parasite figured in 'Yarrell,' and attached to the gills were several of *Cecrops Latreillii* (Leach)\*.

Liver *very* large, and of a gamboge-yellow. Heart half the size of a man's fist. The contents of the stomach could not be judged of.

I bought a specimen of the Fork-beard in Plymouth Market last June. It, with the last-named specimen, is in our collection.

J. C. BELLAMY, *Curator.*

## OBITUARY.

J. C. LOUDON, ESQ., F.L.S.

THERE are few that have lately passed away from amongst us whose loss will be more deeply felt than that of Mr. Loudon, who lately expired at his house in Porchester-terrace, Bayswater. He died of disease of the lungs, which had wasted him to a shadow; but he retained the possession of his clear distinctive faculties to the very last, and walked from the drawing-room to the bed-room, almost without assistance, a short time before he died.

The number and magnitude of his works are almost without parallel, and excite absolute astonishment when we consider the painful disadvantages under which he laboured, having lost one arm, and being deprived to a great extent of the use of the other; but nothing damped his desire of usefulness, or checked his industry. He has been known, while walking up and down his study, to dictate to two amanuenses, and that so clearly and continuously that their pens were never at rest. In all Mr. Loudon's great agricultural, and especially his floricultural works, during the last twelve years of his life, he was assisted by his wife. Mrs. Loudon was favourably known to the literary world, before her marriage, as the author of one or two novels; but she made an easy transit from the ideal to the real, and also accompanied her husband on his visits, when occupied in laying out the landscape gardens of many of the nobility, both in England and his native Scotland. Early and late—nearly day and night—he laboured, and his mind was as independent as industrious. During his last absence from home a number of individuals connected with horticulture in its various and beautiful branches assembled together, determined to show their respect for Mr. Loudon, and their appreciation of his works, by presenting him with

\* Mr. Yarrell, to whom I communicated a specimen, writes me thus:—"Your specimen is a female, and, when I first looked at her, she had several young ones crawling about the hollow cavity of the under surface of the thorax; these young ones varied in size, and resembled *Acari* in their general appearance." This specimen, prior to being sent to London, had been soaked two or three days in spirit, and had lain dead at the taxidermist's for several days previously!

some splendid testimonial of their respect; but, on his return, he publicly expressed his determination to accept of no such tribute. He seemed sent to rescue his country from the impeachment of "ay booin'," for he never bowed to what he did not feel was entitled to respect.

We have not heard his age named; but his high brow, ploughed and furrowed, and the appearance of his thoughtful face the last time we had the pleasure of seeing him, would lead us to suppose he was somewhat about sixty. He has left a widow and one daughter.

His country owes him much, perhaps more than it does to any other individual who has pursued the same walks through life. His name will be honoured and respected as long as the happiest and most interesting of human pursuits are valued.—*The Britannia*.

METEOROLOGICAL OBSERVATIONS FOR NOVEMBER 1843.

*Chiswick*.—November 1. Hazy: foggy at night. 2. Hazy: rain. 3. Foggy: very fine. 4, 5. Fine. 6. Overcast: rain. 7. Heavy rain: cloudy: clear. 8. Cloudy and fine: heavy rain: clear and frosty at night. 9. Frosty: clear. 10. Rain. 11. Fine: easterly haze: clear and frosty. 12. Cloudy and fine: clear and frosty. 13. Sharp frost: fine: cloudy. 14. Hazy: rain. 15. Frosty: very fine. 16. Clear and very fine. 17. Frosty: haze: heavy rain. 18. Fine. 19. Clear: boisterous at night. 20. Clear and windy. 21. Overcast: boisterous. 22. Hazy clouds: overcast: heavy rain. 23. Rain: clear and frosty at night. 24. Foggy: densely overcast: rain. 25. Hazy and drizzly. 26. Cloudy: boisterous at night. 27. Squally: clear and fine. 28. Very fine. 29. Clear and very fine throughout. 30. Sharp frost: hazy: drizzly.—Mean temperature of the month  $0\cdot9^{\circ}$  above the average.

*Boston*.—Nov. 1. Cloudy, with rain. 2. Foggy: rain early A.M. 3. Foggy. 4. Fine. 5. Cloudy. 6, 7. Rain: rain early A.M. 8, 9. Fine. 10. Cloudy: rain early A.M. 11. Cloudy. 12, 13. Fine. 14. Cloudy: rain P.M. 15. Foggy: rain P.M. 16—18. Cloudy. 19. Fine: stormy night. 20. Stormy: rain early A.M. 21. Cloudy: rain early A.M. 22. Stormy: rain A.M. and P.M. 23. Rain. 24. Fine. 25. Cloudy: rain P.M. 26. Cloudy. 27. Fine. 28. Cloudy: rain P.M. 29, 30. Fine.

*Sandwick Manse, Orkney*.—Nov. 1. Showers: clear: fine. 2. Clear: fine. 3. Cloudy. 4. Rain: cloudy. 5. Clear: clear and rain. 6. Showers: clear. 7. Showers. 8. Showers and hail. 9. Cloudy: cloudy and snow. 10. Damp. 11. Cloudy. 12. Rain. 13. Cloudy: showers and clear. 14. Bright: fine and cloudy. 15. Rain: showers. 16. Cloudy. 17. Showers. 18. Cloudy: clear. 19. Clear: showers: clear. 20. Rain. 21. Showers: cloudy. 22, 23. Cloudy: showers. 24. Showers: clear frost. 25. Fine: clear frost. 26. Damp: fine: rain. 27. Rain: damp. 28. Damp: rain. 29. Showers: cloudy. 30. Rain.

*Aplegarth Manse, Dumfries-shire*.—Nov. 1. Frost: fine. 2. Fine. 3. Cloudy: rain P.M. 4. Showers. 5. Fair. 6. Showers. 7. Rain early A.M. 8. Fair. 9. Fair till P.M.: wet. 10. Showers. 11. Fair and fine. 12. Dull and cloudy: showers. 13. Dull and cloudy. 14. Fair. 15. Rain: frost A.M. 16. Fair: frost A.M. 17, 18. Rain. 19. Slight showers. 20. Showers. 21. Rain. 22. Slight showers. 23. Frost. 24. Frost: thaw P.M. 25—28. Rain. 29. Fair. 30. Fog and rain P.M.

Mean temperature of the month .....  $41^{\circ}\cdot7$   
 Mean temperature of November 1842 .....  $40^{\circ}\cdot7$   
 Mean temperature of November for twenty years .....  $39^{\circ}\cdot9$

*Meteorological Observations made by Mr. Thompson at the Garden of the Horticultural Society at CHISWICK, near London; by Mr. Veall, at BOSTON; by the Rev. W. Dunbar, at Applegarth Manse, DUMFRIES-SHIRE; and by the Rev. C. Clouston, at Sandwick Manse, ORKNEY.*

Days of Month.	Barometer.				Thermometer.				Wind.				Rain.					
	Chiswick.		Dumfries-shire.		Orkney Sandwick.		Chiswick.		Boston.		Dumfries-shire.		Orkney Sandwick.		Chiswick.	Boston.	Dumfries-shire.	Orkney Sandwick.
	Max.	Min.	9 a.m.	9 p.m.	9 $\frac{1}{2}$ a.m.	8 $\frac{1}{2}$ p.m.	Max.	Min.	8 $\frac{1}{2}$ a.m.	8 $\frac{1}{2}$ p.m.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1.	29.740	29.677	29.24	29.73	29.61	29.78	50	32	43	40	46	29	44 $\frac{1}{2}$	40	.02	.95	.....	.....
2.	29.780	29.713	29.38	29.72	29.80	29.72	49	42	44	48	32 $\frac{1}{2}$	49	44	48	.18	.04	.....	.....
3.	29.660	29.652	29.15	29.52	29.50	29.38	50	44	51.5	49	36	48 $\frac{1}{2}$	50	45	.....	.....	.....	.....
4.	29.783	29.691	29.15	29.36	29.28	29.50	58	39	49	55	44	49	47	49	.....	.....	.....	.....
5.	29.992	29.931	29.53	29.92	29.81	29.50	53	37	44	45	33 $\frac{1}{2}$	43	44	44	.02	.....	.....	.....
6.	29.965	29.927	29.45	29.50	29.63	29.35	57	44	45	52	44 $\frac{1}{2}$	46	43	43	.10	.17	.....	.....
7.	29.749	29.662	29.10	29.37	29.10	29.18	59	33	54	54	43	44	44	44	.17	.38	0.94	.13
8.	29.769	29.500	29.09	29.35	29.73	29.15	52	28	43	43	36 $\frac{1}{2}$	34	32	32	.03	.....	.....	.....
9.	29.936	29.717	29.50	29.83	29.47	29.78	52	26	34	39	25	35 $\frac{1}{2}$	36	36	.07	.....	.....	.....
10.	29.720	29.512	29.13	29.27	29.64	29.50	46	30	41	47	35	39	39 $\frac{1}{2}$	41	.03	.07	.....	.....
11.	30.112	29.946	29.61	29.90	30.08	30.13	46	26	41	51	38	38	41 $\frac{1}{2}$	41	.....	.....	.....	.....
12.	30.167	30.136	29.86	30.07	30.00	29.95	48	21	35	44	39	42 $\frac{1}{2}$	46	46	.....	.....	.....	.....
13.	30.227	30.207	29.85	30.08	30.13	29.97	44	25	33	46	38	43 $\frac{1}{2}$	46	46	.05	.....	.....	.....
14.	30.174	30.124	29.77	30.17	30.24	30.22	48	26	37	44 $\frac{1}{2}$	31	39 $\frac{1}{2}$	37	37	.03	.....	0.50	.15
15.	30.220	30.020	29.88	30.05	29.88	29.74	46	24	37.5	44 $\frac{1}{2}$	31 $\frac{1}{2}$	45	46	42	.07	.05	.....	.....
16.	30.007	29.979	29.62	30.00	29.85	29.90	48	24	36	51	42	46	39	39	.11	.....	.....	.....
17.	29.914	29.591	29.53	29.44	29.33	29.15	51	36	41	45	37	40 $\frac{1}{2}$	38	38	.10	.....	.....	.....
18.	29.569	29.504	29.15	29.22	29.22	29.09	53	29	40	47	34	39	40	40	.01	.....	.....	.....
19.	29.797	29.649	29.30	29.39	29.40	29.15	52	40	47	47	40	44	38 $\frac{1}{2}$	40	.....	.....	.....	.....
20.	29.600	29.500	29.08	29.27	29.33	29.28	51	35	50	51	40	41	37	37	.13	.....	.....	.....
21.	29.618	29.536	29.89	29.42	28.91	29.25	57	52	50	47	40	44	38 $\frac{1}{2}$	40	.02	.12	.....	.....
22.	29.565	29.275	28.94	29.30	29.30	29.28	51	44	53	54	44	44	40	40	.62	.13	.....	.....
23.	29.568	29.523	29.22	29.43	29.56	29.40	44	33	43	43	34	38 $\frac{1}{2}$	39	39	.01	.34	.....	.....
24.	29.682	29.539	29.27	29.50	29.44	29.53	46	42	33.5	40 $\frac{1}{2}$	27 $\frac{1}{2}$	40	36	36	.08	.27	.....	.....
25.	29.685	29.665	29.19	29.22	29.27	29.12	56	42	42	49	40	27	38	33	.34	.....	.....	.....
26.	29.798	29.648	29.09	29.12	29.44	29.05	56	51	52	51	37	44	45	45	.01	.08	.....	.....
27.	30.143	30.075	29.50	29.88	29.83	29.42	59	44	53	47 $\frac{1}{2}$	45 $\frac{1}{2}$	47	48	48	.....	.....	.....	.....
28.	30.366	30.293	29.73	30.15	30.28	29.85	56	41	49.5	47 $\frac{1}{2}$	45 $\frac{1}{2}$	44	46	46	.....	.....	.....	.....
29.	30.381	30.064	29.93	30.13	29.86	29.90	52	45	37	51 $\frac{1}{2}$	33	47 $\frac{1}{2}$	46	46	.05	.....	.....	.....
30.	29.879	29.759	29.36	29.394	29.630	29.505	52.00	35.26	42.6	47.7	36.6	42.48	41.33	41.33	.06	.....	.....	.....
Mean.	29.879	29.759	29.36	29.394	29.630	29.505	52.00	35.26	42.6	47.7	36.6	42.48	41.33	41.33	2.13	2.84	3.41	4.17



THE ANNALS  
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X.—*Notes on the Coleopterous genus of Insects, Rhynchites of Herbst.* By JOHN WALTON, Esq.

IN the year 1838 I published some notes in the 'Entomological Magazine' (vol. v. p. 1 and p. 254) on the genera *Sitona*, *Polydrusus*, *Phyllobius* and *Apion*, belonging to the family *Curculionidae*, since which the species of the remaining genera have more or less engaged my attention. I repeat with pleasure that I have been permitted most liberally to examine all the metropolitan cabinets of insects, especially the rich one of Mr. Stephens, containing the late Mr. Marsham's collection; and I have endeavoured to determine, I hope with as few errors as possible, the nomenclature of our indigenous species, according to the views of Marsham, Kirby, Stephens and Curtis. In the above-named publication I recorded my belief that the principal part of the foreign synonyms of the British Curculionites were then in a very incorrect state; I therefore determined to make an attempt to ascertain by what names our species were known to the continental entomologists; and in order to carry out this intention I entered into correspondence with M. Schönherr, Dr. Germar and M. Chevrolat. I sent a series of British species of Curculionites to each of the above-named celebrated foreign entomologists, and in return was kindly furnished not only with the names by which they were known to them, but with numerous named types of species according to the Swedish, German and French authors, together with much valuable information. Principally from these materials I have been enabled to clear up, in a manner satisfactory to myself at least, the nomenclature of nearly all the British species, and propose to give a list of the indigenous Curculionites with their synonyms, accompanied with such observations as I presume may be useful.

As I shall frequently have occasion to refer to specimens contained in the Kirbian cabinet, so liberally presented to the Entomological Society by its venerable and talented Honorary President, it may be as well to call attention to the fact that that collection contains many species of Curculionites (as well as other Coleoptera).  
*Ann. & Mag. N. Hist. Vol. xiii.* G

rous insects) named by the late celebrated Major Gyllenhal, with whom the Rev. Mr. Kirby corresponded; and moreover it may be generally regarded, with reference to the British specimens, as furnishing good authority for the Marshamian species.

The Linnæan and the Banksian collections I have also repeatedly examined: many of the specimens in the former have names attached in the handwriting of the illustrious naturalist; and as far as my experience goes, I think with Mr. Kirby, that a *large proportion* of the species which Linnæus described may be determined by a reference to his collection.

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*Germ.* Insectorum Species, auctore E. F. Germar, 1824.  
*Curt.* British Entomology, by John Curtis. 8 vols. 1823—1840.  
*Steph.* Illustrations of British Entomology (Mandibulata), by J. F. Stephens, 1831. vol. iv.  
*Schön.* Synonymia Insectorum, Genera et Species Cureulionidum, a C. J. Schönherr, 1833.  
*Steph.* Manual of British Coleoptera, by J. F. Stephens, 1839.

1. *Rhynchites Betulæ*, Linn., Herbst., Gyl., Schönh.

*Attelabus Betulæ* (Mus. Linn.), Fab., Marsh.

— *Betulæ*, Mus. Kirb.

*Deporaüs Betulæ*, Steph.

Mr. Stephens has erected this single species into a new genus from an alleged difference in the construction of the antennæ, and from the males having the posterior femora dilated. I have carefully examined the structure of the antennæ of this and the other species of the genus *Rhynchites*, but cannot discover a difference of sufficient value to warrant a generic separation: the small females of *R. Betulæ* are closely linked to this genus by *R. megacephalus* not only in habit but in the form of the joints of the antennæ, and these assimilate with at least a majority of the species; but others are aberrant. *R. pubescens* has the seventh and eighth joints of the antennæ slender and obconic; the basal joints of the club (ninth, tenth) long obconic. *R. Betuleti* has the seventh and the eighth joints stout, transverse or lenticular; the basal joints of the club robust, transverse or subquadrated; the long slender antennæ of the females of *R. æquatus* and *R. æneovirens* also differ considerably from those of *R. Populi*. These anomalies exist more or less in every long genus of this family of insects, particularly in the genus *Otiorynchus*; but this diversity of structure in the

antennæ does not warrant in my opinion the dismemberment of a natural genus of insects. I may notice, that the antennæ in the females of this genus are more or less distinctly longer than in the males; the males have the antenna and its articulations shorter and stouter than the females: these sexual differences are very evident in the two species *R. æquatus* and *R. æneovirens*. The dilated posterior femora in the males of the present species can only be regarded as a sexual character: other organs are equally modified or varied in their structure by sexual differences, as I shall have occasion to notice in this and other portions of my communication.

2. *R. megacephalus*, Germ. 1824.

— *Mannerheimi*, Hummel.

— *lavicollis* and *cyaneopennis*, Steph. 1831.

— *constrictus* (Waltl.), Schönh. 1839.

Of species No. 2\* I sent many specimens to Germar, whose authority I have for the first two names quoted: this author says, "it is without doubt my *R. megacephalus*." From Schönherr I have received a specimen of the *R. constrictus* of his work, and a comparison of that with the *lavicollis* and the *cyaneopennis* of Stephens leaves no doubt in my mind of the accuracy of the above synonyms.

I have found this species plentifully on the birch (*Betula alba*) in the middle of the month of July.

3. *R. pubescens*, Fab. (Mus. Banks.), Herbst, Germ., Steph., Schönh.

*Cure. pubescens*, Fab. Syst. Ent. 1775.

— *pubescens*, Marsh.

*R.* (♂) *cavifrons* (Chevr.), Schönh., Steph. Man.

*Att. pubescens*, Mus. Kirb.

M. Chevrolat, when in England, separated, as being his *R. cavifrons*, certain specimens from among a series in Mr. Waterhouse's cabinet, which were there labelled *pubescens*. I have likewise received a specimen of *R. cavifrons* from M. Chevrolat; these specimens are undoubtedly all males of *R. pubescens*, which differ from the females in having the head oblong, anteriorly broad, posteriorly narrowed, with the forehead more concave: the female has the head broader and shorter, less concave between the eyes, and of a transverse quadrangular form—sexual differences which are more or less distinctly traceable in very many species of this genus.

The ♂ and ♀ of *R. ophthalmicus* (a very nearly allied species)

\* Throughout the paper I shall speak of the species according to the number, in preference to any name, to prevent confusion.

differ from each other in precisely the same way. I may notice likewise, that the males and females of this and many other species of *Curculionites* can be distinguished from each other by the differences in the form of the rostrum and the situation of the antennæ. The rostrum in the males is shorter and generally stouter, with the antennæ inserted before the middle or nearer the apex than in the females. In the females the rostrum is longer and situated at the middle, or more or less behind the middle\*.

I have taken both sexes of this species upon the young shoots of the oak in the month of June.

4. *R. ophthalmicus*, Steph. Ill. 1831.  
 — (♂) *comatus*, Schönh. 1833.  
 — (♀) *cyanicolor*, id.  
 — (♂) *similis*, Curtis, 1837.  
 — *sericeus*, Steph. Man., not Herbst.  
 — (♂) *tomentosus*, Schönh. ?

Mr. Stephens is apparently the first author to have described this insect: subsequent to the description which appeared in his 'Illustrations,' he was of opinion that it was identical with the *R. sericeus* of Herbst. Dr. Germar however has sent me an insect with this last name attached, which is very distinct from the *ophthalmicus* of Stephens. I have not observed the *R. sericeus* of Herbst in any of our British collections.

I have found this species on the white-thorn (*Mespilus Oxyacantha*) in woods near Gravesend in the month of May and the beginning of June.

5. *R. nanus*, Payk. (1792), Gyl., Germ., Steph., Schönh.  
 — *minutus*, Herbst, 1797.  
*Att. cæruleus*, Fab. Syst. Nat. Suppl. 1798.  
 — *planirostris*, Fab. Syst. Eleuth. 1801.  
 — (♀) *cylindricus* (Kirb. MSS. and Mus. Kirb.), Steph.

Of No. 5, I have three specimens sent me by Schönherr as the *R. nanus* of Gyllenh. Schönherr also gave the same name to some English specimens I forwarded to him for examination. From Dr. Germar I have the following note relative to this species: "The true *minutus* of Herbst agrees with *R. nanus*, Payk.; and *Attelabus cæruleus*, Fab., and *planirostris*, Fab. (non Schönh.) are also specifically identical with *nanus* (Mus. Herbst, Mus. Fabricii)."

The *Att. cylindricus* of Kirby's MSS. and of his collection I have carefully examined; it belongs to *R. nanus*.

I have repeatedly found this species upon the birch (*Betula alba*) in the month of July.

\* Notes upon the genera *Sitona*, &c., Ent. Mag. vol. v. pp. 9, 10.

6. *R. conicus*, Illig. (1801—1806), Germ., Schönh.— *Alliariæ*, Steph.*Curc. Alliariæ*, Marsh.*Att. Alliariæ* and *nanus*, Mus. Kirb.

I have the authority of Schönherr and Germar for applying the name of *conicus* to this species. To both of these authors I have sent specimens. I have found this species in white-thorn hedges in the months of June and October.

7. *R. pauwillus*, Germ. (1824), Schönh., Steph. Man.— *atroceruleus*, Steph. Ill.

Of *R. pauwillus* of Germar I possess five specimens sent me by that author.

“This species (No. 7) is distinguished from *R. minutus* of Steph.” (Dr. Germar observes in his letter to me) “by the thorax being more deeply punctured, its dorsal channel distinct, and by the hairs covering the body being longer and more erect.” To these characters may be added a difference in the rostrum, viz. this organ is more curved in the present species than in the *minutus*. I have found the *R. pauwillus* on the white-thorn hedges at Swanscombe near Gravesend, in the months of May and June.

8. *R. germanicus*, Herbst, 1797. Mus. Herbst.— *minutus*, Gyl. (1813), Steph., Schönh.*Curc. nanus*, Marsh? 1802.*Att. æneovirens*, Mus. Kirb.\*

Of this species (No. 8) I have foreign specimens sent me by Schönherr and Germar under the name *minutus*. I have also two English specimens which I forwarded to Germar, returned to me with the same name. From this latter author I have the following note regarding the present insect: “*R. minutus*, Schönh.; according to the cabinet of Herbst, it is the true *germanicus*.”

This is a very common species: its time of appearance is in the month of June.

9. *R. Alliariæ*, Payk. 1792, Gyl. 1813.— *interpunctatus* (Wilkin MSS.), Steph. 1831.— *megacephalus*, Schönh.

I sent this species both to Schönherr and Germar: the former informs me it is his *R. megacephalus*; from Germar I have the following note: “*R. interpunctatus*, Steph.—this name would be re-

\* In Schönherr's ‘Syn. Ins.’ vol. i. p. 233, 1833, *Curc. æneovirens* of Marsham is cited as a synonym to No. 33, *R. Fragariæ* (“Teste Dom. Kirby”). It is evident from this that Kirby sent Gyllenhal a true Marshamian type (a blue variety) of the *æneovirens*, and judging from the only two examples of No. 8 now in Mr. Kirby's cabinet, which are blue-green varieties, he seems to have considered this species the same as the *æneovirens*.

Gyllenhal (which is very singular) made precisely the same error: see ‘Ins. Suec.’ iii. p. 27, 1813, which he corrected in Schönherr's ‘Syn. Ins.’ as above, twenty years afterwards.

tained, but it is the *Rh. Alliarie* of Gyl. and Payk.\*, and the *R. megacephalus* of Schönherr." The *R. interpunctatus* of Wilkin's cabinet (now in the Zoological Society's museum) I have carefully examined.

I found this species very plentiful in Swanscombe Wood near Gravesend, on the young shoots of the oak underwood of two or three years' growth, in May.

10. *R. æquatus*, Auctorum.

*Curc. æquatus*, Mus. Linn.

*Att. ♂ æquatus*, Mus. Kirb.

— ♀ *nigripes*, id.

11. *R. cæruleocephalus*, Schal., Fab., Steph., Schönh.

*Curc. cæruleocephalus*, Schaller, Acta Hallensia, i. p. 282, 1783.

Of this insect I am only acquainted with one example; it is in the National cabinet: with that specimen I have compared one, with which it agrees, sent me by Dr. Germar bearing the same name.

It is found upon the white-thorn in Saxony.

12. *R. æneovirens*, Marsh. 1802, Steph.

— *Fragariæ* (Sturm, Ins. Cat. 1826), Schönh.

— *obscurus* (Megerle MSS.), Schönh.

*Att. cupreus*, Mus. Kirb.

Of the true *Curc. æneovirens* of Marsham I sent specimens to Schönherr, who states the species to be synonymous with his *R. obscurus*.

I sent to Dr. Germar many specimens of No. 12, including varieties, which he informed me were the *R. obscurus* of Schönherr.

It appearing to me that the *R. Fragariæ* of Schönherr was but

\* In the Linnæan cabinet I find an insect agreeing with Linnæus's description pinned to a label with the name *Alliarie* on the upper side, and "4 *violaceus*" on the underside, both in the handwriting of Linnæus. This insect is a ♀, and I have little doubt, judging from Gyllenhal's description is the *Thamnophilus frontalis* of that author. Also besides the specimen with the double name upon the label there is another label, upon which is written by Linnæus the name *violaceus* only; the two insects upon this label are ♂ ♀ of the same species as the single insect which stands on the double name. In the 'Fauna Suecica,' p. 174, "No. 579, *Curc. violaceus, mediæ magnitudinis*." "No. 580, *Curc. Alliarie, magnitudo pulicis, præcedenti simillimus*; sed PAULO MAJOR, an *sexus vel ætatis discrimen*?"

Now it will be seen that Linnæus, in his 'Syst. Nat.' 1767, separates and places in two distinct sections the *C. Alliarie* and the *C. violaceus*; the former being placed in the section which he gives as character "longirostris femoribus simplicibus;" the latter (*C. violaceus*) is located in the section "longirostris femoribus dentatis." The fact is, that the *C. violaceus* and *C. Alliarie* of Linnæus are the sexes of one species, and in one sex (♀) the rostrum is longer, more curved and shining than in the male. Linnæus must have overlooked the tooth in the femora, as he has done to my knowledge in *Tychius*, *Bruchus* and some other genera.

a variety of this species, I called Dr. Germar's attention to the point, and in his notes he observes, "I agree with you in opinion that the *R. Fragariæ* is a blue variety of the *æneovirens* of Marsham." Dr. Germar has sent me a foreign specimen of the *Fragariæ*.

The blue-green varieties (the small males having the rostrum short) very much resemble, and may easily be mistaken for, the same coloured varieties of No. 8; however, this species is distinguished by having the body densely covered with long erect cinereous hairs. No. 8 is sparingly clothed by short subdepressed fuscous pubescence.

This species is found in the month of May upon the oak as soon as it begins to bud.

13. *R. cupreus*, Auctorum.

*Curc. cupreus*, Mus. Linn.

I am indebted to T. C. Heysham, Esq., of Carlisle, for the sexes of this rare and beautiful species, who kindly sent them alive in a pill-box by letter; he found them on the mountain-ash (*Pyrus aucuparia*) in the beginning of June.

14. *R. Betuleti*, Fab. (1792), Herbst, Gyl., Germ., Schönh.

*Curc. Betulæ*, Linn. (Mus. Linn.), Marsh.

— (var.) *nitens*, Marsh., Mus. Kirby.

*R. Betulæ*, Steph.

*Att. Betuleti*, Mus. Kirb.

It becomes necessary to follow those authors who use the Fabrician name *Betuleti* for this species to prevent confusion, Linnæus having given the name *Betulæ* to another insect as well as to the present one, and that insect is by many authors regarded as a member of the genus *Rhynchites*.

15. *R. Populi*, Auctorum.

*C. Populi*, Linn. Mus. Linn.

*Att. Populi*, Mus. Kirb.

I have taken this insect in the month of June in Darent Wood from the young shoots of the *Populus tremula*.

At Colney Hatch Wood Mr. Smith has taken this species from the same plant in great abundance, and invariably found, by seeing them *in copulâ*, that the specimens with the spine on the side of the thorax were the males.

16. *R. auratus*, Scop., Schönh.

*Curc. auratus*, Scopoli, Ent. Carniol. 1763.

— (♂) *Bacchus*, Don. Brit. Ins.

— *Bacchus*, Marsh.

*R. Bacchus*, Gyl., Steph.

*Att.* (♂ ♀) *Bacchus*, Mus. Kirb.

The ♂ has the head longer and narrower than the ♀; the an-

tennæ inserted between the middle and the apex of the rostrum ; thorax anteriorly armed on both sides with a porrect spine ; scutellum in both sexes very large, and the margin elevated. The ♀ has the head shorter and broader than the ♂ ; the antennæ inserted in the middle of the rostrum, the thorax less dilated at the sides and very little narrowed in front, oblong, sub-cylindric, unarmed.

♂ ♀ in the cabinet of the British Museum and in that of the Entomological Society, Mr. Stephens's and my own.

“ Taken in numbers on the *Prunus spinosa* at Crayford in Kent by myself.”—Marsham MSS., Steph. Ill.

♂ ♀, in the cabinet of the Entomological Society, are from the collection of the Rev. Mr. Kirby.

Mr. Stephens had his specimens, with many others of this and the following species, from the Marshamian collection. I obtained mine from the cabinet of the late Mr. Millard.

The ♂ of this species, figured by Donovan, “ was taken in the middle of June in a field near Kent.”

This species has the usual sexual characteristics so generally developed throughout this extensive family of insects.

Schönherr's ‘*Synonymia Insectorum*,’ vol. v. p. 325, contains an observation that the Comte Dejean, in a letter to Gyllenhal, asserts that he is convinced, from his own experience, that the species with the thorax armed are the males, having taken pairs *in copulâ*.

Gyllenhal, Schönherr and other authors appear to have mistaken the sexes of this species.

#### 17. *R. Bacchus*, Linn., Schönh.

*Curc. Bacchus*, Mus. Linn.

Splendid golden copper, with a shade of purple, shining, and covered with erect fuscous hairs. Head between the eyes deeply impressed ; vertex convex, deeply and coarsely punctured ; short, subquadrate. Eyes very prominent. Rostrum elongate, slender ; longer than the head and thorax together ; almost straight above ; at the base with two deeply impressed striæ which are punctate ; the interstice forming an elevated ridge or carina which is entirely of a violaceous black. Antennæ inserted a little before the middle of the rostrum, the joints dark violaceous, the club dusky black ; thorax rounded at the sides ; above convex ; constricted at the base and apex ; subglobose ; of a shining golden purple ; deeply and thickly rugose ; punctate anteriorly ; under both sides with a rudimental minute spine. Elytra of a shining golden copper ; indistinctly striated ; the striæ with rows of large deep punctures ; the interstices with smaller punctures, transversely rugose and elevated. Legs elongate ; femora clavate ; shining golden purple. Tibiæ golden purple. Tarsi violaceous black.—(Long. corp. 4 lin.)



The ♂ is distinguished (from the ♂ of *R. auratus*) by the head being shorter, the *eyes* evidently more *prominent*, the *rostrum* distinctly *longer* and *thinner*, the antennæ inserted nearer the middle of the rostrum, and the thorax shorter and having a minute rudimental spine on both sides. The scutellum in both sexes is distinctly smaller, and has the margin less elevated.

The ♀ has the *rostrum* distinctly *longer* and *thinner* (than the ♀ of *R. auratus*), the thorax shorter and more rounded at the sides, the *eyes* more *prominent*, and the sculpture in both sexes is deeper and coarser.

♂ ♀ in the cabinet of the British Museum and in that of Mr. Stephens and Mr. Curtis: ♀ in my own collection.

In the Linnæan cabinet there is one example only of this species, pinned through the name, and which is undoubtedly the true *Curc. Bacchus* of Linnæus. The ♂ ♀ in the cabinet of Mr. Stephens he obtained with many others in the Marshamian collection.

Mr. Curtis had his (♂ ♀) from the British cabinet of the late Mr. Francillon.

The ♀ in my own possession was taken by Mr. Benjamin Standish near Cracking Hill, Birch Wood, on the 24th of September 1843, off the oak underwood. Mr. Douglas, who was there on the same day, saw the insect alive.

At the first glance this species has certainly a great resemblance to No. 16, *R. auratus*, but the specific characters which separate the two are distinct and unequivocal: the blending of these two species in our cabinets must be attributable to the want of a proper examination.

XI.—*An account of some Seeds buried in a Sand-pit which germinated.* By Mr. WILLIAM KEMP of Galashiels, in a Letter to Charles Darwin, Esq.

HAVING received early last spring some seeds, which were found at the bottom of a sand-pit upwards of twenty-five feet in depth, I most carefully examined into all the circumstances of their discovery. They were first seen by a respectable workman of the name of Thomas Welsh, who was excavating the finer sand at the bottom of the pit, in a part which was rather undermined; and fortunately Mr. John Bell of Melrose, the proprietor of the place, was looking on at the instant that they were disinterred. He kindly sent by Welsh some of the seeds to me, and I immediately returned with him, and in company with Mr. Bell carefully examined the layer in which they had been imbedded. The seeds were apparently of only two kinds; I sent specimens of them (through

Mr. Darwin) to Professor Lindley, and sowed the others myself. The plants reared by myself were sent to Professor Henslow, who states that they consist of *Polygonum convolvulus* and a variety of *Atriplex patula*; the seeds planted at the Horticultural Society by the kindness of Professor Lindley produced *Rumex acetosella* and an *Atriplex*, which was not at first recognised, but which Mr. Babington states is exactly like a variety of *A. angustifolia* which he has seen growing on mud in salt-marshes and on manure-heaps.

The sand-quarry is situated about a quarter of a mile west of Melrose, and at the height of between fifty and sixty feet above the nearest part of the Tweed. The seeds were mingled with some decayed vegetable fibres, and formed a layer resting upon another layer, eight inches in thickness, of fine sandy clay. This latter lay over a mass of gravel, which again rested on a great mound belonging to the boulder formation. This mound, which extends about a mile along the middle of the valley, is about ninety feet in thickness, and I believe was formed by the action of glaciers. It contains enormous angular blocks of rock, and others smoothed and distinctly scored in lines parallel to their longer axes. The layer of sandy clay, on which the seeds rested, was capped by upwards of twenty-five feet in thickness of distinctly stratified sand, which has been largely quarried. The beds of sand vary in thickness and in fineness; sometimes they alternate with thin seams of impalpable clay, and sometimes they contain minute pebbles and fragments of carbonaceous, decayed wood. The layers slope at an angle of fifteen degrees towards the valley, and in this direction they thin out; the upper layers extend further into the valley than the lower ones; the entire mass has a level top, and is capped by some thin beds of fine gravel. From these several facts (as every geologist will admit), and from the general aspect of the layers of sand, it is scarcely possible to doubt that they were deposited by a river or torrent, at the point where it entered a sheet of water. I had long been of opinion that the valley of the Tweed in this part must formerly have been occupied by a lake, at a period when a great trap dyke, 100 yards wide, which crosses the valley four miles lower down at Old Melrose, had not been worn through. By an accurate levelling I have ascertained, that the layers of sand lie just beneath that level which a lake would hold, if the barrier at Old Melrose were reclosed. A depression on the surface of the land can, also, be distinctly followed from the spot where the sand-quarry is situated, up the valley, to where it joins the bed of the existing river; I cannot doubt that the Tweed anciently flowed in this depression, and deposited on the borders of the lake, the layers of sand where we now find them. It is certain that in the time of the Romans, about 2000 years

since, no lake existed here ; and when we reflect on the time necessary to have worn down the barrier of trap-rock and to have drained so large a lake, which must have stood at its highest level whilst the thin layers of sand were deposited over the bed with the vegetable remains, the antiquity of these seeds is truly astonishing ; and it is most wonderful that they should have retained their power of germination.

As the plants raised are common British weeds, it is indispensable that I should detail the precautions which I took, to ascertain that they did not come from other seeds, existing in the soil in which they were planted. I first put all the seeds into a tumbler of water, and about one-fourth sunk to the bottom ; of these I planted about three dozen, in parallel rows in flower-pots in my house and some others in the garden ; and I carefully marked each row. Rather more than one dozen of these seeds germinated, so that of the seeds found only about one-tenth part produced plants. I watched from day to day their germination, and saw each little plant bring to the surface the husk of its seed ; and these husks I compared under a microscope with other seeds which I had not planted. None of my plants at first grew vigorously. Five or six weeds appeared out of the rows, and these I picked up as they appeared and threw away. Of the two kinds of seeds sent to Professor Lindley, one was pronounced by him to be a *Polygonum*, and the other probably a *Chenopodium* ; this latter genus belongs to the same natural family with *Atriplex*, and the seeds resemble each other. It is therefore certain that I planted seeds resembling those of *Polygonum* and *Atriplex* : now will any one believe, that, in the soil in the garden and likewise in the flower-pot (which in the latter produced only five or six weeds), there were accidentally lying, in exactly the same parallel rows in which I planted my seeds, above a dozen other seeds of these two genera ? I think no one will imagine that this was the case. Moreover, the few seeds planted at the Horticultural Society produced an *Atriplex* and a *Rumex* : whether this latter plant was really produced from my seeds I do not know ; but as its triangular seeds resemble those of *Polygonum*, I may have overlooked their difference, and have obtained these two kinds, besides the *Atriplex*, from the sand quarry.

I hope that this account, besides establishing the fact that seeds may retain, when naturally preserved, their vitality for enormous periods of time,—from an epoch when the external features of the country were widely different,—will stimulate naturalists to search for seeds in the ancient alluvial deposits of other districts.

XII.—*Remarks on the Habits of Birds which are Natives of the British Islands.* By THOMAS AUSTIN, Esq.

Rook, *Corvus frugilegus*.

IN some districts of Ireland the rooks suffer severely during the interval between the sowing of the spring crops and the autumn, a season in which ploughing operations in a great measure cease, so that the supply of larvæ &c. no longer affords them subsistence. If the season should also prove dry at the same time, their sufferings are still more intense. During this period the famishing birds may be seen in the maritime districts skulking into corners in search of food, or greedily rooting up the grubs which are sometimes found in the heaps of sea-weed which have been collected for manure. They also spread themselves along the shores in quest of the small marine insects which lie scattered about, or if severely pressed by hunger, they pick up any stray offal that may fall in their way.

Sometimes they exercise the same instinct as the gulls and the gray-crows: when they meet with a molluscous animal, and which is not easily removed from its testaceous covering, the rook will then rise in the air until it attains a sufficient altitude for its purpose; it then lets its captive fall to the ground; the shock of striking on the hard surface is generally sufficient to fracture the shell, or to force the animal in part from its calcareous citadel, when it becomes an easy prey to the bird. Whilst the shell is falling the bird descends rapidly after it, lest some intrusive beak might bear the expected prize away.

This instinct is paralleled by the blackbirds and thrushes, who carry the snails they feed upon to some stone suited to the purpose, against which they continue to strike the shell, still retaining it partly in the beak, until it is sufficiently broken to enable the bird to seize on the contents. In plantations and other favourite haunts of these birds, piles of snail-shells so broken may always be seen along side-stones selected for the crushing process.

The strange fancies the rooks sometimes indulge in when founding a new colony afford amusing instances of what to a mere spectator would appear whimsicalities, but which no doubt the birds have good and sufficient reasons for observing.

In the spring of 1840, a number of rooks commenced building their nests in the low trees which ornament the approach to Mr. Allen's house at Ballystraw, near Duncannon, county of Wexford. After the labours of the day were over they would assemble in the trees, and apparently take up their station for the night; but no sooner did the twilight fade away than the rooks, as if distrustful of their safety, took flight to Kilmannock, the seat of Mr. Haughton, near Dunbrody Abbey. In this

manner they continued nightly to forsake the newly-planned colony until incubation commenced, when they were constrained to remain, or to spoil their eggs by leaving them. They preferred the former and reared a numerous progeny.

According to our notions of such matters, the trees here alluded to were, from their small size, totally unfit for the purpose to which the rooks had applied them; but they no doubt were led to select the spot from its proximity to good feeding-ground or other cogent considerations.

It is a remarkable fact, that the rooks which build in the trees at Woodstown, the seat of Lord Carew, on the Waterford side of Waterford Haven, always obtain their supplies of food for their young ones from the Wexford side. The distance they have to fly across the estuary is little less than two miles, yet do they invariably undertake the journey many times a day, even in the most tempestuous weather, and when it is difficult to make head-way against the storm.

#### Kestrel, *Falco Tinnunculus*.

This bird is partially insectivorous, and at particular seasons of the year it destroys great numbers of coleopterous insects. It is probable that the young kestrels, on their first development from the egg, are wholly supported on this kind of food.

I was induced to examine into this circumstance by observing the hawks at various times, particularly the breeding season, hovering and pouncing every instant on to the ground in a manner which convinced me that it could not be either birds or mice they were in pursuit of. I was for some time unable to conjecture what they could be so eagerly engaged in capturing, until by repeated observation I became convinced that some species of insect was the object of their solicitude. To place the matter beyond a doubt I procured several specimens, the stomachs of which were filled with the undigested bodies of coleopterous insects. Subsequently I had opportunities of examining some of their resting-places, when the fæces found there were composed almost exclusively of the antennæ, legs, elytra and other indigestible parts of beetles. These observations were repeated with similar results along the line of cliffs between the fine strand of Duncannon and Broom Hill Point, county of Wexford.

The fact of the kestrel feeding on insects has been frequently noticed before, but it is interesting to extend our observations in order to ascertain that the habit is general, and not a local peculiarity.

#### Land Rail, *Rallus Crex*.

A favourite food of the Land Rail is a small lizard (*Lacerta agilis*). I have frequently dissected rails in the autumn, and al-

ways found them to contain these reptiles in various stages of digestion.

Rails are exceedingly numerous in Ireland, though less so of late years than formerly. All the eggs of this bird which I have met with in that country, amounting to some hundreds, are of a dark colour, irregularly sprinkled over with large olive-coloured spots. But the eggs of the same bird obtained in England are, according to Mr. Hewitson, of a light ground, speckled with small olive-coloured spots. How can this circumstance be accounted for? Are they really varieties of the same bird, or can difference of food cause the difference in the colour of their eggs? Specimens of each may be seen in the museum of the Bristol Institution.

#### Stormy Petrel, *Procellaria Pelagica.*

The Stormy Petrel is frequently driven on to the Irish coast by severe weather, and may then be seen hovering over the foam along the margin of the sea, as if in search of food. The petrel, though possessed of great power of wing, is frequently overwhelmed and perishes by the fury of the tempest. After a stormy night in 1832, I obtained on the Wexford coast seven or eight dead specimens which had been washed on shore; and I saw several other birds which were more or less crippled, and which could have been readily captured had they been pursued.

Almost every winter the petrel may be obtained along the shores of the Irish coast, either by shooting the straggling and tempest-driven birds, or by searching along high-water mark for the stranded ones. It need scarcely be remarked that a lee shore is the proper place to look for them.

Kingsdown, Bristol, Nov. 29th, 1843.

### XIII.—*A List of the species of Myriapoda, Order Chilopoda, contained in the Cabinets of the British Museum, with synoptic descriptions of forty-seven new Species.* By GEORGE NEWPORT, Fellow of the Royal College of Surgeons, Pres. Ent. Soc. &c.

THE *Myriapoda* have been more neglected by naturalists than almost any other division of the Articulata. This neglect has arisen in part from the uninviting appearance of the objects, and in part also from the very great similarity of the species. Most of the families and genera are recognised by well-marked characters, but the species so nearly resemble each other that it is exceedingly difficult to distinguish them. Very few of them were known to Linnæus, and many of those few were confounded by him under a single name. Dr. Leach, to whom we are indebted for laying the foundation of a truly scientific examination of this class, described but few species, most of which were British, but even

these it is now difficult to distinguish. Many of those described by Leach are in the cabinets of the British Museum, and thus enable us to obtain the most accurate information. The Museum cabinets also contain many species that were entirely unknown to Leach, and which have remained undescribed up to the present period. These specimens I have examined and named; and many months ago, at the request of the head of the Zoological Department, J. E. Gray, Esq., attached my manuscript names to them, intending to publish a full description of them at my earliest convenience. A list of these names, with notes and synonyms, has recently been prepared, with my assistance, by Dr. Hamel, to be transmitted to Professor Brandt, who also is engaged on this class; and perhaps a similar list of the whole species in the Museum cabinets, with short descriptions of the new species, may not be unacceptable to the British naturalist.

Some of the structures from which I have drawn my descriptive characters have not hitherto been made use of for identifying species, but, nevertheless, they offer some of the best and most certain distinctive marks. The chief of these are the number of the ocelli in adult specimens, and the number and form of the labial teeth. Both of these structures usually present some differences in the different species. Besides these parts I have also employed those pointed out by Brandt,—the form of the posterior legs, and the number and arrangement of their spines. These parts taken together afford good characters. An examination of the few remaining specimens of Linnæus, still existing in the Linnæan cabinet, has enabled me to identify some of the Linnæan species, and has required the names of some of Dr. Leach's species to be changed; but whenever this is done in the following list, Dr. Leach's synonym is also added. I ought here to state that Dr. Leach had not access to the Linnæan specimens.

### Class MYRIAPODA.

#### Order I. CHILOPODA.

##### Genus CERMATIA, Illiger, Leach.

1. *C. coleoprata*; *C. livida*, Leach. Madeira.
2. — var. *Floridensis*, mihi. Florida.
3. — *rugosa*, mihi. Scutella roughened, with a single dark-coloured fascia, with three fasciæ on the first tibial joint. Africa.
4. — *nobilis*, Paterson. Ceylon.
5. — *Hardwickei*, mihi; *C. longicornis*, Hardwicke. This is not the *longicornis* of Fabricius.
6. — *longitarsis*? mihi. Scutella greenish, with a single light-coloured fascia; posterior legs thrice as long as the body.
7. — *dubia*, mihi. Scutella with a median fascia, and two dark-coloured patches on the posterior margin; basilar tarsal joint very long.

8. *C. rubrilineata*, mihi. Dark orange, with three longitudinal deep reddish brown fasciæ. East Indies.
9. — *maculata*, mihi. Yellow; scutella with a single longitudinal fascia, and two black patches on each side. Swan River, Australia.
10. — *Smithii*, mihi. Greenish mottled; dorsal plates rugose, narrowed posteriorly; posterior pair of legs three times as long as the body; femoral and tibial joints short, tarsus very long, with the first basilar joint only one third longer than the second; length of body eight lines. Bay of Islands, New Zealand.

Genus LITHOBIUS, Leach.

1. *L. variegatus*, Leach. Wimbledon Common.
2. — *Hardwickei*, mihi. Brown; ocelli eighteen on each side; pre-anal ventral plate hairy and tuberculated. Singapore, E. I.
3. — *forficatus*, Linn.; *L. vulgaris*, Leach.
4. — *Leachii*, mihi; *L. forficatus*, Leach.
5. — *pilicornis*, mihi. Head smooth; antennæ large, very hairy; labial teeth ten; ocelli twenty-two to twenty-four; legs and body hairy.
6. — *Sloanei*, mihi. Head large, deeply punctured; ocelli twenty-four; labium elongated at its external margin; teeth eight; posterior legs long. America?
7. — *lavilabrum*? Leach. Young of *L. forficatus*?
8. — *castaneus*, mihi. Dark chestnut antennæ, and legs very hairy; dental margin narrow; teeth six; dorsal plates with curved impressions. Sicily.
9. — *emarginatus*, mihi. Head quadrate, ovate, eye large, single dental plates distinct, toothless, but with three slight emarginations; dorsal plates with distinct elevated border; colour ferruginous; legs yellowish. New Zealand.

Genus SCOLOPENDRA, Linn.

Section A. *Parvidentata*, mihi. Labial teeth small, numerous and obtuse.

1. *S. subspinipes*, Leach.
2. — *De Haanii*, Brandt. Java.
3. — *sexspinosa*, mihi. Superior surface of the basilar point of the posterior legs flattened, with two spines on the margin, two on the internal and two on the inferior surfaces.
4. — *Childreni*, mihi. Olive; head, mandibles and posterior legs ferruginous; teeth ten, indistinct; basilar joint of the posterior legs broad, with three spines; inferior surface naked.
5. — *Hardwickei*, mihi. Bright yellow, with each alternate segment, except the seventh, dark blue; labium, mandibles and anal appendages ferruginous; posterior legs short, with three minute spines; inferior surface naked. India.
6. — *cingulata*, Latr.
7. — *cingulatoides*? mihi. Basilar joint of the posterior legs short, flattened, with slightly elevated margins, with five spines on the internal margin, the angular one large, bifid; inferior surface convex, with two spines; teeth eight, obtuse. Corfu.



8. *S. platypus*, Brandt. Jamaica. Labial teeth eight.
9. — *platypus*? Tobago. Labial teeth six, obtuse.
10. — *angulipes*, mihi. Basilar joints of posterior legs very short and thick, subtriangular, flattened above with an elevated external margin; internal margin six-spined, the apical one large, quadrifid; inferior surface rounded, with nine spines; labial teeth eight, minute, obtuse. Madagascar.
11. — *erythrocephala*, Brandt. Java.
12. — *viridicornis*, mihi. Antennæ and dorsal surface green, margins of the segments yellow; mandibles, labium and posterior legs ferruginous; teeth eight, minute, obtuse; internal basilar margin of the legs with seven spinulæ, inferior surface with six spines in three series.
13. — *Leachii*, mihi; *S. morsitans*, Leach. Fantee, Africa.
14. — *platypoides*, mihi. Labial teeth eight, obtuse; posterior legs short; surface subconvex, with the margin elevated; internal margin acute, with six spinulæ in a double series, inferior surface with nine spinulæ; preanal scale with a longitudinal sulcus, margin rounded.
15. — *multidens*, mihi. Labial teeth very small, from twelve to fourteen in number; mandibular tooth large, with a minute tubercle; colour ferruginous; legs yellow, tarsal joints greenish. Perhaps *S. ferruginea*, Fabr.
16. — *tuberculidens*, mihi. Testaceous; mandibular tooth with an acute tubercle at its base; labial teeth eight, distinct, obtuse; basilar joint of posterior legs narrowed, flattened, and slightly margined with six spinulæ, the angular one large, quinquefid; preanal scale cordate-quadrangle. Ceylon.
17. — *longicornis*, mihi. Antennæ elongated; teeth eight, very distinct but obtuse; posterior legs slender, somewhat triangular, with the surface of all the joints flattened and margined; inferior surface longitudinally excavated with three series of spinulæ. Port Essington, Australia.
18. — *morsitans*, Linn., Fabr. Head, mandibles and labium yellowish orange, posterior margins of segments dark green; teeth ten, short, obtuse; basilar joint of posterior legs slender, flattened; internal margins with five spines, the apical one elongated, quadrifid. Africa: British Museum and Banksian cabinets.
19. — *anomia*, mihi.
20. — *punctidens*, mihi. Antennæ green; mandibles and labium orange; teeth six, black, short, obtuse, deeply punctured; posterior pair of legs with six spines on the inferior surface in two series, four in the external and two in the internal. South America?
21. — *variegata*, mihi. Dark chestnut, with the anterior margin of the frontal segment, and the posterior of each dorsal, with labium, mandibles and ventral surface of the body bright orange; antennæ olive; legs orange, with dark orange fasciæ. Demerara: British Museum and Mr. Hope's cabinet.
22. — *angulata*, mihi. Dark green; head, basilar segment, labium and mandibles orange, the latter tipped with black; legs yellowish, posterior pair green; segments flattened, with the anterior lateral margins angulated; teeth eight, small, acute. Trinidad.

23. *S. cristata*, mihi. Brown; antennæ and legs greenish; teeth six, the internal one on each side bifid; posterior segment convex, with a median longitudinal crest; legs short, rounded, with five small acute spines; inferior surface with six spines in three series, two in each series. China.
24. — *canidens*, mihi. Dark olive; teeth eight, the three internal ones on each plate small and approximated, the external one large, acute and projecting outwards; margins of legs with eight or nine spinulæ; inferior surface slightly excavated, with eight spinulæ. Egypt.
25. — *gigas*, Leach. Bright ferruginous; head green; legs with dark olive fasciæ. Venezuela?
26. — *spinigera*, mihi. Brown; posterior pair of legs slender, flattened, almost equal in size throughout, with the internal superior margin and the inferior surface with double rows of sharp spines; teeth eight, acute, irregular. Tripoli.
27. — *affinis*, mihi. Greenish brown, head and mandibles ferruginous; legs yellowish; basilar joint of posterior legs excavated, with three rows of minute spines. Greece.

Section B. *Latidentata*, mihi. The internal tooth broad and dilated at its margin; the external one small, acute and distant.

28. *S. alternans*, Leach. The internal labial teeth sharp, spatulate; mandibular tooth with a minute tubercle near its apex; posterior pair of legs subconvex, with numerous minute black spines, from thirty to forty in number, on their internal margin and surface, with the angular process multifid; inferior surface with from fifteen to twenty spinulæ, in little irregular transverse clusters; preanal scale small and elongated, margin rounded. Length six inches. S. America?
29. — *Grayii*, mihi. Dark ferruginous; head with two slight longitudinal ridges; basilar joint of the posterior pair of legs elongated, with from twelve to fifteen minute spines arranged in three or four oblique series on the internal margin and surface; inferior surface with about fourteen minute spines in three alternating series; preanal scale narrowed, elongated, posterior margin straight. Length  $6\frac{1}{2}$  inches.
30. — *complanata*, mihi. Body depressed, dull reddish brown, with the antennæ and legs, except the posterior pair, greenish; internal tooth on each side denticulated; internal margin and surface of posterior legs with twenty or more minute spines in three oblique series; inferior surface with seventeen. St. Kitts, W. Ind.
31. — *multispinata*, mihi. Dark brown, antennæ and legs green; internal margin of posterior pair of legs with six or seven minute spines in two series, a series of six on the internal surface, and from seventeen to twenty in three irregular series on the inferior. Length  $4\frac{3}{4}$  inches. St. Kitts, W. Ind.

Section C. *Longidentata*, mihi. Teeth large, acute, and lanceolate.

32. *S. spinicauda*, mihi. Light brown with a single dark-coloured longitudinal dorsal line; posterior legs long, with a single large

spine on the middle of the internal margin of the basilar joint.  
Tripoli.

33. *S. Trigonopoda*, Leach, Africa; *S. Eydouxiana*? Gerv. Teeth eight.
34. — *rubriceps*, Newport. New Zealand.
35. — *megacephala*, mihi. Olive-coloured, shining, with the anal appendages reddish olive; head large; teeth six, large, acute and serrated; posterior legs short; basilar joint long, with five large acute spines; inferior surface with six spines, two on the inner side, four on the outer, and a single spine at the base between the two series. Port Essington, Australia.
36. — *sulcidens*, mihi. Dark olive; antennæ purple; mandibles and labium orange; legs yellowish, tibial joints green; teeth six, large, acute, serrated and deeply sulcated; basilar joint of posterior legs with an elevated longitudinal ridge; internal margin with five long acute spines; inferior surface with six large spines. New Holland: British Museum and Linnæan Society collections.
37. — *scabriventris*? mihi. Dark blue violet; head and basilar segment dark green; antennæ with orange-coloured hairs at the apex; mandibles, labium and legs ochraceous; teeth six, acute, serrated, punctured and sulcated; legs as in *S. sulcidens*, of which perhaps it is a variety. New Holland.
38. — *squalidens*, mihi. Frontal segment small; antennæ finely striated; teeth six, acute, the internal one on each side with minute lobules; basilar joint of the posterior legs with five spines on the internal margin and six on the inferior surface as in *S. sulcidens*.
39. — *sulcicornis*, mihi. Ochraceous; antennæ elongated, twenty joints, very finely striated with minute hairs; teeth six, large, acute, with marginal lobules and longitudinal sulci; basilar joint of the posterior legs with five spines on the internal margin and six on the inferior surface arranged in two longitudinal series, three in each series. Port Essington.
40. — *aurantipes*, mihi. Brown olive, legs lighter orange; dental margin rather narrow; teeth six, rather short and obtuse, the external one acute and distant, the internal on each side bifid; basilar joint of the posterior legs with a median diagonal elevated ridge; internal margin with four spines, the angular one bifid; inferior surface excavated, with five spines arranged in two series. Port Essington, Australia.

Section D. *Arctidentata*, mihi. Dental margin very much narrowed, sometimes arched; teeth minute.

41. *S. lobidens*, mihi. Dark chestnut-red, with the antennæ, legs and ventral surface of the body bright yellow; dental margin very narrow; teeth on each side united into two pointed lobes, each with a smaller lobe at its external base; posterior legs cylindrical, elongated, narrowed, with four or five exceedingly minute spines; inferior surface with three minute spines in a longitudinal series. Length of dried specimen 8 inches.

42. *S. picta*, mihi. Body yellowish olive; cephalic segment dark chestnut marked with green; mandibles, labium, posterior segment and anal appendages bright red; legs and antennæ bluish green; teeth eight, distinct, obtuse; basilar joint of posterior legs slender, subcylindrical, with six marginal spinulæ; inferior surface excavated, with ten minute spines in a double longitudinal series.
43. — *viridifrons*, mihi. Orange, with the anterior of the cephalic segment, and the posterior of the dorsal, and the posterior legs and antennæ dark green; teeth eight, small, obtuse; posterior legs elongated, subcylindrical, with four minute marginal spines; inferior surface slightly excavated, with four spines arranged in two longitudinal series.
44. — *punctiventris*, mihi. Head and dorsal surface greenish brown; antennæ green; mandibles and labium bright orange; legs yellow, posterior pair olive; teeth eight, distinct, the internal ones slightly elongated; anal appendages deeply punctured; posterior legs short; with four marginal spines, the inferior surface with six spines arranged in three series, two in each series. Florida.
45. — *Westwoodii*, mihi. Dark green; legs yellow; cephalic segment, mandibles, posterior legs and segment orange red; teeth six, minute, obtuse, black; basilar and second segment of the posterior legs large, subconical, convex; internal margin and surface with two spines on the surface and three on the margin; inferior surface deeply excavated, with four minute spines on the external and two on the inner margin; anal scale elongated, margin straight; anal appendages elongated, punctured, orange. Australia: Brit. Mus. and Banksian cabinets.
46. — *subminiata*, mihi. Head, mandibular apparatus, posterior legs and segment vermilion; body depressed, yellowish, with the posterior margin of the segments green; legs yellow; teeth six, short, obtuse; legs as in *S. Westwoodii*; anal appendages short, obtuse; apex bifid. Australia.  
It is not improbable that this may be a variety of *S. Westwoodii*.

#### Genus CRYPTOPS, Leach.

1. *C. posticus*, Say.
2. — *anomalans*, mihi. Yellow; antennæ fifteen-jointed; basilar segment very large; labium narrow; segments quadrate, with two lateral, impressed, oblique lines; preanal scale subquadrate, margin rounded; lateral anal appendages deeply punctured, short and rounded. Length  $1\frac{3}{4}$  inch. —?
3. — *sexspinus*, Say.
4. — *hortensis*, Leach.
5. — *Savignii*, Leach.

#### Genus MECISTOCEPHALUS, Newport.

1. *M. punctifrons*, Newp.
2. — *punctilabium*, Newp.

Subgenus *NECROPHLÆOPHAGUS*, Newport.

1. *N. longicornis*, Leach, sp.
2. — *punctiventris*, mihi. Yellow, head dark ferruginous; antennæ yellow, scarcely three times as long as the cephalic segment; joints punctured, hairy; labium quadrate, deeply punctured; internal margin of the mandibles bidentated; anal appendages large, with deeply impressed hairy punctures; legs hairy, sixty-six pairs. Sicily.

Genus *GEOPHILUS*, Leach.

1. *G. carpophagus*, Leach.
2. — *subterraneus*, Leach.
3. — *acuminatus*, Leach.
4. — *rubens*, Say.
5. — *barbaricus*, Gervais.
6. — ————? Greece.

Genus *GONIBREGMATUS*, Newport.

1. *G. Cumingii*, Newp. Philippine Islands.

XIV.—*Catalogue of Irish Entozoa, with observations.* By O'BRYEN BELLINGHAM, M.D., Member of and Professor of Botany in the Royal College of Surgeons in Ireland, Member of the Royal Zoological, Geological and Natural History Societies of Dublin, &c.

[Continued from Charlesworth's Magazine of Natural History, vol. iv. p. 351.]

THE following list of the Entozoa indigenous to Ireland (the first part of which appeared some time since) is confined almost altogether to the species which I have discovered and examined myself, and the great majority are new to the British fauna. The classification followed is that given by Rudolphi in his 'Synopsis Entozoorum,' and adopted by Bremser and most zoologists. In the nomenclature I have also followed Rudolphi; and where species are mentioned which had been discovered previously in this country, I have been careful to notice the fact and to give the credit to the discoverer.

## Order 1. NEMATOIDEA.

## Genus 6. SPIROPTERA.

(Derived from *spira*, a curl or circle.)

Body cylindrical and elastic, slightly attenuated at each extremity. Mouth orbicular. Anus large, a little in front of the posterior extremity. Caudal portion of the male spiral, with lateral alæ, between which the penis, a simple filament, projects.

This genus was first named *Acuaria* by Bremser in his cata-

logue of the Vienna collection ; it was subsequently changed to *Spiroptera* from the disposition of the caudal extremity. The species are numerous, forty being enumerated by Rudolphi, of which eighteen are marked doubtful ; they occur only in vertebral animals, and are most common in birds. They inhabit the œsophagus or crop, and are found between the membranes of the alimentary canal and in tubercles connected with these parts, more frequently than in the canal itself ; in fish they sometimes occur in the swim-bladder. The species are arranged by Rudolphi in two subdivisions, from the character of the parts about the mouth.

*Ore papilloso.*

- |                                   |  |
|-----------------------------------|--|
| 1. <i>Spiroptera anthuris</i> . . | œsophagus of rook ( <i>Corvus frugilegus</i> ).                          |
| 2. ———— <i>cystidicola</i> .      | { Swim-bladder of trout ( <i>Salmo Fario</i> ).                          |
|                                   | { Swim-bladder of Gillaroo trout ( <i>Salmo Fario</i> , var.).           |
| 3. ———— <i>leptoptera</i>         | { œsophagus and crop of sparrow-hawk ( <i>Accipiter fringillarius</i> ). |
| [————— <i>strumosa</i> .          | Stomach of mole ( <i>Talpa europæa</i> ).]                               |

*Species dubia.*

- |                          |   |
|--------------------------|---|
| 4. <i>Spiroptera</i> . . | œsophagus of raven ( <i>Corvus Corax</i> ).                         |
| 5. ———— . .              | œsophagus of golden plover ( <i>Charadrius pluvialis</i> ).         |
| 6. ———— . .              | Small intestine of bald-coot ( <i>Fulica atra</i> ).                |
| 7. ———— *                | { Tubercles in œsophagus of shieldrake ( <i>Tadorna Bellonii</i> ). |
| 8. ———— †                | Crop of shearwater ( <i>Procellaria Anglorum</i> ).                 |
| 9. ———— . .              | Stomach and intestine of skate ( <i>Raia Batis</i> ).               |

\* This species of *Spiroptera*, which I found in tubercles connected with the œsophagus of the common shieldrake, appears not to have been previously noticed, and it differs from every species hitherto described (except one observed by Creplin and named *Spiroptera aculeata*) in having the body armed with spines. None of the specimens which I possess however are quite perfect ; the longest, which appears to be nearly so, is an inch and a half in length, cylindrical and very nearly of the same diameter throughout ; a narrow line runs along the dorsal, and another along the abdominal surface from the head to the caudal extremity. The mouth is orbicular, conspicuous, and without papillæ, hence it belongs to the first division in Rudolphi's arrangement ; the head and the whole anterior portion of the body are armed over every part with innumerable recurved hooks. The alimentary canal extends in a straight line from before backwards, and is nearly of the same diameter in every part.

† This species of *Spiroptera*, which occurred in the crop of the shearwater (*Procellaria Anglorum*) like the preceding, is armed with spines. The specimens which I possess are females ; they were attached to the mucous membrane of the crop by their anterior extre-

## Genus 7. STRONGYLUS.

(Derived from *στρογγύλος, teres.*)

Body cylindrical and elastic, attenuated at each extremity. Mouth orbicular or angular, simple or provided with tubercles. Anus sub-terminal. Penis a simple filament, issuing from the centre of a kind of pouch, which terminates the body of the male.

This genus was established by Müller, and has been adopted by zoologists since. The species are numerous: Rudolphi enumerates thirty-eight, of which fifteen are doubtful; they occur in mammalia and birds, rarely in reptiles, and are not found in fish. They occur in almost every part of the body, but inhabit principally the trachea, œsophagus, or tubercles connected with these parts, the stomach and intestines; they are sometimes contained in aneurismal tumours of the mesenteric artery in the horse and ass. The species have been arranged by Rudolphi in his 'Synopsis' under three subdivisions.

*Ore orbiculari noduloso seu papilloso.*

- |                                 |   |   |
|---------------------------------|---|---|
| 1. <i>Strongylus tubifex</i> .. | { | Tubercles in œsophagus of teal ( <i>Anas Crecca</i> ).        |
|                                 |   | Tubercles in œsophagus of pintail ( <i>Anas acuta</i> ).      |
|                                 |   | Tubercles in œsophagus of shoveller ( <i>Anas Clypeata</i> ). |
| 2. ————— <i>contortus</i> .     |   | Small intestine of sheep ( <i>Ovis Aries</i> ).               |

*Ore nudo.*

- |                                      |   |   |
|--------------------------------------|---|---|
| 3. <i>Strongylus retortæformis</i> . | { | Small intestine of rabbit ( <i>Lepus Cuniculus</i> ). |
|                                      |   | Small intestine of hare ( <i>Lepus timidus</i> ).     |

mity, and they lived in water for some time. Their length is six to seven lines, they are thicker posteriorly than anteriorly, and when recent were quite pellucid, so that the whole tract of the alimentary canal could be traced through the parietes; this was straight, narrow anteriorly, and becoming wider posteriorly.

The mouth is orbicular and prominent, with four tubercles surrounding it, which varied in shape when the animal was alive; hence this species must be referred to the second division in Rudolphi's arrangement, in which the mouth is papillary. The anus rounded, and a little in front of the caudal extremity. The part which might be called the neck is armed with recurved hooks; the anterior third of the body is also armed with four rows of much smaller hooks or spines, which are very numerous and close anteriorly; they diminish in number, and gradually disappear near the junction of the anterior with the middle third of the body. The caudal portion of the body is double the thickness of the anterior, and its extremity is conical.

- |                                      |   |   |   |
|--------------------------------------|---|---|---|
| 4. <i>Strongylus Trigonocephalus</i> | } | Small intestine of dog ( <i>Canis familiaris</i> ).         |   |
| 5. ——— <i>Tetragonocephalus</i>      |   | Stomach and small intestine of fox ( <i>Canis vulpes</i> ). |   |
| 6. ——— <i>suis</i> * . . . . .       | } | Bronchial tubes of pig ( <i>Sus Scrofa</i> ).               |   |
|                                      |   | Trachea of domestic fowl ( <i>Gallus domesticus</i> ).      |   |
| 7. { <i>Strongylus trachealis</i> †. |   | }   | Trachea of partridge ( <i>Perdix cinerea</i> ). |
| { <i>Syngamus trachealis</i> , Sieb. |   |   | Trachea of peacock ( <i>Pavo cristatus</i> ).   |

\* In the trachea and bronchial tubes, particularly in the latter, of the pig (*Sus scrofa*), I have found a species of *Strongylus* in great numbers which possesses the characters of the *Strongylus suis*, noticed in the Appendix (Mantissa) to Rudolphi's 'Synopsis,' the female only of which he appears to have seen. The females are an inch and a half in length, the males little more than half an inch; their colour is white, they are of equal diameter in every part, and the females exceed the males in diameter as in length. The mouth is papillary; the caudal extremity of the female is incurved and obtuse, with a short spine; in the male it ends in a pouch which has an anterior and a posterior lobe. The penis is long and dark-coloured; the ova exceedingly numerous and barely visible to the naked eye.

Every specimen, male or female, which was placed in cold water became distended, and in a few minutes the integuments ruptured, allowing the ovaries and intestine to protrude; some gave way near the anterior, others near the caudal extremity, and some near the centre.

† This species was first noticed by Colonel George Montagu in the Memoirs of the Wernerian Natural History Society: his communication is entitled 'An account of a species of *Fasciola* which infests the trachea of poultry,' and contains a figure of the species.

Dr. Charles T. von Siebold of Dantzic has given a full account of it in a paper published in Wiegmann's 'Archiv,' which has been translated in the 'Philosophical Magazine.' He considers it a double animal, in which the male and female are attached permanently to one another, and has given it the name *Syngamus trachealis* from this circumstance. Nathusius looks upon it to be a *Strongylus* in the act of coitus. There is no doubt it ought to be referred to this genus. Rudolphi, who never could have seen this species, or he would hardly have made such a mistake, supposes it to be identical with the *Distoma lineare* discovered by him in the intestinal canal of the domestic fowl. Speaking of the *Distoma lineare* he observes, "huc pertinebit etiam *Distoma tracheæ Georgii Montagu in trachea pulorum phasiani galli &c. repertum.*"

The *Strongylus trachealis* is frequently met with in the trachea of young partridges and poultry, and is believed to be the cause of the disease which is so destructive to them, known under the name of



*Species dubiæ.*

8. *Strongylus*. Cavity of thorax of moor-buzzard (*Buteo rufus*).  
 9. ———. Trachea of turkey (*Meleagris Gallopavo*).

‘the gapes.’ I have found three specimens, each upwards of half an inch in length, in the trachea of a chicken which died of the gapes a fortnight after being hatched, and was informed that it had manifested symptoms of the disease when only five days old.

In the specimens which I have examined the male portion of the animal (as it has been called) was of a paler colour than the other, and no trace of a convoluted tube was visible through its parietes, though very evident in the female portion.

[To be continued.]

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XV.—*Abstract of a paper entitled “Account of a Botanical Tour in North Wales, the South of England and Jersey, during the months of August and September 1843.”* By R. GRAHAM, M.D., Professor of Botany in the University of Edinburgh\*.

IN this communication the Professor only noticed such plants observed by him as are not natives of Scotland, are scarce there, or which otherwise possess interest from marked peculiarities of geographical distribution in the districts which he visited. The journey extended from Liverpool to Chester, and thence by St. Asaph to Bangor. From Bangor the Professor and his party walked up Carnedd Llewellyn, and by the slate quarries of Penrhyn to Llanberris, botanizing in the woods and valleys in the neighbourhood, ascending Snowdon from the west, and passing on to Capel Curig and the Devil’s Kitchen, from which they went by the mail to Birmingham. From Birmingham Dr. Graham proceeded to Dorsetshire and Jersey. Whatever was noticed regarding the vegetation elsewhere was seen only from the coach, or during the almost momentary stoppages at the stages. On returning from Jersey, a few hours were spent in a very hasty examination of the road-side in a corner of the Isle of Wight.

The following are the plants seen in the first half of the journey, and not truly wild in Scotland:—*Lactuca muralis*, in a little glen a few miles to the westward of Chester, and not again observed in the whole journey; and in the same place, *Tamus communis* (afterwards found to be very frequent further south); *Chlora perfoliata*, *Helminthia echinoides* (also profuse near Weymouth); *Diplotaxis tenuifolia*, abundant on the walls near Ches-

\* Read before the Botanical Society of Edinburgh, Dec. 14, 1843.

ter; *Rosa arvensis*, *Nepeta cataria*; *Senecio tenuifolius*, abundant also further south, but native, as far as is known, in very few localities in Scotland; *Sedum dasyphyllum*, on walls at Conway; *Calamintha officinalis*, *Fœniculum vulgare* (also plentiful near Weymouth and in Jersey), *Orobanche barbata* in profusion, and *Verbena officinalis*.

The Welsh mountains, at least in August, possess very little interest to a Scotch botanist. The alpine species are few compared with the vegetation of the Grampians, and the number of specimens even of common species is very small. The valleys, however, contain in abundance several plants which are rare in Scotland, or which do not exist there as natives. Among these are *Poterium Sanguisorba*, *Serratula tinctoria*, *Campanula hederacea*. "*Thalictrum minus* is abundant in several places in Scotland, but we found it at the Devil's Kitchen, at a much higher elevation than I ever recollect seeing it before, except in Cunnamara in the west of Ireland. In the same station we also found *Arenaria verna*, a species which is very abundant near Edinburgh, but which I never before gathered on the west side of the island."

In the Botanic Garden at Birmingham a specimen of *Erodium Hymenodes* was pointed out, said to have been picked from among many others on the Flat Holmes in the Severn, and which the intelligent curator, Mr. Cameron, said had all the appearance of being a native specimen when brought to him. Mr. Cameron also pointed out a variety of *Sedum Telephium*, which he first observed in considerable quantity on the Titterstone Clee Hill, Shropshire, in 1839, at an elevation of 1400 feet, and had cultivated since 1840 without any alteration in its character except increase of size. It is distinguished from the ordinary state by its smaller fruit, its procumbent stems, and its long, slender, horizontal, underground stoloniferous shoots.

The plants which appeared characteristic of the neighbourhood of Cheltenham, Bristol and Bath were—*Viburnum Lantana*, *Clematis Vitalba*, *Pastinaca sativa*, and *Convolvulus Sepium*; the first three not belonging to the Flora of Scotland, and the last remarkable for its vast profusion in almost every hedge. These plants were observed along the whole route to Weymouth, and in addition, between Dorchester and Weymouth were seen *Cnicus acaulis* and *Campanula glomerata*; the latter, however, very small, or at most never acquiring the luxuriant appearance it has in the neighbourhood of Edinburgh. A few plants of *Carduus eriophorus* were seen by the road-side a little way to the southward of Bath.

One of the most interesting walks of the whole excursion was that of the 16th of August, along the beach parallel to the Chesil

Bank, as affording a collection of plants most unlike the Scottish Flora. The principal of these were, *Brachypodium pinnatum*, *Iris fœtidissima*, *Tamaria gallica* (certainly introduced), *Linum angustifolium*, *Linaria Elatine*, *Linaria spuria*, *Lathyrus Nissolia*, *Lathyrus Aphaca*, *Trifolium maritimum*, *Vicia bithynica*, *Ervum tetraspermum*, *Helminthia echioides*, *Petroselinum segetum* and *Sison Amomum*. None of these, it is believed, really belong to the Scottish Flora, and not above one or two, if any, have been permanently naturalized in a few stations in Scotland. Besides these, there were found on the same ground the following plants which are wild, some perhaps only naturalized, in a few localities to the north of the Tweed:—*Hordeum pratense*, *Sinapis nigra*, *Trifolium fragiferum*, *Medicago maculata*, *Vicia lutea*, *Anthemis nobilis*, *Serratula tinctoria*, *Cichorium Intybus*, *Poterium Sanguisorba*, *Œnanthe pimpinelloides*, *Linaria vulgaris*, var. *Peloria*, and a single specimen of a remarkable variety of *Plantago Coronopus* with many paniced heads.

The walk on the 17th of August was from Dorchester to Wareham, and was by no means so productive as that of the day before, yet several plants unknown to or scarce in the Flora of Scotland were observed. Of these, some have been named already, others were the following:—*Cornus sanguinea*, *Scabiosa columbaria*, *Drosera longifolia*, *Silene anglica*, *Galeopsis Ladanum*, *Antirrhinum Orontium*, *Ulex nanus* (a variety perfectly procumbent, very different from the Scotch or Irish plant), *Picris hieracioides*, *Cuscuta Epithymum*. These last two plants are said by Sir Wm. Hooker to be frequent in Scotland, but Dr. Graham has never seen either, nor any species of *Cuscuta* there, not evidently introduced.

The walk on the 18th of August was from Winfrith to Osmin-ton Mill, partly by lanes, partly over chalk downs, and by the cliffs on the shore. The only plants gathered and not before mentioned, which are not wild in Scotland, though certainly so in the stations where they were then seen, were *Ligustrum vulgare*, *Asperula cynanchica*, *Inula Conyza* and *Euphorbia amygdaloides*. Others found only in limited stations in Scotland were, *Campanula Trachelium*, *Silaus pratensis* and *Euphorbia portlandica*.

The next walk was on the 24th of August, about half way up the east coast of the Isle of Jersey, where the following plants were gathered:—*Bromus diandrus*, *Cyperus longus*, *Chenopodium murale*, *Scilla autumnalis*, *Rumex pulcher*, *Marrubium vulgare*, *Matthiola sinuata*, *Senecio vulgaris*, var. *radiatus*, *Euphorbia Paralias*, *Atriplex laciniata*, *Erodium moschatum*. It was remarked, that of the three species of *Papaver*—*P. Argemone*, *P. dubium* and *P. Rhæas*—so abundant in the neighbourhood of Edinburgh, only the second was seen in Wales, only the third in the south of England, and that *P. dubium* again appeared in Jersey. On the

26th, accompanied by Dr. Macreight, the walk was along St. Aubin's Bay by La Haule, across the Quenvais to St. Ouen's Bay and the village of St. Ouen. In this route the most interesting plants gathered, and not already named, were, a densely tufted glaucous species of *Festuca*, with short, erect, very rigid and sharp subulate leaves, considered a form of *Festuca ovina*, but very unlike any form of that species which has been observed anywhere else; *Schæenus nigricans*, *Polycarpon tetraphyllum*, *Scirpus pungens*; *Scirpus maritimus*, a variety with unusually elongated peduncles and ovato-lanceolate attenuated spikes; *Armeria plantaginea*, varying considerably in the breadth of its leaves, but always distinguishable from *A. maritima* by the want of hairiness upon the scape; *Juncus acutus*, *Polygonum maritimum*, *Dianthus prolifer*, *Oxalis corniculata*, *Ranunculus hirsutus*, *Mentha rotundifolia* and *Orobanche Eryngii*? profuse on drift-sand in St. Ouen's Bay. "In adopting this name I by no means wish to give an opinion as to its propriety. It is, I confess, only an attempt to escape from the necessity of intermeddling with a subject in almost hopeless confusion. The species of *Orobanche* are, to say the least, separated by ideal boundaries, and the principle in which I seem to acquiesce by the name I have here given, namely to characterize species by the plants on which they are parasitical, has always appeared to me erroneous. Vaucher found an *Orobanche* parasitical on *Eryngium campestre* in the southern provinces of France, and he called it *O. Eryngii*, and the designation is adopted in the 'Botanicon Gallicum.' Our plant is certainly parasitical on *E. maritimum*, and upon this very slender ground, for I have not seen a French specimen, I have given it the same name. It is only half parasitical, as I doubt not are all the species; half parasitical in a different sense to that in which the same thing may be said of the species of *Cuscuta*. These are at one period of their existence wholly terrestrial, and afterwards wholly parasitical; but the *Orobanche* is permanently attached to the extremity of a root of *Eryngium*, which is there thickened and terminated abruptly, but it sends its own roots into the sand all around. The roots were so deep in the loose sand, that we failed in many attempts to raise an entire plant of *Eryngium* with the parasite attached to it; but Dr. Macreight showed me, that by the peculiar and pungent taste, it was quite certain that the fragment of the root which we often got up with the *Orobanche* was that of *Eryngium maritimum*." Other plants of the same day's walk, either local in Scotland or not at all native there, were the following: *Sibthorpia europæa*, *Bartsia viscosa*, *Diplotaxis muralis*, *Coronopus didyma*, *Erigeron acris*, *Diotis maritima*, *Centaurea Calcitrapa*, *Spiranthes autumnalis*, *Amaranthus Blitum*, *Asplenium lanceolatum*, *Asplenium marinum*.

On the 2nd of September, again accompanied by Dr. Macreight, we walked by St. Brelade round the south-west corner of the island

to La Moye and the southern extremity of the Quenvais. The following plants were picked in this route: *Isolepis Savii*, *Rubia peregrina*, *Centunculus minimus*, *Echium violaceum*, *Datura Stramonium*; *Scilla autumnalis* in great profusion and beauty, both of its usual colour and also with white flowers; *Rumex maritimus*, *Silene nutans*, *Cistus guttatus*, *Antirrhinum Orontium*, *Trifolium subterraneum*, *Gnaphalium luteo-album*, *Hieracium umbellatum*. On other days in which a few minutes only could be given to botany, *Grammitis Ceterach* was picked from the churchyard wall of St. Saviour's, the only situation in which it was seen in the island; and in the same place what has been called *Mercurialis ambigua*, but there and everywhere else in Jersey every variety of form from this to the most usual condition of *Mercurialis annua* may be found; *Scrophularia Scorodonia* was met with in every lane; *Carex extensa* was gathered near Rozel Harbour. In a pasture field near La Haule was gathered *Verbascum nigrum*, in such variety as to show that the character of this species must have a wide range as to the shape of the leaves, the amount of tomentum, and the length of the petioles.

The 11th of September was the last day spent in Jersey, and a rapid glance was taken of the vegetation of the Town Hill and Gallows Hill in the immediate vicinity of St. Helier's. On the former was gathered *Crithmum maritimum* nearly two feet high, *Statice spathulata* of very large size and in very fine condition, *Atriplex portulacoides*, *Senebiera didyma* and *Polycarpon tetraphyllum*; the last two grow also in the less frequented streets of St. Helier's. On Gallows Hill were found *Herniaria glabra*,  $\beta$  *subciliata*, *Centaurea solstitialis*, and *Amaranthus Blitum* in better condition than elsewhere.

On leaving Jersey Dr. Graham and his friends went to Southampton, where they were met by Dr. Bell Salter, and, accompanied by him, went to Cowes and drove to Ryde, leaving the carriage only while ascending the hills. Even this glimpse of the vegetation of the Isle of Wight however was most interesting, and furnished a long list of South-of-England plants. *Gastridium lendigerum* had not been seen before, and is very common in the Isle of Wight. *Silauus pratensis* is a local plant in Scotland. From Dr. Bromfield specimens of *Cyperus longus*, *Chenopodium glaucum*, and *Calamintha officinalis* of unusual form and large size were received. Doubts were entertained of the specific identity of the last with the British plant already recognised as *Calamintha officinalis*; but it will probably turn out to be the extremity of a chain which may be traced into the usual form through a plant which in 1830 the late Mr. Christy gathered at Fishponds, Gloucester, and one which Mr. Roberts gathered at Craig Millar Castle near Edinburgh in 1836.

XVI.—On a Fossil Crustacean of the Order Isopoda, discovered by the Rev. P. B. Brodie in the Wealden formation of Britain. By M. MILNE EDWARDS\*.

[THE discovery by the Rev. P. B. Brodie of fossil *Isopoda* in company with Insects in the Wealden beds of the Vale of Wardour is briefly noticed in the 'Geological Proceedings,' vol. iii. pp. 134, 780, and in the 'Ann. Nat. Hist.' vol. xi. p. 480. A full account of these curious remains will be given in the work on the Fossil Insects of the British secondary strata which Mr. Brodie is about to publish (see 'Ann. Nat. Hist.' vol. xiii. p. 63), and in the meantime the following notice of the Isopoda, by M. Milne Edwards, may interest our readers.]

Fossil Crustacea of the great division of *Edriophthalmia* have been but recently discovered by geologists, a very small number only being yet known, and that in a very imperfect manner. It appeared to me, therefore, to be desirable to indicate here the existence of two new species by which the museum of the Jardin des Plantes has been recently enriched.

The first of these was discovered in the Vale of Wardour in England by the Rev. P. B. Brodie, who has had the kindness to send me some specimens, and to request me to describe them. This species occurs in the Wealden beds of the county of Wilts, and appears pretty abundant in some localities. The specimens sent me by Mr. Brodie are about 12 centimetres long and 9 broad, but that gentleman has found some which are considerably larger, and which have, he says, nearly the dimensions of a small Trilobite. The body of these Crustaceans is very flat, and is composed of a series of segments terminated posteriorly by a sort of rounded buckler. Unfortunately the head is much injured in all the individuals which I have seen. I have not been able to perceive any traces of feet, but Mr. Brodie has detected them on other specimens, and I believe I can distinguish vestiges of the impressions left by the antennæ. I have no doubt then as to the order to which this fossil belongs; it is evidently an Isopod, and judging from its general conformation, it ought to be ranged in the family of the *Cymothoidæ*. I cannot, however, refer it to any of the genera hitherto established, and it appears to me that it cannot even be classed in any of the tribes of which this great division of the *Edriophthalmia* is composed. It seems to be intermediate between the genus *Serolis* and the erratic *Cymothoidæ*. It approaches the former in the enlargement of its body and the great development of the lateral or *epimeral* pieces compared to the medial or *tergal* lobe of the thoracic and abdominal rings, as well as in the lamellar form of

\* Translated from the Annales des Sciences Naturelles.

the *epimera*, and the structure of the terminal buckler of the body; but it is essentially distinguished from *Serolis* by the considerable development and evident mobility of the first rings of the abdomen, a character which connects it with the *Ægæ* and other erratic *Cymothoidæ*. The several segments comprised between the head and the caudal buckler scarcely differ among themselves, so that there is no visible limit between the thorax and the abdomen; but they are twelve in number, and as the thoracic segments never exceed seven throughout the division of *Edriophthalmia*, we must conclude that the five hindmost ones belong to the abdominal portion of the body, which would consequently consist of six moveable segments, as in the genera *Ægæ*, *Nelocira*, &c. The sixth segment of the abdomen, which composes the terminal buckler already mentioned, is almost semicircular, and exhibits in its medial and anterior portion a tubercular swelling somewhat analogous to that observed in the same part in various *Sphæromatidæ*. It appears to me also that the margin of this piece is notched laterally to give insertion to an appendical portion placed in the same manner as in *Serolis*. We may also infer, from the arrangement of the lateral pieces of the other abdominal and thoracic segments, that the animal possessed the power of rolling itself into a ball like the *Sphæromatidæ*. Lastly, the structure of the head appears intermediate between that of the last-mentioned Crustaceans and that which is exemplified in *Serolis*, for the cephalic segment is widened like that of *Serolis*.

From the facts thus indicated it appears that this fossil Crustacean is probably distinct from all Isopods hitherto known, and ought to be classed in a separate generic division. I propose then to designate it by the name of *Archaoniscus Brodii*.

[The memoir then proceeds to describe a second species of fossil Isopod, found in the neighbourhood of Paris, and denominated by the author *Palaoniscus Brongniartii*.]

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XVII.—*Notice of the Blind Fish, Cray-fish, and Insects from the Mammoth Cave, Kentucky\**.

At a meeting of the Belfast Natural History and Philosophical Society, January 17, 1844, Mr. Thompson, the President, called attention to specimens of the Blind Fish, Cray-fish, and Locusts from the great Mammoth Cave in Kentucky, procured in the month of May last specially for the Society by the kind attention of our townsman Gordon A. Thomson, Esq. on his visit to the cave. They are perhaps the first examples of their respective species brought thence to Europe.

\* Communicated by Mr. Thompson.

The cave itself is popularly known from having been described in Chambers's Edinburgh Journal for 1838, vol. vi. p. 234; and more recently, at least in this town, from a letter by the Rev. Wm. Murphy, St. Mary's College, Kentucky, published in the Belfast Commercial Chronicle of January 1, 1844, where it occupies two columns, but the source whence it was obtained is not acknowledged. The Blind Fish is described in Silliman's American Philosophical Journal for August last\*, and the article was republished verbatim in the 'Annals of Natural History' for October 1843. It is therefore unnecessary to do more than refer to the description, with the exception of a few remarks made by the donor. He obtained these specimens of the fish, the largest of which is  $4\frac{1}{2}$  inches in length, and according to the guide—perhaps not the least interested authority—the largest taken down to that time. The hearing of the fish is very acute, so that it is with great difficulty captured. Being of a whitish yellow, or cream-colour, it is very conspicuous in the water. When taken, and viewed closely, it is somewhat transparent, like china-ware, so that the intestines, &c. can be distinctly seen. Our donor is not aware of the fish having been tried as food:—at the price of a dollar each they are sold at the entrance to the cave. One interesting fact in the economy of the species, unnoticed in the description alluded to, is perhaps new, namely, that it is viviparous. The largest specimen on being captured was placed in water, where it gave birth to nearly twenty young, which swam about for some time, but soon died. These, with the exception of one or two, were carefully preserved, and fifteen of them are now before us: they are each 4 lines in length.

The Cray-fish and "Crickets" are stated in the letter already noticed to be blind, but this is erroneous. Both species have eyes. Our specimen of the cray-fish wants both the claws, but is otherwise perfect, and agrees with the description of the *Astacus Bartoni*, Fabr., given in Milne-Edwards's 'Histoire des Crustacés,' vol. ii. p. 331. The length there attributed to the species is 3 inches: the specimen before us is  $2\frac{1}{4}$  inches in length from the point of the rostrum to the extremity of the caudal plates. The *A. Bartoni* is said to inhabit the river Delaware and other parts of North America.

Of the Insects, which are doubtless the same as those called "crickets" (though not properly so) in the published letter, several were captured by our donor seven miles from the entrance of the cave—the fish was taken four miles within it. They be-

\* The fish is here stated to correspond "for the most part with the description of the *Amblyopsis spelæus*, described by Dr. Dekay in the 'Fauna of New York,' but in some particulars it differs." Mr. Thompson stated that he had not the opportunity of referring to this work.



long to the genus *Phalangopsis* of Audinet Serville, and come near to the *Phalangopsis longipes* of that author, described and figured in his 'Histoire Naturelle des Orthoptères' (Suites à Buffon), p. 369. pl. 12. f. 1, and like to it are all—both males and females—in the larva state. The length of their body is 9 lines; of their antennæ 4 inches: the legs in proportion to the body are similar in length to those of *L. longipes* as figured in the work quoted. A mere general idea of these insects is here sought to be conveyed, as it is due to the American naturalist to leave to him the describing and naming of the species.

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XVIII.—*Further notice of the Species of Birds occurring in the vicinity of Calcutta.* By EDWARD BLYTH, Curator to the Museum of the Asiatic Society of Bengal.

THE 'Ann. and Mag. of Nat. Hist.' for August and September last have just come to hand, comprising my catalogue of birds procured in the neighbourhood of Calcutta up to the close of the preceding cold season, with addenda to June 7th; from that time to the recent commencement of the present cold season, little worthy of notice in the ornithological line has occurred to me, at least in the way of recent specimens; but the now opening campaign of 1843-44 has begun very favorably, for during the last week alone I obtained several capital specimens, including some additional *Raptores*, as *Falco vespertinus*, *Aquila pennata*, and *Limnæctus hastatus*, besides others of rare occurrence. I shall now proceed to look over and remark upon the list published, and will revert to the subject at the period of the departure of the mail, when any additional species which I may have procured by that time shall meet with notice.

No. 6 a. *Falco vespertinus*, vel *rufipes*; *F. subbuteo*, var. A, Latham, Gen. Hist. i. 121. The Society has skins of this species obtained in the vicinity, besides the fine specimen just procured here, as already noticed; and I have received examples from Nepal and one from the Neelgherries.

14. Specimens of *Circus rufus*, vel *æruginosus*, in the state of plumage figured by Mr. Gould in his 'Birds of Europe' as that of the old male, with ash-coloured wings and tail, are not uncommon. Many think them distinct, and, as such, they have been described as *Circus pectoralis*, Vieillot, and *C. variegatus*, Sykes.

15. Genus *Spilornis*, G. R. Gray.

16 a. *Aquila pennata*; *Spizaëtus milvoides*, Jerdon, Madras Journ. No. xxiv. 75.

N.B. Of the modern genus *Aquila*, the following species inhabit India:—

1. *A. chrysaëtos*. Mr. Hodgson has sent a specimen of this bird from Nepal.

*Ann. & Mag. N. Hist. Vol. xiii.*

2. *Aquila imperialis*, Tem., v. *heliaca*, Savigny; *Falco mogilnik* and *astracanus*, Auct. This is the *A. chrysaetos* of Mr. Jerdon's catalogue, and most probably also that of Col. Sykes. The skin of a fine specimen, killed in the province of Negwunsing, was brought to me while yet imperfectly dry; and I have received others from Nepal and Central and Southern India.

3. *A. bifasciata*, Hardwicke and Gray; *A. nipalensis*, Hodgson, As. Res. xviii. part ii. 15. Himalaya and hilly regions of Southern India. This is about the size of the preceding species, but has a weaker bill and feet, and a wider gape; approximating it, as does also its plumage, to *Limnaëtus hastatus*.

4. *A. nævia*: a most variable species, to which I think must be referred *A. Vindhiana*, Franklin, and most probably *Falco malaiensis*, Reinwardt, together with *A. punctata*, *fusca* and *fulvescens* of Hardwicke's published drawings. I have received characteristic specimens from Nepal and Central India, and feel tolerably satisfied that the whole of the above names apply to this one species.

5. *A. pennata*, antè.

6. *A. Bonelli*, to which I greatly suspect should be referred the *Nisaëtus grandis*, Hodgson, or doubtfully cited *niveus* of Mr. Jerdon's list; a species most frequent in the Himalaya, but occurring also in the mountainous regions of *the south*; it is scarcely, however, a true *Aquila*, though more allied to this genus than are the other *Nisaëti* of Mr. Hodgson. *A. Bonelli* is enumerated in Mr. Vigors's list of species procured at Cacheremere and on the Himalaya. I have given a minute description of the Indian bird in Journ. As. Soc. Beng. vol. xii. 301-2.

*Ictinaëtus* (Jerdon) *perniger*; *Heteropus*\* (olim *Aquila*) *perniger*, Hodgson. This curious bird requires to be introduced *en suite* of the foregoing eagles. Vide Journ. As. Soc. Beng. xii. 127.

16 b. *Limnaëtus hastatus*; *Morphnus hastatus*, Lesson; *L. punctatus*, Jerdon. I have just procured a fine specimen of this species close to Calcutta, and am now satisfied of its distinctness from *L. unicolor*, which also inhabits Nepal, and with which I considered it to be identical in J. A. S. B. xii. 128.

17. *Haliaëtus Macei*; *H. lineatus*, Gray, represents the first plumage, and *H. unicolor*, Gray, the second plumage of this species. Vide the published drawings of the late Major-Gen. Hardwicke.

18. Genus *Haliastur*, Selby.

19. *Ichthyaëtus cultrunguis*, nobis, I have already referred (vol. xii. 230) to *Haliaëtus blagrus*. Vide remarks on this genus in J. A. S. B. xii. 304.

21. Add *Milvus atolius*, Lesson, as a synonym.

25 a. There is another vulture, which I believe is the *Kolbii*, higher up the country, and which I am informed may occasionally be met with here, though I have not seen it. A young specimen from Nepal considerably resembles the young of the common *V. bengalensis* v. *leuconotus*, but has a much more lengthened cere, and a white rump.

\* Applied previously to a group of Kangaroos.

The following are the *Vulturidæ* of India known to me:—

1. *Gypætos barbatus*; *G. himalayanus*, Hutton, J. A. S. B. iii. 22. Himalaya.

2. *Polypteryx* (Hodgson) *cinereus*. Himalaya.

3. *Otogyps* (G. R. Gray) *pondicerianus*. India generally.

4. *Gyps fulvus*. Himalaya.

5. *Vultur* (*Gyps*?) *indicus*. Indian peninsula.

6. *Vultur bengalensis*. India generally.

7. *V. Kolbii*? Described as having a black naked neck, large white ruff, and fulvous plumage, when adult. Bengal and Nepal.

8. *Neophron percnopterus*.

Cat. No. 31. For *Buceros malabaricus* read *B. albirostris*, Shaw, which represents *B. malabaricus* of the Indian peninsula in Bengal, Nepal, Assam, and the Tenasserim provinces. *B. ginginianus* is also an inhabitant of Bengal.

33 a. *Merops Phillipinus* I have since obtained.

37. *Halcyon amauropterus*. Occurs at all seasons.

39. *Ceryle varia* (?), Strickland.

43. Is, I have reason to conclude, the *Picus goensis* as now recognised, which would take precedence of the synonyms given. I have lately described a beautiful new species allied to it as *P. (Chrysocolaptes, nobis) melanotus*; this was obtained at Midnapore, and may therefore be looked for in this more immediate vicinity. The present appears to me to be a very distinct form of woodpecker from that of *P. aurantius*, upon which Mr. Strickland founds his *Brachypternus* (P. Z. S. 1841, p. 31), referring to it *goensis* and *hæmatribon*, which latter, for certain, pertains to my *Chrysocolaptes*. It does not, indeed, appear to me that *Brachypternus*, with its rudimental fourth toe, need be separated at all from the tridactyle *Tiga*, which essentially accords in all other respects.

48. I have obtained other specimens of *Yunx torquilla*.

52. Read subgenus *Polyphasia, nobis*.

52 a. I strangely omitted to mention the Coël (*Eudynamys orientalis*), one of our most common species, though I incidentally referred to it in my notice of the Shahmour (*Copsychus macrourus*).

56. This agrees tolerably well with *Caprimulgus macrourus*, Horsfield, as described by Stephens in the continuation to 'Shaw's Zoology;' but I have sent a specimen to the India-house, by reference to which this question may be determined.

P. 96, erratum. The word "Mynab" occurs several times; I wrote *Mynah*. Line 8, for "wild" read *vile*.

No. 65. *Gracula indica*. This is the *G. religiosa* of Mr. Jerdon's catalogue, replacing in Southern India the true *religiosa* of Bengal, Nepal, and Tenasserim. I doubt its occurrence in this part of the country.

66, 67, 68. Genus *Acridotheres*, Vieillot.

69, 70. Genus *Sturnia*, Lesson. No. 70 is *Sturnia malabarica*, and the *Pastor malabaricus* of Mr. Jerdon's catalogue will now rank as *S. senex*, Jerdon.

74 a. *Malacocercus Earlei*, nobis. One of several new species added to this genus.

75. Mr. Hodgson has rightly indicated this as a new genus, by the appellation *Pyctoris*.

76. Should be *Orthotomus sutorius*, and *Bennettii* reduced to a synonym.

77. *Iora typhia* of Bengal, Nepal and Assam is distinct both from *I. zeylonica* of Southern India and from *I. scapularis* of the Malay countries.

79. *Geocichla citrina*; *Turdus citrinus*, Auct.

88 a. I have now received specimens of *Phyllopneuste* (or rather *Phylloscopus*) *trochilus* and *rufa* from England, which enables me to pronounce on the distinctness of the species noticed in xii. 230, which I have since described as *P. magnirostris*. I may also remark that I have just obtained a recently moulted specimen of *P. modestus*, wherein the mesial coronal streak is barely discernible, and would certainly not be observed unless specially looked for, whereas other specimens have it more or less conspicuously developed.

90 a. *Acrocephalus*, vide Ann. Nat. Hist. vol. xii. 231. I presume this species to be the *Sylvia rama* of Jerdon and Sykes.

112. *Lanius melanotus*, Cuvier, is the species enumerated. Another dull-coloured shrike, very common about Singapore, is the *L. magnirostris*, Lesson, since termed *L. strigatus* by Mr. Eyton.

126. The specimen referred to *Oriolus galbula* is, I am now satisfied, merely *O. aureus* in a particular state of plumage; and it is still the only example of this species which I have met with, though I have received both it and *O. chinensis* from Midnapore.

130. *Dendronanthus* (nobis) *indicus*; *Motacilla indica*, Gm. *M. variegata*, Vieillot, not of Latham. I have just obtained a beautiful specimen of this bird.

135. This appears to be identical with the *Alauda gulgula* of Mr. Jerdon's catalogue.

154 a. The *Vinago militaris* of Mr. Jerdon's catalogue is distinct from that of Bengal, and has the abdominal region green instead of gray. I have obtained, however, one specimen in this neighbourhood, and have designated the species *V. chlorigaster*.

168. *Coturnix flavipes*, nobis. I now much suspect this to have been *C. Phillipensis* in a particular state of plumage.

169. The *Turnix taigoor* of Southern India Mr. Jerdon now decidedly considers to be identical with *T. pugnax* of Sykes; but the Bengal bird is certainly different both from that species and *T. atrogularis* of Eyton, which latter extends up through the Tenasserim provinces to Nepal. Several Indian additions to this genus have been recently made.

175. *Ardea flavirostris*, Wagler, and *A. modesta* of Gray. I have obtained both in immature and adult plumage, some of each with the feathery train characteristic of the nuptial dress, that is to say, black-billed and yellow-billed specimens of the large Indian egret which agree in every other respect; and I have also obtained both old and young specimens with the bill partly yellow and partly black, some of these also having the dorsal train.

176. *A. putea*. I have also had both young and old specimens, the latter adorned with the train, of this egret with perfectly yellow

bills, which however is usually black-tipped when the bird is very young; and I have one with the train which has a considerable portion of its beak black.

181 *a*. *Ardea lepida* is now and then shot in this part of Bengal, but I have not yet procured a specimen. Mr. Jerdon has obtained it in Southern India.

188. *Argala capillata* (?). I did not see a single example of this species during the late season for these birds.

201, 202. These I have before expressed my presumptive opinion to be *Charadrius Geoffroyi* and *C. Leschenaultii*. I have forwarded specimens of both to the India-house.

206. *Himantopus asiaticus* of Lesson. It appears never to have the black cap of *H. melanopterus*.

209. This appears to be the *Totanus stagnatilis*.

220 *b*. Mr. Jerdon has obtained the *Calidris arenaria*; he also gets *Numenius phaeopus*, which I have not yet seen here; and his oyster-catcher is the *Hematopus longirostris*, which I have likewise received from Arracan.

234, 235. Are male and young female of the same species, which is also the *Gallinula plumbea* of Vieillot.

241 *a*. Two species of flamingoes occur here, the *Phænicopterus antiquorum*, Tem., more rarely, and the *P. minor*. I have had a fine series prepared of both.

263. *Plotus Vaillantii*. A bird of this species was brought to me some time ago, weak from want of food, caused by its having swallowed, or, I should rather say, attempted to swallow, a small Siluroid (*Bagrus teugara*), which had erected its pectoral spines and thus pierced the throat of the bird, the spines of the fish projecting on either side through the skin of its captor.

265. I have lately procured several specimens of both species of pelican mentioned.

266 *a*. *Rhynchops flavirostris*. Now and then observed upon the river opposite Calcutta, skimming and ploughing the surface of the water.

Nov. 2, 1843.

### XIX.—Observations on Ehrenberg's *De Mycetogenesi Epistola*, &c.

By ARTHUR HILL HASSALL, Esq.

IN the 'Annals and Magazine of Natural History' for November 1842 the following editorial remark occurs, appended to a notice of a paper read by me before the Microscopical Society of London, and entitled "An Explanation of the Cause of the rapid Decay of many Fruits, more especially of those of the Apple Tribe:"—

"Complete observations on this interesting subject have been made known by Professor 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.'"

A repetition of the substance of the same observation, affixed to a paper on the Influence of Fungi in the Production of Disease, in-

serted in the 'Annals' for August 1843, caused me to consult Professor Ehrenberg's 'De Mycetogenesi Epistola.'

The illustrious Professor of Berlin, after citing the various opinions entertained by naturalists as to the nature of Fungi, proceeds to give descriptions of certain species, together with the details of experiments performed with the view of determining the fact of their development from sporules or seeds.

The first species which the Professor describes, "*Ordeium Fructigerum*," he says, "springs up in PUTRID pears, apples, and plums in whatsoever manner cultivation shall have changed these. The most luxuriant crop usually proceeds from those apples which either hang from the tree or lie upon the ground, premature decay having invaded them. At 7 A.M. of the 20th day of August, I sowed the sporidia of this fungus in a *putrid* pear so cut up as that it should show similar plants wherever these were placed upon it. I thought moreover, that if any germs could proceed out of the sporangia, that this ought more readily to occur in a soil manifestly adapted to the nourishment of these plants, and experience taught me that all fungi would not grow in every putrid body. I performed the experiment in the following manner:—

"I cut up a pear, drew out with the moist point of a fine knife applied to the tufts of the fungi an abundance of sporidia, and deposited them in some internal part of the *putrid* pear. In this manner I placed many little heaps of sporidia near to each other, all being visible. I placed the pear in such a situation as that I could always procure it, but it was deposited in high grass every dewy morning, nor could it be touched by the sun. At 8 o'clock the next morning I sought for the grains sown yesterday. I saw all the heaps with the unaided sight shining as though adorned with silk, and some even were subhirsute. I concluded that now the germs had come forth. Immediately I removed with the point of a knife a small portion of one of the clusters, and being placed in a drop of water on a piece of glass, I separated it with the aid of two very fine knives. I saw the germs of the sporidia increased in diameter about a hundred times, and so distinct as that any one ought to be able to perceive them readily who sought for them after my method."

The above and other experiments with another fungus, *Rhizopus nigricans*, conducted, as Ehrenberg especially tells us, in precisely the same manner as the former, are the only ones which he performed with the view of determining the development of fungi in connexion with fruit. Now it is not a little curious to notice that the condition of the fruit experimented on should be so particularly referred to in the account, viz. that it was in a state of putridity or decay, as though it were conceived that such a condition was a circumstance essential to the development of the fungi; the worthy Professor little imagining (as was most probably the case, for it is a rare thing for a fruit, vegetable or flower to decay without the co-operation of fungi) that the sporules which he was at so much pains to introduce existed already in the decayed fruit, and that his sections did little more than present a direct way of egress to the filaments of the fungi.

From a consideration of the above-quoted remarks it is therefore evident, that Ehrenberg merely employed the putrid fruit as a nidus favourable for the growth of the fungi; that he did not inoculate sound fruit; that he had no suspicion of the real cause of its decay, much less an accurate knowledge of it, as the writer of the paragraph quoted in the commencement of this paper supposed; and that he has consequently in no way anticipated the observations made by me on the cause of the destruction of fruit, contained in certain papers read before the Microscopical Society of London.

Ehrenberg's epistle was undertaken, as its title implies, with a view of ascertaining the modes of reproduction and development of fungi, and for the purpose of disproving the dangerous doctrine of spontaneous generation; an endeavour which was eminently successful as regards the tribe of Fungi.

In the second paper of mine, referred to before, entitled "Observations on a Disease, the production of a Fungus, occurring in the Lettuce and other vegetables," ('Annals' for August 1843,) the following observation occurs:—

"One of the greatest peculiarities of the fungi consists in the preference which they manifest for organic matter in a concentrated form. But it has hitherto been supposed that their powers were confined to dead organic matter, which they speedily decompose, assimilate and remove," &c.

It was my intention to have added, and I thought that I had done so, after the word dead, "or diseased," and my omitting to do so subjected me to the underwritten remark of the editor:—

"This statement is by no means correct; the researches of Ehrenberg, Meyen, and many other physiologists have long since proved the falsity of this now antiquated notion."

That the omission of the words "or diseased" was an oversight, and that I was fully acquainted with the fact that fungi were sometimes found in the diseased living tissue, may be gathered from the perusal of the opening paragraph of my paper, which, as I wish to exonerate myself from so manifest an imputation of ignorance of a well-known fact, I may perhaps be pardoned for quoting:—

"The production of diseases through the agency of fungi, whether in the animal or vegetable fabric, has not hitherto received that degree of attention to which the frequency of their occurrence and the importance of the subject so eminently entitle them." Here then is a distinct admission of the existence of fungi in the diseased living organism. I must confess, however, that until very recently I was not aware that any other experiments were in existence proving the power of fungi to originate diseased action, not merely in the living tissue, but in it when in a perfectly sound condition of vitality, save those made known by me in reference to fruit, flowers and vegetables.

I now know, however, that unexceptionable experiments have been made to determine this point by Bassi and Audouin\*, who produced

\* Rapport sur divers travaux entrepris au sujet de la maladie des Vers

the destruction of the caterpillar of the silk-worm by inoculating it with a fungus; and by Dr. Hannover\*, by whom several sound freshwater salamanders were inoculated, and all successfully, some of the animals having died through the development of the fungi thus introduced. Other observers have probably adduced additional proofs of the same wonderful and important manifestation of the power of fungi in attacking and subduing the healthy living structure.

Cheshunt, Aug. 24, 1843.

*Observations on the preceding Communication.* By W. FRANCIS.

As the notes in question were inserted by me, it is but fair that I should receive any blame attaching to them. From the perusal of Mr. Hassall's observations on the first note, which obviously could have no reference to a paper published nine months later, and his conclusions as to what the writer of it supposed, the reader would imagine that Mr. Hassall had described the inoculation of sound fruit, explained the cause of decay, &c. &c.; he will therefore be not a little surprised, on referring to the paragraph to which the note was appended and to which it solely applied, to find that no mention is made by Mr. Hassall of sound fruit, but of the mode of growth of fungi in a "portion of *decayed* apple." Further observation is therefore unnecessary.

With respect to the second note, fortunately the two concluding paragraphs of Mr. Hassall's present communication completely justify its insertion; it will suffice that the reader should compare Mr. Hassall's paper in the August number of the 'Annals,' where he supposes himself to be the first discoverer of an interesting fact, with the two paragraphs in question, in which he confesses his total ignorance at that time of the numerous and complete experiments and observations that had been previously published on the subject, to judge how much the author has benefited by the editorial note of which he complains. I could not be aware of what it was Mr. Hassall's *intention* to have inserted; but when it was found to be broadly stated that the powers of Fungi were *CONFINED* to *dead* matter, it was the duty of the editors to their readers no less than to themselves to point out the incorrectness of the assertion. But supposing the word "diseased," which Mr. Hassall endeavours to show from the opening paragraph had been omitted by an oversight, to have been inserted, the note in question would not have been a whit the less correct, as is evident from Mr. Hassall's subsequent confession.

Mr. Hassall states that he "*now knows* that unexceptionable experiments have been made," but in fairness to myself he should have also stated how he came by his knowledge; he should have informed the reader that in an interview soon after the insertion of the last note, he denied altogether the accuracy of the statement, and that I

à Soie, connue vulgairement sous le nom de Muscardine. Par M. Dutrochet. — *Annales des Sciences Naturelles*, Partie Zoologique, tome neuvième.

\* Muller's Archiv.



immediately read to him an account of Dr. Hannover's successful experiments of inoculation on the freshwater salamander, and moreover furnished him with references to other papers on the subject. In return, Mr. Hassall endeavours to turn to account a slight inaccuracy in the note, in order to cover his admitted want of acquaintance with the subject upon which he had been writing.

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

### *Details respecting some parts of Mexico and their Vegetation\*.*

TOWARDS the end of 1840 the Danish government sent to Mexico M. Liebmann, a distinguished botanist, who had been several years preparing for this journey; he was accompanied by a gardener, who was to gather fresh plants and seeds for the botanic garden at Copenhagen. This little scientific expedition seems to succeed well; the gardener is already returned with a rich collection of living plants, amongst which are a hundred and twenty *Orchideæ*. M. Liebmann remains in Mexico and will not return until the spring of next year. The following are extracts from three of his letters, which appear to give full information respecting this country, so favoured by nature, and at the same time so unfortunate.

“ Vera-Cruz, February 21, 1841.

“ I intend to travel with Mr. Karwinsky, a Russian naturalist. The present condition of Mexico obliges those who would explore it to form a party of several together, in order to face the dangers to which the complete demoralization of the population, and the anarchy which everywhere exists, expose the traveller at each moment. It is a sad spectacle to see this fine country given up to universal pillage†. One step further, and all the ties and every law which govern society will have disappeared from it. Throughout nothing is to be seen but deceit and perjury. The interior of the country swarms with thieves, who rob and murder with perfect impunity. The few honest people who still remain bitterly regret the downfall of Spanish domination, and pray for its re-establishment; but what is Spain herself now? The only part of the Mexican people who may still be trusted are the Indians, and we consequently made up our minds as much as possible upon our excursions to make choice of the villages belonging to this nation to take up our abode at.

“ During our fourteen days stay here, we have been almost exclusively occupied with the necessary preparations for our journey. There are at present difficulties to surmount, with regard to this, of which no one can form any idea. Nothing can be obtained without paying extravagant prices; and if we did not reckon upon the hospitality of the Indians, the last remaining virtue that reminds us of

\* Extracted from the *Flora*, February 1843, as given in the *Bib. Universelle de Genève*, July 1834.

† The article relating to the journey of Mr. Stephens (*Bibl. Univ.* May 1843, p. 71 and following) contains details no less deplorable respecting the political and moral state of central America and of Yucatan.

the better times which have disappeared, we must be bankrupts. I give some examples of this dearness of all things, which has not diminished in spite of the universal distress which weighs upon the country: wretched mules covered with sores, fifty good piastres each; the keep of the eight which we have bought, costs us here at Vera-Cruz, six piastres a day; we pay sixteen piastres a month to the *mozo* who leads them; an old second-hand Mexican saddle, twenty piastres; a pair of *armas de aqua*, calf-skins attached to the saddle to protect the legs of the rider against rain, and in the woods against thorns, twelve piastres; and the *colchores* and *coquinillos*, kinds of wallet, eight piastres; a hammock, six piastres; a musqueteer, eight; the carriage of a mule's load from hence to Mexico, thirty piastres, &c. &c. Judge from these of the expense to which a traveller must be subjected, whether for his own outlay or in order to forward his collections. For this reason we preferred procuring a sufficient number of beasts of burthen at first, so as not to be obliged to hire fresh mules and conductors in the interior, which would cost us even much more. On account of the insecure state of the country, and of the almost absolute impossibility of joining a long caravan in the steep mountain-passes, it was necessary also to make up my mind to separate myself from the greater part of my baggage and my books, and to leave them at Vera-Cruz; I only keep by me the most indispensable instruments of observation.

“ In two days we set off. We shall pass by Antigua, Papantla, Misantla and Tuzpan; then, crossing the high table lands of the interior, we shall reach the zone of the *Echinocacti* and of the *Melocacti*; thence we shall pass the foot of the volcanoes of Perote and Orizaba on the west.”

“ Xicaltepec, April 9, 1841.

“ We have reached this village in good health after a journey of sixty leagues from Vera-Cruz. The whole of the country we have just passed through is a part of what is called *Tierra caliente*, burning earth: the greater part of our route was across the scorching sands on the sea-coast, and the remainder at a distance of eight or ten leagues from the coast, amongst the low mountains which run parallel to the high mountains of the interior and decline towards the sea, thus forming a series of terraces. The vegetation with which I have become acquainted in this region certainly equals in richness that of the most interesting parts of Peru, and at the same time it is very little known, because the yellow fever which often prevails in this zone, and the insupportable scourge of myriads of all kinds of insects which allow of no rest by night or day, have hitherto kept most naturalists away. I have not yet suffered from the heat of the climate, but my companion took a fever at Colipa, from which, however, he recovered in a week. Colipa, the first Indian village we met with, is ten leagues from the coast, amidst mountains covered with the most magnificent virgin forests of so varied a vegetation, that in a week's time M. Karwinsky made a collection of 100 kinds of hard woods. We remained twenty-seven days in this place, both on account of our rich harvests and because it was impossible to find a dwelling at

Misantla, the centre of the vanilla trade, where we had reckoned on being able to stop.

“Misantla, as to corruption, need not envy the richest mining villages: vanilla has introduced the same demoralization there that the precious metals have brought elsewhere. In all the forests of the hot region where this plant grows, money has hardly any value, and consequently all provisions are without a price. A man has only to go into the woods, as one may say, to gather piastres. It is astonishing to what a price this substance rises in the very place where it is produced. Each pod (gousse) while yet green is paid for at the rate of twelve to eighteen shillings by the first buyer, who then sells it to the merchant at Papantla. A thousand of these pods or capsules are packed together in leaden cases, which are afterwards covered with cedar-wood and sent to Vera-Cruz. And what a difference between the price of vanilla and that of sarsaparilla! Whilst the former costs almost more where it grows than it does in Europe, only three reals (1.15 franc of France) are paid for twenty-five pounds of sarsaparilla; and 180 pounds of this same drug only bring the poor Indian the price for which a single pound is sold in Germany! Yet how much more difficult is it to turn up the earth in order to procure the long roots of this plant, which creep about in the thickest parts of the woods, than to reach out the hand, and so at once to gather fifty pods of vanilla, which each stalk of this orchideous plant bears!

“Mexico is not so poor in species of palms as has hitherto been supposed. That which particularly characterizes the warm region is the *Acrocomia spinosa*, Martius, whose fruit serves as food for the Indians. The cocoa-nut tree grows on the hill-sides, but I have not yet met with it wild. Near the Laguna Verde I have found some magnificent forests of *Sabal mexicanum*, Martius, with trunks forty feet high and as hard as those of our fir-trees. These forests are very picturesque, and especially remarkable from no other kind of tree being mixed with the palms. In the virgin woods over the whole extent of coast we found a magnificent palm, which they here call the *Palma real*. The petioles are nearly fifty feet long; they are extremely hard and have four or five angles; the folioles are linear, ranged in two rows; the trunk is excellent timber; the fruit, which is as large as a plum, serves as food for cattle. In the mountain forests the species of *Chamadorea* prevail, with lank slender stalks and only from four to ten feet high. Along the wild path which leads across the almost impenetrable virgin forests to the village of Xicaltepec, there grows a remarkable new palm, with a stem of a finger's thickness, from ten to twelve feet high, the wood black and excessively hard; the petioles are six feet long, and it is quite covered with sharp black thorns two inches long. We gathered several new *Cycadeæ*. Another family which promises some fine discoveries is that of the *Aroideæ*; they occupy a very prominent part in the physiognomy of the virgin woods; all the trunks of trees are clothed with them. Above all, we find some new and gigantic species of *Caladium* with petioles three feet long, bearing leaves which are sometimes

rounded, sometimes jagged, sometimes pierced with holes. Immense *Pothos* are also parasites on the trees, or spring out of clefts in the rock; in the marshy places numerous species of *Arum* grow, one of which has leaves four feet long and two broad. The difficulty, or rather the impossibility of drying specimens of these plants, is one of the reasons why they are still so imperfectly known."

"Turutlan, May 15, 1841.

Beginning of the rainy season.

"From Santa-Maria of Tlepacoyo, situated at twenty leagues from the south of Papantla, in the *Tierra caliente*, it takes only eight or ten hours, mounting to the westward, to cross what is called the *Tierra templada*, or temperate region, and to reach Turutlan, a small town situated at the entrance of the cold region, *Tierra fria*. Nowhere else, I think, could the naturalist observe in so short a space of time vegetation under such different aspects. Although the first village, Santa-Maria, is from eight to nine hundred feet above the sea, and on that account beyond the region of musquitos and those legions of other insects which infest the coast, yet the thermometer rises from 25 to 30 degrees of Reaumur during the day, and the vegetation is quite tropical. We ascend thence across the temperate region as far as the Cordilleras, and the beautiful tree-fern, the *Cyathæa mexicana*, was the first indication that we had left the *Tierra caliente*; magnificent oaks with glossy leaves compose the forests, and many smaller plants remind the botanist of the neighbouring European species. Buildings of stone or of wood take the place of bamboo huts. As we continue to ascend, we meet with the *Liquidambar styraciflua*, the first tree characteristic of the *Tierra fria*; at every step the forms of the vegetables are more like ours, although mixed with a multitude of others peculiar to this country. On the neighbouring heights magnificent forests of pines rise majestically, and the declivities are adorned with shrubs of *Arbutus* and *Vaccinium*, with flowers larger and more beautiful than our species of the same genera, as well as with a *Rhexia* with deep red corymbs.

"The *Alnus Jorullensis*, which greatly resembles the alder of our own country, accompanies the traveller as far as the elevated table lands of the interior. It is here that the aspect of nature suddenly changes, and that we might believe ourselves transported into central Europe: instead of a clear sky we again find the clouds and the grayish tints of our northern regions; fogs veil a part of the plain, and dark clouds rise and descend all day along the mountain-sides. Whilst in the hot region thick forests filled with climbing plants cover the whole face of the country, and the lands cleared by the Indians are merely small spaces where they have set fire to the wood, and where they cultivate just enough maize and beans to subsist on; here, on the table land, as far as the eye can reach, we see well-cultivated fields of the same plants, as well as of other cereals. On heaps of stones laid in the form of dikes grows the *Agave americana* or *Maquay*, which produces the wine of the country; the enclosures are formed of quickset hedges of *Mespilus pubescens* and other shrubs. Apple-trees of a bad sort, the *Prunus Capuli*, a kind of cherry-tree,

whose fruit is somewhat different from ours, and rose-trees covered with innumerable flowers, afford their shade to farm-houses built of stone in the style of the houses of southern Europe, or constructed of timber. A beautiful willow of pyramidal form surrounds the churches, and gives to the villages a picturesque aspect from a distance. Apricot and peach trees grow in the gardens of the peasants. The most important plant of all which are cultivated is the *Sechium edule*, a cucurbitaceous plant whose growth is immense, and which produces in the course of a year a most astonishing quantity of fruit. It surrounds everything about it with its climbing stalks; it often covers entire houses and descends on the other side of the roof. It would without doubt bear our climate, and would be a great resource for the poorer classes. The soil of these table lands is formed of a light sandy clay, yellowish and extremely fertile when not exposed to too long a drought; this clay rests upon a friable grit. The plain is furrowed with deep ravines or *barrancos*, at the bottom of each of which is a water-course; there we find syenite, granite and argillaceous schist, upon which the formations above mentioned repose. Above the plains, to about 2000 feet, there rise heights, for the most part calcareous. The mean temperature of these table lands, at  $20\frac{1}{2}^{\circ}$  of north latitude, was in May  $13^{\circ}$  Reaumur, and the temperature of the soil gave the same result.

“The forest vegetation, which quite disappeared on the table land itself, consists on the heights of different species of fir, of oak and of alder. In the environs of Turutlan, nine different species of the first genus may be counted, two of which are new. The most remarkable are the *Pinus Montezumæ*, *Pinus Teocote*, and especially *Pinus Ayacalmite*, which Ehrenberg first made known a few years ago, whose trunk rises to 120 feet, and whose cones attain the length of from fifteen to sixteen inches. This magnificent tree would doubtless grow in our country, for during the winter months abundant snow falls here in the places where it lives, and the climate is cold and moist all the year. It would be a valuable acquisition on account of its resin, which has an agreeable smell, and which is so abundant that it flows from the cones in limpid drops. These pine woods are also mixed with oaks of five different species, and just as in European forests of this nature, but few herbaceous plants grow under their shade; amongst others a variety of our *Pteris aquilina* and the *Myrica xalapensis*, which takes the place of our *Arbutus Uva-ursi*. In the same way, the *Helianthemum glomeratum* here takes the place of our *Vaccinium Myrtillus* and heath, and amongst its tufts creeps the *Fragraria mexicana*, which much resembles our common strawberry. The *Viscum vaginatum* grows as a parasite on the pine-trees. A quantity of noxious European weeds, amongst others the *Urtica urens*, have accompanied man up to this table land: the sterile and uncultivated lands are covered with a very low underwood of oak and alder, with the *Helianthemum*, *Pteris* and *Myrica* which I have just mentioned, and they have quite the same appearance as regions of similar nature in Europe. A large species of rabbit lives upon these heaths, and is the only wild mammiferous animal of these table lands;

there are also but very few species of birds. If we descend from these sterile plains into the barrancos, we directly find a richer and more luxuriant vegetation.

“The vegetation of the heights, which break the uniformity of the table land, is also very poor in species, but always richer in the gorges than on the declivities. Together with others, amongst the blocks of syenite, we remarked a *Pitcairnia* with red flowers, the *Cereus flagelliformis*, the *Pentstemon fruticosum*, a magnificent new gesneriaceous plant with a unilateral raceme, and having a purple corolla from two to three inches long; two Agaves, two beautiful new *Stachys*, the *Fuchsia arborea*, and other kinds.”

M. Liebmann has subsequently made an excursion to the famous Peak of Orizaba, the height of which is known to be nearly 17,000 feet. He remained fourteen days upon the mountain, in a place called the *Vacqueria del Jacal*, which is nearly 10,000 feet above the sea. We shall hereafter give an account of this interesting part of his journey.

#### BIBLIOGRAPHICAL NOTICES.

*Narrative of a Voyage round the World.* By Capt. Sir E. Belcher, R.N., &c. 2 vols. 1843, London.

To notice the contents of the larger portion of this highly interesting work does not fall within the objects of these ‘Annals,’ but an article appended to the second volume does quite accord with them. The paper to which we refer is of very high interest to the student of botanical geography, and is entitled “The Regions of Vegetation, being an Analysis of the Distribution of Vegetable Forms over the surface of the Globe, in connexion with Climate and Physical Agents,” by Richard Brinsley Hinds, Esq., Surgeon, R.N. The author divides the world into 48 regions of vegetation, of which 10 belong to North America, 7 to South America, 7 to Australia, 7 to Africa, 10 to Asia, 6 to Europe, and 1 is Oceanic. Each of these is considered under five heads: 1. as to its *Extent*; 2. its *Physical Characters*, under which are included accounts of its plains, mountain ranges, rivers, geology and soil; 3. *Climate*; 4. *Flora*; 5. *Relations* with the other regions.

Our space will not allow of going into detail or quoting any portion of this elaborate dissertation, which extends to 136 pages, but we cannot recommend it too strongly to our readers, and must at the same time express our sorrow that it is only to be had as forming a part of so large a work.

*Elia Fries Novitarum Floræ Suecicæ Mantissa tertia.* 8vo. Lund and Upsal, 1842.

We have recently, through the kindness of its distinguished author, received this third Mantissa to the well-known ‘*Novitiæ Floræ Suecicæ*’ of Fries. It contains 204 pages, and is accompanied by a ge-

neral index and title, so as to form the three Mantissæ into a volume. It is totally impossible for us to give any idea of the valuable contents of this book: to those who are already acquainted with its author's other works, it is quite unnecessary to say anything in its praise; and to such as are not, we have only to recommend that they should form an acquaintance with them immediately.

*A Report on the Progress made in the Investigation of the Flora of Hertfordshire, with a Catalogue of Species known or reported to have been found.* By the Rev. R. H. Webb, M.A., of Essendon, and the Rev. W. H. Coleman, M.A., of Christ's Hospital, Hertford.

We notice this tract in order to call the attention of such botanists as may have any acquaintance with the plants of Hertfordshire to the Flora which is in preparation, in the hope that they may be induced to assist the authors in their undertaking. This list of 885 species which have been noticed in that county is not published, but will be given to all who desire to possess it on the receipt of a "postage stamp for the purpose" by the authors. We cannot too strongly recommend this plan of previously circulating a list (the example of which was, we believe, first set by Dr. Bromfield, who is preparing a Flora of the Isle of Wight), to all who may have local floras in preparation.

*Spicilegium Floræ Rumelicæ et Bithynicæ.* Auctore A. Grisebach. Fasc. 1. Brunswick, 1843. 8vo.

This is the first part of a work intended to include all the plants that have been found in the provinces of Bosnia, Servia, Bulgaria, Albania, Macedonia and Thracia, and is the result of the examination of specimens collected by Grisebach, Friedrichsthal, Frivaldzki and Pestalozza, and the descriptions of Buxbaum, Forskäl, Sibthorp, Sestini and others. Such a work was much wanted, and the name of its author ensures its excellence.

*Flora Dalmatica, sive Enumeratio Stirpium vascularium quas hactenus in Dalmatia lectas et sibi observatas descripsit, digessit, rarorumque iconibus illustravit* Rob. de Visiani. Vol. i. 4to. Leipsic, 1842.

It had long been hoped that the distinguished author of this work would favour botanists with a flora of his native and almost unknown country. Its situation on the eastern shore of the Gulf of Venice, and its very peculiar structure, consisting of a narrow strip of territory formed of islands, deep inlets of the sea, and lofty mountains, render any list of its native plants greatly interesting, but a complete flora from the hands of Dr. Visiani has peculiarly strong claims to attention.

*Sertum Plantarum, or Drawings and Descriptions of Rare or Undescribed Plants from the Author's Herbarium.* By H. B. Fielding, F.L.S. and R.G.S., assisted by G. Gardner, F.L.S. Part I. 8vo. London, 1843.

This is the first part of a work on the same plan, and similarly executed, with Hooker's 'Icones Plantarum,' and we cannot but wish

it all success. We consider that the example set by Sir W. J. Hooker is highly deserving of imitation, as, although none can more admire splendid botanical plates, still we feel that cheap but correct working drawings, such as are supplied by this work and the 'Icones Plantarum,' are of far greater real use to botanists, many of whom are precluded by their price from becoming possessors of more beautiful but not more accurate works.

## PROCEEDINGS OF LEARNED SOCIETIES.

### ROYAL SOCIETY OF EDINBURGH.

Dec. 18, 1843.—Dr. Abercrombie in the Chair.

The only communication of the evening bearing on natural history was a paper by Professor Traill "On the Luminousness of the Sea, and on some of the Animals which appear to produce it."

The author stated that this phenomenon seems scarcely to be noticed in the writings of Aristotle or of Pliny which have reached us, though Pliny was familiar with the light emitted by certain shell-fish, and by the *Sea Lung* or Medusa.

Mr. Boyle gives an account, from the journal of a ship-master, of the luminousness of the sea; and it is particularly detailed, from personal observation, in the Indian Voyage of Father Bourzes in 1704.

The first philosophers who ascribed it to light emitted by living animals would seem to be the Abbé Nollet, Professor Vianelli, and Dr. Gressellini of Venice, about the middle of the last century. In Cook's first voyage, the luminous properties of several marine animals are well described by Banks and Solander; and in his second voyage by Forster. Spallanzani made some good experiments on the phosphorescence of a Medusa in the Straits of Messina.

Since that period the catalogue of Noctilucous animals has been greatly enlarged, especially by Perou and LeSueur, the naturalists to the French 'Voyages des Découvertes aux Terres Australes.' A good paper on the Luminousness of the Sea, by Mr. Macartney, appeared in the 'London Phil. Trans.' for 1810, in which the phenomenon is ascribed entirely to living animals; an opinion now generally embraced by naturalists.

The author then detailed his own experiments and observations, made from early life, in different parts of the European Atlantic from lat. 62° to 36° N., chiefly around the shores of Britain, all which confirmed this opinion.

He detected in 1814 several of the same noctilucous animals in the waters of the Bay of Biscay as in our own seas, especially the *Noctiluca miliaris*, *Orithya minima*, and a very minute Crustacean, seemingly a *Zoë*.

Besides these, the *Beroë fulgens* of Macartney, and several other Medusaria, he found two very remarkable animals in the luminous waters of the seas around the Western Isles of Scotland; one an *Æquorea*, most splendidly phosphorescent, which seems to be *Æquo-*



*rea Mesonema* of Eschscholtz ; and the other a most elegant *Cydippe*, probably the *Cydippe pomiformis* of Patterson. Both were carefully figured from life by the author, and magnified drawings of them were exhibited to the Society.

The paper was concluded by some strictures on the hypothesis of Lamarck respecting the absence of muscular power and of voluntary movements in the order of *Radiatares Mollusces*. He gave the results of many experiments which he had made on the movements of the *Medusa*, and which convinced him that they possessed considerable muscular power obedient to volition ; and he ascribed the erroneous views of Lamarck on this subject to his little familiarity with those animals in their natural haunts ; for a *Medusa* swimming in the sea, and cast on the beach, has very different capabilities of locomotion.

#### BOTANICAL SOCIETY OF EDINBURGH.

This Society held its second meeting for the season on Thursday January the 14th, W. C. Trevelyan, Esq., in the Chair.

Professor Graham read the continuation of his botanical tour to the South of England and Jersey ; in the course of which he mentioned the various plants observed so far as peculiar to those districts, or only of rare occurrence in Scotland. He was rather surprised to notice species growing in considerable quantity that have, for the most part, been very sparingly supplied to the Society ; a circumstance which shows the desirableness of English botanists keeping in view, when making their annual collections, that such species, though not uncommon to them, must be always in demand among their Scotch brethren. The Professor also made some observations on the climate and general aspect of the island of Jersey, in reference to its height above the level of the sea, the nature of its soil, &c., as bearing on the vegetation. At the close of public business the meeting proceeded to the election of office-bearers for next year, when the following gentlemen were appointed, viz. President, Professor Graham ; Vice-Presidents, Dr. Neill, David Steuart, Esq., W. C. Trevelyan, Esq., and W. H. Lowe, Esq., M.D.

Jan. 11, 1844.—Professor Graham, President, in the Chair.

1. Read "A short Notice of some recent Improvements on Ward's Plant-cases," by their inventor. The principal improvement consists in dividing the case into several compartments with different soils in each ; so that plants which naturally grow in moist situations may thrive under the same roof with others usually found in drier localities.

2. "A Catalogue of the *Musci* and *Hepaticæ* of Teesdale," by Mr. Richard Spruce of the Collegiate School, York. This highly interesting paper, in which six species new to the British flora are described, was illustrated by a series of beautiful specimens, for which the thanks of the Society were specially voted to Mr. Spruce.

3. "Notes on a new *Cœnanthe*," by the Rev. W. H. Coleman. Drawings of the fruit and leaves were exhibited to the meeting to

show the difference between it and *Æ. Phellandrium*, to which it is nearly allied. As this and the preceding paper will appear at length in the 'Annals and Magazine of Natural History,' it is unnecessary here to give an abstract of them.

4. Mr. James M'Nab read the first part of a journal kept by him while on a tour through the United States and the Canadas, during which his attention was chiefly directed to the botany and horticulture of these countries.

Mr. Trevelyan laid before the meeting cones of *Pinus sylvestris*, exhibiting on the one side the character of *P. sylvestris*, and on the other that of *P. Mughus*. He stated that the cones were taken from a tree near Taunton in May 1843, differing in no other respect from the ordinary state of *P. sylvestris*, and the phænomenon now presented by them appears to substantiate the views of those botanists who believe the two species to be identical.

#### ZOOLOGICAL SOCIETY.

March 14, 1843.—William Yarrell, Esq., Vice-President, in the Chair.

A paper by Mr. G. B. Sowerby was read, containing the following descriptions of new species of Shells belonging to the genus *Cyclostoma*. The species described are chiefly from the collection of H. Cuming, Esq.

**CYCLOSTOMA SUTURALE.** *Cycl. testâ orbiculato-depressâ, tenui; epidermide olivaceâ indutâ; anfractibus 3-4 rotundatis, transversim tenuissimè striatis; aperturâ circulari, supernè emarginatione obsoletâ; peritremate tenui, margine acutiusculo; umbilico patulo; operculo concinnè spirali.*

*Hab.* in umbrosis Demeraræ.

A few specimens of this species were received many years ago by G. C. Bainbridge, Esq., of Liverpool.

**CYCLOSTOMA RUGULOSUM.** *Cycl. testâ orbiculato-subdepressâ, tenui, translucidâ; anfractibus 4-5 rotundatis, rugulosis; suturâ distinctâ; aperturâ rotundatâ, supernè acuminatusculâ; peritremate tenui, margine acutiusculo; umbilico magno.*

*Hab.* in Jamaicâ.

Found among the shells in the collection of the late G. Humphrey.

**CYCLOSTOMA SEMISTRIATUM.** *Cycl. testâ orbiculato-subdepressâ, tenui, albâ, fasciis pallidè fuscis interruptis; spirâ subprominulâ, apice obtusiusculo; anfractibus 4-5 rotundatis, supernè longitudinaliter striatis, infrâ levibus; suturâ distinctâ; aperturâ circulari, supernè subacuminatâ; peritremate obsoletissimè subreflexo, tenui, margine acutiusculo; umbilico magno; operculo sulco externo spirali, anfractibus 4-5.*

*Hab.* in Indiâ Orientali, in regione Poonah dictâ.

**CYCLOSTOMA TRANSLUCIDUM.** *Cycl. testâ subglobosâ, subpellucidâ, albâ; epidermide corneo-indutâ; spirâ breviusculâ, obtusâ; anfractibus quatuor rotundatis, propè suturam elevatusculis, striatis, supernè rugulosis; aperturâ subcirculari, supernè subacuminatâ;*

*peritremate acuto; umbilico mediocri; operculo testaceo, tenuiusculo, anfractibus septem, striatis.*

**CYCLOSTOMA BRASILIENSE.** *Cycl. testá orbiculato-subdepressá, tenui, albá, opacá; anfractibus 4-5 rotundatis, transversim striatis; suturá profundiusculá; aperturá circulari; peritremate tenui, acuto; umbilico magno; operculo testaceo, duplicato, extùs tenuissimè spirali.*

*Hab.* in umbròsis propè Rio Janeiro, Brasiliæ.

**CYCLOSTOMA GIGANTEUM.** *Cycl. testá orbiculato-subdepressá, crassiusculá, albicante; epidermide corned, fulvá, indutá, apice rufescente; anfractibus 5-6 rotundatis, transversim striatis, striis supernè validioribus; suturá distinctá; striá longitudinaliter impressá propè suturam; aperturá subeffusá, supernè angulatá et in canalem inconspiciam subdecurrente; peritremate subincrassato; umbilico magno; operculo lineá elevatá spirali, interstitiis obliquè striatis.*

*Hab.* in sylvis propè Panamam.

**CYCLOSTOMA CORRUGATUM.** *Cycl. testá orbiculato-subdepressá, crassiusculá, albidd, apice rufescente; epidermide tenui, fuscá, indutá; spirá subprominulá, acuminatusculá; anfractibus quinque rotundatis, transversim striatis et corrugatis; suturá distinctá; aperturá circulari, subeffusá, supernè angulatá et in canalem inconspiciam desinente; peritremate tenuiusculo, margine acutiusculo, latere umbilicali incrassato; umbilico magno, margine crenulato, intùs transversim striato; operculo testaceo, extùs lamind elevatá, convolutá, intùs corneo, polito.*

*Hab.* Jamaica.

**CYCLOSTOMA CLATHRATULUM.** *Cycl. testá subglobosá, crassiusculá, obscurá; spirá subconoidali, apice obtusiusculo; anfractibus quatuor ad quinque rotundatis, supernè longitudinaliter tenuiter striatis, infrá lævibus; aperturá subovali, supernè angulatá; peritremate incrassato, suprâ umbilicum mediocre paululùm extenso.*

*Hab.* apud Yemen, Arabiæ.

**CYCLOSTOMA TIGRINUM.** *Cycl. testá suborbiculari, conicá, crassiusculá, læviusculá, pallescente, strigis irregularibus, transversis, saturatè brunneis pictá; spirá subacuminatá, submammillari; anfractibus quinque, raptim crescentibus, rotundatis, plerumque carinis tribus vel quatuor subobsoletis; aperturá magná, orbiculari, posticè subemarginatá; peritremate reflexo, albo, incrassato, propè ultimum anfractum subinterrupto; labio columellari subextenso umbilicum mediocre partim tegente; suturá distinctá; operculo tenui, corneo, multispirali, anfractuum marginibus lamellosis. Long. 1·0; lat. 1·25 poll.*

Mr. Cuming has collected the following varieties, viz:—

Var. *a.* Shell with three rather indistinct spiral ridges; peritreme nearly white.

Var. *b.* Shell with three rather indistinct spiral ridges; peritreme dull brown. Found under decayed leaves in the island of Guimaras.

Var. *c.* Shell with a more elevated spire and with three prominent spiral ridges, together with some small interstitial ridges. Found under decayed leaves in the island of Masbate.

Var. *d.* Shell dark brown, with less conspicuous streaks; aperture orange-brown. Found under decayed leaves in the island of Leyte.

Var. *e.* Shell like var. *d.*, but larger and paler. Found under decayed leaves at Catbalonga, in the isle of Samar.

Var. *f.* Shell prettily variegated with dark brown. Found on leaves of bushes in the island of Siquijod.

Var. *g.* Shell small and thicker, with rather elevated spire and prominent ridges. Found under decayed leaves at Baclayan.

CYCLOSTOMA PILEUS. *Cycl. testá conicá, tenui, albidá, fusco pallidissimè nubeculatá; spirá subacuminatá; anfractibus quinque, planulatis, anticè carinatis; aperturá rotundato-subtrigond, extùs angulatá; peritremate albo, reflexo, labiis posticè disjunctis; umbilico parvo.* Long. 0·7; lat. 0·6 poll.

*Hab.* infra foliis putridis apud Sinait, provinciæ Ilocos meridionali, insulæ Luçon. H. Cuming.

Var. *a.* Shell pale brown, mottled; peritreme white. Found at Sinait.

Var. *b.* Shell white. Found in the same situation and locality.

Var. *c.* Shell white, larger than var. *a* and *b*, with a sharper keel. Found on leaves of trees at St. Juan, in the province of Cagayan.

CYCLOSTOMA LINGUIFERUM. *Cycl. testá suborbiculari, subconicá, crassá, pallescente, maculis saturatè brunneis angulatim variegatá; spirá subacuminatá, submamillari; anfractibus quatuor, rotundatis, levibus, spiraliter obsolete striatis; aperturá magná, orbiculari; peritremate incrassato, subreflexo; labio internè linguam latam efformante; umbilicum partim tegente.* Long. 1·1; lat. 1·25 poll.

*Hab.* infra foliis putridis, in sylvis, apud Loboek, insulæ Bohol.

Var. *a.* Light brown, variously mottled with dark brown.

Var. *b.* Much paler in colour, and having the spiral striæ much more distinct.

Var. *c.* Yellowish brown, with an orange mouth.

CYCLOSTOMA LISTERI, Gray. *Cycl. testá subglobosá, crassiusculá; spirá conoided, subacuminatá; anfractibus 4-5 rotundatis, levibus, nonnunquam supernè longitudinaliter obsolete striatis; suturá distinctá; aperturá circulari; peritremate subincrassato, supernè angulato, latere umbilicali calloso, callo umbilico partim obtegente; umbilico parvo, spiraliter striato.*

Var. *a.* *Testá omnino albicante.*

Var. *b.* *Testá pallidè fulvá, fasciá inferiore fuscá.*

*Hab.* in insulâ S<sup>th</sup> Mauritiî.

Mr. Lovell Reeve's descriptions of various new Shells, about to be figured in the 'Conchologia Iconica,' were then read.

PLEUROTOMA GARNONSII. *Pleur. testá elongato-turritá, gracillimè fusiformi, albidá, transversim multicarinatá, carinis maculis parvis rubido-fuscis vividè pictis; anfractibus convexis, macularum gran-*

*dium serie superne ornatis; anfractu ultimo infra fusco-fasciato; canali plus minusve elongato.*

*Pleurotoma Babylonia* var., Kiener.

Long.  $2\frac{1}{2}$ ; lat.  $\frac{1}{2}$  poll.

*Hab.* Island of Zebu, Philippines.

We have much pleasure in dedicating this species to our excellent friend the Rev. W. L. T. Garnons, F.L.S. &c. The labour which this worthy gentleman has bestowed on the arrangement of the Woodwardian collection of shells at Cambridge bears ample testimony of his zeal for the science. Several specimens have lately made their appearance in London, but we are not aware from whence they have arrived. The above locality is obtained from a single specimen found by Mr. Cuming at that place, lying dead upon the shore at low water.

*PLEUROTOMA SPECTABILIS.* *Pleur. testâ subelongato-turritâ, multicingulatâ; albâ, cingulis nigro-maculatis, maculis grandibus et parvis, numerosissimis, anfractibus convexis, supra et infra fusco-fasciatis; canali brevi, leviter flexuosâ.* Long.  $2\frac{1}{2}$ ; lat.  $\frac{5}{8}$  poll.

*Hab.* Island of Ticao, Philippines (on the reefs).

The spotting is of a more numerous and miscellaneous character in this species than in any of the genus, though it presents in certain respects a modification of that in the preceding species. The dusky band which girds the lower portion of the whorls in that species is exhibited both round the lower and upper portions in this, and the number of spots is apparently doubled in like manner; the canal is short, and presents a great peculiarity of character.

*PLEUROTOMA EXASPERATA.* *Pleur. testâ turritâ, anfractibus in medio tuberculato-muricatis, tuberculis solidis acutis; albâ, anfractu ultimo zonâ fuscâ cingulatâ; canali brevissimo; columellâ albâ, superne callosâ; apertura fauce albo.* Long.  $\frac{7}{8}$ ; lat.  $\frac{3}{8}$  poll.

*Hab.* — ?

This interesting little shell resembles the *Pleurotoma unizonalis* in being surrounded with a single clear dark band; but it differs, first, in being of a more turreted form; secondly, in having the whorls encircled with a sharp row of tubercles instead of longitudinal ribs; and thirdly, in the columella and interior being white, whereas in that species it is always brown.

*PLEUROTOMA ARCUATA.* *Pleur. testâ arcuato-fusiforâ, tenui, inflatâ, subpellucidâ, anfractibus lineatis, in medio acutè carinatis, carinâ maculis fuscis regularibus ornatâ; labro externo rotundato ab anfractu ultimo sinu lato separato; canali gracili, arcuato, spirâ longitudinem æquante.* Long.  $1\frac{3}{8}$ ; lat.  $\frac{3}{8}$  poll.

*Hab.* Coast of Veragua, Central America.

A few specimens only of this inflated transparent-looking shell were collected at the above-mentioned place by R. Hinds, Esq., of Her Majesty's ship 'Sulphur,' a zealous and intelligent conchologist.

*PLEUROTOMA PICTA* (Beck, MSS.). *Pleur. testâ acutissimè turritâ, solidâ transversim carinatâ, albâ, carinis perspicuis, subdistanti-*

*ous, maculis fuscis perparce pictis, carinâ superâ valdè maximâ, labro fissurâ parvâ, subcentrali; canali recto, spirâ longitudinem æquante. Long. 2; lat.  $\frac{1}{2}$  poll.*

*Hab.* Panama, St. Blas, Gulf of Nicoya, &c.

This shell is of a straight solid growth, and cannot well be confounded with any species hitherto described.

**PLEUROTOMA PAPALIS.** *Pleur. testâ fusiformi, acutè turritâ, pallidè luteo-brunnescente, anfractibus supernè concavis, longitudinaliter leviter liratis, liris numerosis, anfractu ultimo pallidè albo-fasciato; canali brevi. Long.  $1\frac{7}{8}$ ; lat.  $\frac{1}{2}$  poll.*

*Pleurotoma mitraformis* var., Kiener.

*Hab.* — ?

After carefully examining one or two specimens of this shell, which Kiener describes as a variety of the *Pleurotoma mitraformis*, I am forced to the conclusion that it is specifically distinct.

**PLEUROTOMA OBESA.** *Pleur. testâ obeso-fusiformi; spirâ turritâ, anfractibus luteolis, supernè albis, lineis fulvis, obliquis, longitudinaliter venosis; labro acuto, sinu subcentrali; canali mediocri, brevi subitò reflexo. Long.  $1\frac{3}{8}$ ; lat.  $\frac{1}{2}$  poll.*

*Hab.* — ?

The solid obesity of this shell has suggested the above title.

**PLEUROTOMA VIRGINEA** (Beck, MSS.). *Pleur. testâ fusiformi-turritâ, pallidè luteolâ; anfractibus in medio angulatis, tuberculis minutis albis seriatim cinctis; anfractu ultimo multiseriatim granuloso; canali mediocri, leviter recurvo. Long.  $1\frac{5}{8}$ ; lat.  $\frac{1}{2}$  poll.*

*Hab.* Mouth of the Gambia.

This shell, though comparatively common in our collections, does not appear to have been hitherto described.

**PLEUROTOMA ANNULATA.** *Pleur. testâ solidâ, subulatâ, brunned; anfractibus leviter convexis, liris lævibus, pallidioribus, numerosis, annulatim cinctis; canali subelongato. Long.  $1\frac{7}{8}$ ; lat.  $\frac{1}{2}$  poll.*

This shell is not very much unlike the *Pleurotoma Deshayesii*; it may however be readily distinguished from that species by the number of well-marked ring-like ridges by which the entire surface is encircled.

**PLEUROTOMA CATENA.** *Pleur. testâ elongato-fusiformi, turritâ, acuminatâ, flavido-griseâ; anfractibus medio valdè convexis, quasi subitò tumidis, tuberculis eximiiis, albis, obliquis, seriatim coronatis; labro tenui, sinu lato; canali elongato, recto. Long.  $2\frac{1}{4}$ ; lat.  $\frac{1}{2}$  poll.*

*Hab.* — ?

The leading feature of this new and very distinct shell is the bright perlaceous series of link-shaped tubercles which run round the periphery of the whorls.

**PECTUNCULUS GIGANTEUS.** *Pect. testâ valdè convexâ (juniore depressâ), solidâ, gigantâ, longitudinaliter striatâ, striis contiguis, regularibus, et sulcatâ sulcis ferè obsoletis; albâ, infernè castaneo-tinctâ, supernè maculis rubido-fuscis numerosis, undatis, contin-*

*gentibus, profusè et vividè pictâ; intùs albâ, marginibus (in adultâ) castaneo-nitidis, crenatis; epidermide crassâ, pilosâ. Alt. 4; long. 3 $\frac{3}{4}$ ; lat. 2.*

*Hab.* Guaymas, Gulf of California.

This magnificent shell, which was brought from the above port by Mr. Babb, R.N., accords in some measure with Lamarck's description of his *Pectunculus undulatus*. The figure in Delessert's 'Recueil de Coquilles,' however, of that shell, fully exhibits its specific difference.

**PECTUNCULUS RARIPICTUS.** *Pect. testâ subobliquè cordatâ, radiatim costatâ, costis planis in medio sæpè sulcatis; costarum interstitiis profundis; albâ luteo-castaneâ, parcè variegatâ, intùs albâ, anticè purpureo-tinctâ.*

*Hab.* — ?

The ribs in this shell are peculiarly firm and squarely grooved out, as it were, and they are often slightly rutted about half-way up the middle.

**PECTUNCULUS AURIFLUUS.** *Pect. testâ orbiculari-cordatâ, inæquilaterali, radiatim costatâ, costis obsoletè sulcatis; albâ, transversim auriflud, anticè maculis aureis nigerrimo-fuscis marginatis.*

*Hab.* — ?

This new and beautiful shell may be easily recognised by its very bright orange painting.

**PECTUNCULUS HOLOSERICUS.** *Pect. testâ suborbiculari, lævi, albidd, multiradiatâ, epidermide sericâ indutâ.*

*Hab.* — ?

The peculiar, close, velvety epidermis of this shell is alone sufficient to distinguish it.

Mr. Fraser characterized two new species of Birds from Western Africa:—

**MUSCIPETA SMITHII.** *Musc. corpore pallidè rufo; caudâ, alisque nigrescentibus, cinereo-lavatis; capite, collo, rostro, pedibusque nigris.*

Long. tot. 7 $\frac{3}{4}$  unc.; *alæ*, 3 unc. 4 lin.; *rostri*, a rictu ad apicem, 10 lin.; *caudæ*, 3 unc. 10 lin.

*Hab.* Western Africa.

The dimension above given of the tail of this bird includes the two central feathers, which are about half an inch longer than either of the others; these latter, when spread out, form a segment of a circle, the outermost feathers being the shortest. The head and neck are glossy black, but in certain lights exhibit a slight bluish tint: the whole body and wing-coverts are of a rust-colour, for the most part pale, but assuming a decided and rich hue on the abdomen; the tail and feathers of flight in the wings are of a deep brownish gray, but inclining to black. The bill is stout.

**TRERON CRASSIROSTRIS.** *Trer. viridis; capite, collo pectoreque cinerascanti-viridibus; ventre citrino; alarum tectricibus regione carpali vinaceo-purpureis; remigibus fusco-nigrescentibus; caudâ*

*nigrá ad apicem latè cinereo-fasciatá ; rostro magno, pedibusque pallidis.*

Long. tot. 12 unc. ; *alæ*,  $6\frac{3}{4}$  ; *caudæ*,  $4\frac{1}{4}$  ; *rostri*, 11 lin.

*Hab.* — ?

This species is remarkable for its stout bill, which is of a very pale grayish colour, tinted with yellow on the upper surface at the base. The vinaceous patch at the angle of the wing is but of small extent; the primaries, secondaries, and some of the greater wing-coverts are narrowly margined externally with bright yellow, and the vent and some of the under tail-coverts, as well as the greater portion of the feathers covering the thighs, are of the same colour; the larger under tail-coverts are of a reddish brown colour, and the feet are yellow.

March 28. — William Yarrell, Esq., Vice-President, in the Chair.

The following descriptions of new Shells, from the collection of Captain Sir Edward Belcher, R.N., C.B., &c., by Richard Brinsley Hinds, Esq., Surgeon R.N., were read :—

The great accession of species to the genus *Pleurotoma*, as left by Lamarck, renders it necessary that our views respecting it should receive some modification. A very prominent circumstance is, that the frequent repetition of previously trivial characters has elevated them to a situation of importance, and they are thus liable to become the distinctive grounds of new and characteristic groups. I commenced my examination with the species collected in the Sulphur, being about 120 in number; and subsequently I have had the opportunity of extending my researches among the extensive collection assembled together by Mr. Lovell Reeve, from the cabinets of various conchologists, but particularly from that of Mr. Hugh Cuming, the whole amounting in all probability to more than three hundred species. It is not my intention to attempt anything like a monograph of the group, but as it was necessary to make an extensive revision of the subject, to place the species in my hands in their proper position, I trust I shall be doing a service by recording the views which became developed in the prosecution of the work. I shall, however, confine my remarks to those genera, the mention of which is necessary to the elucidation of my species.

#### PLEUROTOMA, Lamarck.

A beautiful genus, presenting the typical characters of the group in their intensity, and capable of being satisfactorily defined. It consists of shells which are elongated and fusiform, having the spire and canal most frequently nearly equal in length; the sinus a slit, usually anterior to the most prominent part of the whorl, with a sharp margin; aperture oval; canal straight, and almost constantly lengthened; outer lip thin, smooth within, usually crenulated on the margin, from the termination of the lesser keels; inner lip rarely produced; sculpture generally transverse. The species are rarely found beyond the tropics, and do not abound in individuals, being found few in number: they are nearly equally abundant in the Ame-



rican and Asiatic Seas, but are remarkably absent from the Pacific Ocean. They never occur on the shores, being always obtained from deep water, and usually on a muddy bottom; to this latter circumstance is probably attributable their singular absence from the Pacific, where coral prevails.

**PLEUROTOMA NOBILIS.** *Pleur. testá fusiformi, solidá, rugosá; anfractibus supernè concavis, leviter striatis, propè mediam cariná maximá, infernè, præcipuè ultimo, carinis parvis alternantibus; suturá simplici; labio externo subintegro, interno infernè paululùm producto; epidermide pallidè fuscá indutá.* Axis 44 lin.

*Hab.* San Blas, Mexico. From seven fathoms; mud.

This is a very considerably larger shell than *P. oxytropis*, but in the character of the sculpture they closely approach each other. It is chiefly distinguishable from it in the absence of any keel between the principal keel and the suture, and in some minor characters.

**PLEUROTOMA GEMMATA.** *Pleur. testá fusiformi, elongatá, gracillimá, fuscá; anfractibus numerosis, medio uniseriatim tuberculato-carinatis; tuberculis rectis, subquadratis, albidis; carinis duabus, parvis, suturam comitantibus, anfractu ultimo multicarinatis; sinu laterali ponè carinam; aperturá ovali; canali elongatá.* Axis 9 lin.

*Hab.* Gulf of Magdalena, California. Obtained from seven fathoms, among sandy mud.

**PLEUROTOMA JUBATA.** *Pleur. testá fusiformi, acuminatá, lævigatá, fulvá; anfractibus medio carinatis, supernè granulis uniseriatim cinctis, infernè cariná parvá unicá, sed ultimo pluribus; suturá carinatá; canali breviusculo.* Axis 12 lin.

*Hab.* The China Sea and north coast of Sumatra: dredged from a muddy bottom in eighteen fathoms.

**PLEUROTOMA STOLIDA.** *Pleur. testá fusiformi, lævigatá, corneá; anfractibus supernè planulatis, infernè costatis; costulis albidis, brevibus, obliquis, in anfractu ultimo evanidis; apice papillari; suturá simplici; canali brevi; labio externo tenui.* Axis 14 lin.

*Hab.* Lagulhas Bank, Cape of Good Hope: dredged from a depth of forty-three fathoms.

**PLEUROTOMA GRAVIS.** *Pleur. testá fusiformi, lævigatá, corné; anfractibus propè suturam angulatis, uniseriatim tuberculis parvis albidis cinctis, supernè latè planulatis; anfractu ultimo coarctato; apice papillari; suturá simplici, ferè occultá, canali brevi; aperturá fuscá.* Axis 11 lin.

*Hab.* Lagulhas Bank, Cape of Good Hope; in company with the preceding.

**PLEUROTOMA INERMIS.** *Pleur. testá ovatá, acuminatá, inermi; anfractibus subrotundatis, flammeis undosis fuscis longitudinaliter ornatis, transversim striatis; suturá simplici; aperturá ovali; canali brevi.* Axis 15 lin.

*Hab.* Bay of Magdalena, California. From seven fathoms; sandy mud.

**PLEUROTOMA VIOLACEA.** *Pleur. testá elongatá, acuminatá, violacéa; anfractibus decenis multicarinatis, longitudinaliter minutissimè et creberrimè striatis; carinis duabus eminentioribus; labro tenui, acuto, crenulato; sinu laterali inter carinas; aperturá ovali; columellá buplicatá; canali brevi.* Axis 8 lin.

*Hab.* North coast of New Guinea and Straits of Macassar. From seven to twenty-two fathoms; sandy mud. Also collected by Mr. Cuming at the Philippines.

The folds on the columella, for which this species is remarkable, are not to be met with in all the specimens.

**PLEUROTOMA RADULA.** *Pleur. testá pyramidalis, acuminatá, cornéa; anfractibus nonis, lineis decussatis, uniseriatim tuberculatis; tuberculis sublunatis; labro tenui, acuto; sinu laterali ponè seriem tuberculorum; suturá lineá elevatá instructá; aperturá ovali; canali brevi.* Axis 7 lin.

*Hab.* Straits of Malacca. In seventeen fathoms; mud.

#### CLAVATULA, Lamarck.

The shells of this genus are subfusiform or clavate; the canal sometimes so short as to be almost wanting, at others somewhat produced and recurved; sinus superior to the most prominent part of the whorl, with a callous everted margin; inner lip often produced; suture frequently embellished; sculpture nearly always longitudinal; outer lip with a slight inferior sinus. This genus is rather less tropical in its geographical relations than *Pleurotoma*. In attempting to trace the *limits of variation*, it may be observed that the canal is liable to fluctuate in length, as may be seen in *C. duplicata*, Sow. (sp.); also in the length of the spire. Varieties in colour are not infrequent, and have been remarked in the above species, in *C. flavidula*, Lamarck (sp.), and in *C. crenularis*, Lamarck, each of which has light and dark varieties. Lastly, the series of tubercles which some display are usually connected by a keel, and the particular sculpture fluctuates between each, as occurs in a remarkable manner in *C. cincta*, Sow. (sp.)

**CLAVATULA MILITARIS.** *Clav. testá turritá, elongatá, acuminatá, albidá; anfractibus supernè concavis et angulatis, plicis numerosis longitudinalibus, granosis lineis decussatis; propè suturam cariná subnodosá instructá; labro intùs lævi; aperturá lineari, in canali brevi recurvo desinente.* Axis 20 lin.

*Hab.* Veragua, Central America; in eighteen fathoms. Panama; in from eight to thirty fathoms; mud.

**CLAVATULA SINENSIS.** *Clav. testá fusiformi, acuminatá, cornéa; anfractibus undenis, subplanulatis, medio costulatis, lineis fuscis decussatis; suturá granoso-carinatá; labro intùs lævi; aperturá ovali; canali mediocri.* Axis 9 lin.

*Hab.* New Guinea; Straits of Macassar; China Sea. In from five to twenty-one fathoms; mud.

**CLAVATULA SPICATA.** *Clav. testá fusiformi, albidá; anfractibus octonis, costulatis, transversim striatis; costulis subacutis; suturá*

*granulosá ; labro intùs lævi, aperturá lineari ; canali brevi ; anfractùs ultimi dorso fusco picto. Axis 6 lin.*

*Hab.* Bow Island. Among the fine coral sand.

*CLAVATULA ROBUSTA. Clav. testá fusiformi, acuminatá, albidá ; anfractibus undenis, lævigatis, angulatè costulatis, lineis elevatis decussatis ; costulis propè mediam angulatis ; suturá simplici ; labro crenato, intùs lævi ; aperturá ovali ; canali mediocri. Axis 8 lin.*

*Hab.* Hong-Kong, China. In from four to seven fathoms ; sandy mud.

*CLAVATULA SPURCA. Clav. testá ovatá, acuminatá ; anfractibus octonis, rotundatis, costulatis, lineis duabus vel tribus elevatis fuscis decussatis, minutissimè transversim striatis ; suturá simplici, labro juxtá incrassato, intùs crenulato ; aperturá ovali ; canali mediocri. Axis 5 lin.*

*Hab.* New Guinea ; Straits of Malacca. In from five to eighteen fathoms ; mud.

*CLAVATULA RAVA. Clav. testá ovatá, acuminatá ; anfractibus octonis, rotundatis, costulatis, transversim striatis ; costulis rotundatis, suturam incurrentibus ; infrà suturam purpureo spiraliter fasciatá, anfractu ultimo iteratá ; labro intùs crenulato ; aperturá ovali ; canali brevi. Axis 5 lin.*

*Hab.* Gulf of Nicoya, Central America. In eighteen fathoms ; mud.

*CLAVATULA ERICEA. Clav. testá fusiformi, acuminatá, pallidá, nitidá ; anfractibus octonis, rotundatis, costulatis ; costulis granulosis lineis elevatis decussatis, suturam incurrentibus ; interstitiis lævigatis ; suturá simplici ; labro juxtá incrassato, intùs lævi ; aperturá subovali ; canali brevi. Axis 5 lin.*

*Hab.* Magnetic Island, Coast of Veragua. From twenty-six fathoms ; mud.

*CLAVATULA DEBILIS. Clav. testá fusiformi, elongatá, acuminatá, gracili ; anfractibus octonis, rotundatis, costulatis, transversim striatis ; costulis parvis, rotundatis, approximatis, suturam incurrentibus ; suturá simplici ; labro intùs crenulato ; aperturá obliquá ; sinu laterali propè suturam ; canali mediocri. Axis  $4\frac{1}{2}$  lin.*

*Hab.* New Guinea ; Straits of Macassar.

*CLAVATULA SCALARIS. Clav. testá fusiformi, acuminatá ; anfractibus septenis, rotundatis, scalariformibus, transversim striatis ; costulis rotundatis, distantibus, suturam incurrentibus ; suturá simplici ; labro arcuato, intùs lævi ; sinu laterali propè suturam ; aperturá ovali ; canali brevi. Axis 7 lin.*

*Hab.* Straits of Macassar. In twelve fathoms ; coarse sand.

*CLAVATULA SCULPTA. Clav. testá fusiformi, elongatá, acuminatá ; anfractibus decenis, rotundatis, costulatis, transversim striatis, fusco fasciatis ; costulis rotundatis, propè suturam desinentibus, suturá striis arcuatis instructá ; sinu laterali propè suturam, marginibus acutis ; aperturá ovali ; canali mediocri. Axis 7 lin.*

*Hab.* Panama. From seven fathoms ; mud.

**CLAVATULA AMABILIS.** *Clav. testá ovatá, turrítá, pallidè aurantiacá ; anfractibus septenis, subrotundatis, costulatis, transversim striatis ; costulis rotundatis, subdistantibus ; suturá maculis albis ornatá ; anfractu ultimo fasciá albá angustá cincto ; sinu laterali pone suturam ; aperturá ovali ; canali mediocri.* Axis  $3\frac{1}{2}$  lin.

*Hab.* Straits of Malacca. From seventeen fathoms ; mud.

**CLAVATULA CINEREA.** *Clav. testá ovatá, acuminatá, anfractibus septenis, longitudinaliter tuberculato-costatis, transversim striatis ; costulis anfractús ultimi furcatis ; suturá lineis arcuatis instructá ; labro incrassato intùs et cum columellá crenulato ; aperturá ovali, obliquá ; canali breviusculá.* Axis 8 lin.

*Hab.* — ?

**CLAVATULA ARGILLACEA.** *Clav. testá ovatá, acuminatá, levigatá, corneá ; anfractibus septenis, tuberculato-costatis ; costulis supernè angulatis, anfractús ultimi evanidis ; sinu laterali magno ; labro incrassato intùs et cum columellá crenulato ; aperturá ovali, elongatá ; canali breviusculo.* Axis 6 lin.

*Hab.* Straits of Malacca. From 17 fathoms ; mud.

**CLAVATULA RUBIDA.** *Clav. testá ovatá, acuminatá, rufá, anfractibus septenis, rotundatis, costatis, transversim striatis ; costis rotundatis, latis, suturam simplicem incurrentibus, labro subincurvo, intùs dentato ; aperturá ovali, oblongá, sinu laterali propè suturam ; canali brevi.* Axis 7 lin.

*Var. Nigro et albo fasciata.*

*Hab.* New Guinea. From seven fathoms ; mud. The variety is from New Ireland : among coarse sand at low water. Also collected by Mr. Cuming at the Philippines.

**CLAVATULA LUCTUOSA.** *Clav. testá ovatá, acuminatá, nigricante, crassá ; anfractibus nonis, levigatis, supernè subplanulatis, propè mediam uniseriatim tuberculatis ; suturá simplici ; sinu laterali posticali ; labro paululùm incrassato, intùs lævi ; aperturá fuscá, ovali ; canali brevi.* Axis  $7\frac{1}{2}$  lin.

*Hab.* Bay of Guayaquil ; Gulf of Magdalena, California. In from five to twenty-two fathoms.

**CLAVATULA ASPERA.** *Clav. testá subclavatá, acuminatá, fuscá vel nigricante ; anfractibus septenis, rotundatis, costulatis, lineis elevatis decussatis ; suturá lined elevatá instructá ; labro paululùm incrassato, intùs lævi ; aperturá fuscá, ovali ; canali brevi.* Axis 4 lin.

*Hab.* Guayaquil. In five fathoms ; mud. North coast of New Guinea.

**CLAVATULA CREBRICOSTATA.** *Clav. testá ovatá, acuminatá ; anfractibus senis, pliciferis, albidis, supernè fusco fasciatis ; plicis parvis, numerosissimis, obliquis, confertis ; suturá simplici ; sinu laterali amplo ; labro tenui, acuto, intùs lævi ; aperturá latè ovali ; canali subnullo.* Axis 3 lin.

*Hab.* Cape Blanco, Africa. In seventeen fathoms.

**CLAVATULA PLUMBEA.** *Clav. testá ovatá, attenuatá, levigatá, pallidá, fusco fasciátá ; anfractibus septenis, subrotundatis, costulatis ;*

*costulis rotundatis, numerosis, suturam simplicem incurrentibus; anfractu ultimo fasciis duabus cinctis, labro intus lævi, aperturâ ovali.* Axis 5 lin.

*Hab.* Bay of Magdalena, California. From five fathoms.

*CLAVATULA OCCATA.* *Clav. testâ fusiformi, attenuatâ, gracili, cornedâ, angulatè costatâ; anfractibus septenis, transversim exaratis; suturâ simplici; aperturâ brevi, lineari; canali mediocri.* Axis  $4\frac{1}{2}$  lin.

*Hab.* Magnetic Island, west coast of Veragua.

*CLAVATULA BELLA.* *Clav. testâ fusiformi, attenuatâ, gracili, lævigatâ, pallidè fuscâ; anfractibus octonis, rotundatis, costulatis, lineis albidis elevatis decussatis, supernè fusco fasciatis, ultimo attenuato; costulis gracilibus, granulis parvis sparsis instructis, suturam simplicem incurrentibus; labro intus lævi; aperturâ ovali, in canali brevi attenuato.* Axis  $5\frac{1}{2}$  lin.

*Hab.* West coast of Veragua: from thirty fathoms; mud. Gulf of Papagayo, Central America: from eight to fourteen fathoms; mud.

*CLAVATULA PUDICA.* *Clav. testâ fusiformi, acuminatâ, nitidissimâ; anfractibus nonis, albidis, propè suturam paululùm lævigatis, infernè tuberculato-costulatis; costulis obliquis, acutis; suturâ simplici; anfractu ultimo anticè costulis acutis obliquis instructo, posticè lævigato maculâ amplâ fuscâ picto; sinu laterali profundo; labro acuto, intus lævi; aperturâ ovali; canali mediocri effusâ.* Axis 6 lin.

*Hab.* Gulf of Papagayo, Central America. From eight to fourteen fathoms; mud.

*CLAVATULA LÆTA.* *Clav. testâ subclavatâ, acuminatâ, nitidissimâ; anfractibus nonis, supernè planulatis, medio uniseriatim tuberculatis, ultimâ serie secundâ parvâ; tuberculis distinctis, erectis, subacutis; suturâ simplici; labro acuto, intus lævi; aperturâ ovali; canali brevi, effuso.* Axis 6 lin.

*Hab.* New Guinea; Straits of Macassar. From seven to ten fathoms.

*CLAVATULA NITENS.* *Clav. testâ clavatâ, excentricâ, fuscâ, nitidissimâ; anfractibus octonis, subangulatè costulatis, propè mediam prominentibus; costulis obliquis, acutis, suturam simplicem incurrentibus; labro acuto, intus lævi; aperturâ latè ovali; canali brevi.* Axis  $5\frac{1}{2}$  lin.

*Hab.* New Guinea; Straits of Macassar and Malacca. From seven to twenty-two fathoms.

*CLAVATULA CANDIDA.* *Clav. testâ fusiformi, acuminatâ, candidâ; anfractibus septenis, costulatis, supernè subangulatis; suturâ simplici; aperturâ ovali, sinu laterali supernè valdè calloso, faucibus crenulatis; anfractûs ultimî basi transversim striato.* Axis  $5\frac{1}{2}$  lin.

*Hab.* Magnetic Island, coast of Veragua.

*CLAVATULA PYRAMIS.* *Clav. testâ clavatâ, angulatè costatâ, hexa-*

*gond, transversim creberrimè striatá; sinu laterali superficiali; aperturá brevi, sublineari; canali brevi.* Axis 4 lin.

*Hab.* Straits of Macassar.

*CLAVATULA MERITA.* *Clav. testá ovatá, turritá, acuminatá, lævigatá, pallidá; anfractibus senis, plico-costulatis, supernè angulatis et lineá fuscá spiraliter cinctis; suturá simplici; anfractús ultimi dorso fusco nebuloso, transversim striato; labro acuto, intùs lævi; aperturá oblongá; canali subnullo.* Axis 4 lin.

*Hab.* Gulf of Nicoya, Central America. Under stones at low water.

*CLAVATULA FLAMMEA.* *Clav. testá clavatá, albidá; anfractibus octonis, rotundatis, transversim striatis, flammulis fuscis, supernè angulatis, infernè subrectis, ornatis; spirá ecostulatá; suturá simplici; sinu laterali modo emarginaturá; labro obtuso, lævissimè crenulato, intùs lævi; aperturá ad basin dilatatá; canali brevi, lato, recurvo.* Axis 7 lin.

*Hab.* New Ireland. Among coarse sand at low water.

*CLAVATULA FELINA.* *Clav. testá ovatá, acuminatá; anfractibus senis, subrotundatis, granulosis lineis transversis et longitudinalibus decussatis, maculis rufis quadratis et oblongis eleganter ornatis; suturá simplici; labro crenulato, subrecto; aperturá oblongá; canali brevi.*

*Hab.* New Ireland. Among coarse sand at low water.

*CLAVATULA PARDALIS.* *Clav. testá ovatá, lævigatá, nigricante; costulis fulvis apice ad basin decurrentibus; interstitiis striatá; aperturá oblongá, labro intùs crenulato; canali brevi.* Axis 2 lin.

*Hab.* Gulf of Nicoya. Under stones at low water.

*CLAVATULA CÆLATA.* *Clav. testá ovatá, elongatá, atro-fuscá; anfractibus octonis, rotundatis, costulatis; costulis obliquis, acutis; suturá lineá elevatá instructá; aperturá atrá, ovali; labro intùs lævi; canali brevi.* Axis 3 lin.

*Hab.* Gulf of Fonseca. From twenty fathoms; mud.

*CLAVATULA PAPILLARIS.* *Clav. testá oblongá, lævigatá, pallidá; anfractibus quinis, rotundatis, obsoletè tuberculato-costulatis; apice papilloso; suturá simplici; aperturá brevi, ovatá; labro intùs lævi; canali subnullo.* Axis  $2\frac{1}{2}$  lin.

*Hab.* Straits of Malacca. From seventeen fathoms; mud.

*CLAVATULA RUBIGINOSA.* *Clav. testá oblongá, cornéa; anfractibus senis, subrotundatis, transversim striatis; suturá simplici; aperturá brevi, ovatá, cornéa; labro intùs lævi; canali subnullo.* Axis 3 lin.

*Hab.* Straits of Malacca. From seventeen fathoms; mud.

*CLAVATULA POLITA.* *Clav. testá valdè fusiformi, politá, albidá; septangulatè costulatá; costulis confluentibus; suturá simplici; aperturá ovali, oblongá; labro acuto, intùs lævi; canali longo, subrecurvo.* Axis 5 lin.

*Hab.* Straits of Macassar. Found among coarse sand in seven fathoms.

**CLAVATULA TEXTILIS.** *Clav. testá ellipticá, acuminatá, albiddá, anfractibus senis, costulatis, supernè angulatis; costulis rotundatis lineis elevatis decussatis, tribus propè mediam anfractús ultimi fuscis; sinu laterali postico; aperturá sublineari; labro intùs crenulato; canali brevi.* Axis  $3\frac{1}{2}$  lin.

*Hab.* Straits of Macassar. From seven fathoms; sand.

**CLAVATULA FIMBRIATA.** *Clav. testá ovatá, pallidè rufá, albo fasciatá; anfractibus quinis, rotundatis, laminis brevibus, numerosis, dentatis, reflexis indutis; suturá simplici; aperturá ovali; sinu laterali minimo; labro crenulato, reflexo; canali brevi.* Axis  $3\frac{1}{2}$  lin.

*Hab.* North coast of New Guinea. From twenty-two fathoms; mud.

**CLAVATULA DONATA.** *Clav. testá ovatá, elongatá, roseá; anfractibus octonis, costulatis, transversim striatis; costulis brevibus, rotundatis; suturá lined nodosá instructá; aperturá parvâ, ovali, roseâ; labro intùs levi; canali brevi.* Axis  $3\frac{1}{2}$  lin.

*Hab.* North coast of New Guinea. From twenty-two fathoms; mud.

**CLAVATULA MICANS.** *Clav. testá ovatá, elongatá, cornedá, nitidá; anfractibus octonis, costulatis; costulis subacutis, albidis, obliquis. supernè propè suturam evanidis; anfractús ultimi dorso ecostulato; aperturá parvâ, ovali; labro tenui, acuto, intùs levi; canali brevi.* Axis  $3\frac{1}{2}$  lin.

*Hab.* Gulf of Papagayo. From fourteen fathoms; mud.

**CLAVATULA ALBICANS.** *Clav. testá ovatá, elongatá, albiddá, nitidá; anfractibus octonis, costulatis; costulis supernè subnodulosis; suturá nodulosá; sinu laterali pone suturam; aperturá parvâ, ovali; labro acuto, intùs levi; canali brevi.* Axis  $2\frac{1}{2}$  lin.

*Hab.* Straits of Malacca. From seventeen fathoms; mud.

**CLAVATULA MUTICA.** *Clav. testá subfusiformi, pallidè fulvâ; anfractibus senis, rotundatis, transversim striatis, maculis fuscis longitudinalibus ornatis; suturá simplici; anfractu ultimo medio angulato et albo fasciato, ad basin fusco; sinu laterali juxtâ suturam; aperturá ovali; labro acuto, intùs levi; canali brevi.* Axis  $3\frac{1}{2}$  lin.

*Hab.* Straits of Malacca. From seventeen fathoms; mud.

**CLAVATULA METULA.** *Clav. testá ovatá, acuminatá; anfractibus quinis planulatis, obsoletè costulatis, transversim striatis, pallidè rufo fasciatis; suturá lineá elevatá instructá; aperturá lineari; labro subinflexo; canali subnullo.* Axis 2 lin.

*Hab.* ———?

**CLAVATULA TESSELLATA.** *Clav. testá elongatá, acuminatá; anfractibus senis, subplanulatis, granulosis lineis longitudinalibus et transversis decussatis, maculis subquadratis fuscis pictis; suturá simplici; aperturá oblongá; labro intùs crenulato; canali brevi.* Axis 3 lin.

*Hab.* Straits of Macassar. From ten fathoms; coarse sand.

**CLAVATULA FULVA.** *Clav. testá ovatá, acuminatá, fulvâ; anfracti-*

*bus senis, granulosis, tuberculato-costulatis, supernè angulatis; suturá lined granulosa instructá; aperturá parvá, oblongá; labro intùs lævi; canali brevi effuso.* Axis  $2\frac{1}{2}$  lin.

*Hab.* Straits of Macassar. From ten fathoms; coarse sand.

*CLAVATULA DENTIFERA.* *Clav. testá elongatá, acuminatá; anfractibus quinis, costulatis, lineis transversis decussatis; costulis numerosis, parvis, angustis, suturam incurrentibus; aperturá oblongá; labro crenulato, infernè dilatato et dentifero; columellá infernè dente parvo; canali breviusculo.* Axis 3 lin.

*Hab.* North coast of New Guinea; Straits of Malacca. From five to seventeen fathoms; mud.

*CLAVATULA GLUMACEA.* *Clav. testá elongatá, pallidá, nitidá; anfractibus senis costulatis, transversim striatis; costulis brevibus, rotundatis, suturam simplicem incurrentibus; aperturá oblongá, fuscá; labro intùs lævi; canali breviusculo.* Axis 3 lin.

*Hab.* North coast of New Guinea. From twenty-two fathoms; mud.

*CLAVATULA QUISQUALIS.* *Clav. testá fusiformi, acuminatá, nitidissimá; anfractibus octonis, supernè lævigatis, infernè costulatis; costulis brevibus, obliquis, acutis; lineis albis sinuosis longitudinaliter instructis; aperturá ovatá; sinu laterali rotundo; labro tenui, acuto, intùs lævi; columellá marginatá; canali brevi, effuso, recurvo.* Axis  $4\frac{1}{2}$  lin.

*Hab.* Gulf of Papagayo, Central America. From eight to fourteen fathoms; mud.

*CLAVATULA RETUSA.* *Clav. testá parvá, obesá, aurantiacá; anfractibus septenis, costulatis, transversim striatis; costulis rotundatis, confertis; spirá conicá; suturá simplici; apice purpureo; aperturá oblongá; columellá contortá; canali breviusculo.* Axis  $2\frac{1}{2}$  lin.

*Hab.* Straits of Macassar. From ten fathoms; coarse sand.

*CLAVATULA IMPRESSA.* *Clav. testá fusiformi, acuminatá, roseá; anfractibus nonis, tuberculato-costatis, transversim striatis; costulis acutis, obliquis, albidis; anfractibus ultimi dorso picto, ecostulato; aperturá ovali; labro tenui, acuto, intùs lævi; canali mediocri.* Axis  $4\frac{1}{2}$  lin.

*Hab.* Gulf of Papagayo, Central America. From eight to fourteen fathoms; mud.

*CLAVATULA NEGLECTA.* *Clav. testá fusiformi, gracili, fuscá; anfractibus nonis, costulatis, lineis elevatis decussatis; costulis brevibus, rotundatis; suturá lined elevatá instructá, infrá propè lævigatá; aperturá ovatá, obliquá; sinu laterali pone suturam; labro incrassato, inflexo; canali mediocri.* Axis 5 lin.

*Hab.* Gulf of Nicoya, Central America. Under stones at low water.

*CLAVATULA RIGIDA.* *Clav. testá ovatá, retusá; anfractibus quinis, costulatis, supernè angulatis, transversim striatis; suturá simplici; aperturá oblongá, labro crenulato; columellá rugosá; canali brevi.* Axis  $2\frac{1}{2}$  lin.

*Hab.* Panama.



## MANGELIA, Leach.

The shells of this group are distinguished by their small size, oval and attenuated shape, long linear mouth, terminated in a short canal, very slightly recurved; outer lip nearly straight, the immediate margin acute, but strengthened by the last-formed rib; above shouldered, with a slight emargination, which does not admit of being called a sinus, and with the margin not callous; apparently not formed before the full development of the shell; inner lip slightly produced; suture always simple; last whorl not at all inflated, and occupying one-half or more of the entire length; sculpture consisting of longitudinal fold-like ribs, terminating at the suture; very probably without an operculum, as Philippi observes that the animal of *Pleurotoma Bertrandi*, which belongs to this genus, is not provided with one. Restricted in this manner, a number of shells may be separated with advantage from the now bulky and somewhat incongruous genus *Pleurotoma*; and in this discrimination I have kept in view the *Mangelia Goodalii* of Leach, but have been by no means guided by the genus, as adopted by Risso.

MANGELIA CINNAMOMEA. *Mang. testá attenuatá, nitidá, cinnamomeá, albo fasciatá; anfractibus senis, plico-costulatis, transversim levissimè striatis; faucibus crenulatis.* Axis  $4\frac{1}{2}$  lin.

*Hab.* North coast of New Guinea; Straits of Macassar; Straits of Malacca. From five to twenty-two fathoms; mud.

MANGELIA CORONATA. *Mang. testá attenuatá, acuminatá; anfractibus senis, plico-costulatis, transversim striatis; costulis supernè subacuminatis; faucibus lævibus.* Axis 4 lin.

*Hab.* Straits of Macassar.

MANGELIA VITTATA. *Mang. testá attenuatá, pallidá, fusco fasciatá; anfractibus senis, plico-costulatis, transversim striatis; costulis numerosis; faucibus crenulatis.* Axis  $3\frac{1}{2}$  lin.

*Hab.* Straits of Macassar. From ten fathoms; coarse sand.

MANGELIA ORIZA. *Mang. testá attenuatá, acuminatá, lævigatá, nitidá, hexagonè plico-costulatá; anfractibus septenis; faucibus lævibus.* Axis  $4\frac{1}{2}$  lin.

*Hab.* North coast of New Guinea. From twenty-two fathoms; mud.

MANGELIA CELEBENSIS. *Mang. testá attenuatá, lævigatá, pallidá, fusco latè fasciatá; anfractibus senis, plico-costulatis; costulis subdistantibus; faucibus crenulatis.* Axis  $3\frac{1}{2}$  lin.

*Hab.* Straits of Macassar. From ten fathoms; mud.

Mr. Reeve then communicated his description of a new species of *Cyclostoma*, from the Cordilleras Mountains.

CYCLOSTOMA STRAMINEUM. *Cycl. testá orbiculari, subdepressá, stramineo-luteá, spirá versus apicem rosaceá; usquequaque elegantissimè striatá, striis, ab umbilico exorientibus, diagonaliter collocatis; aperturá ferè circulari, supernè subsinuatá, peritremate simplici; operculo testaceo, albo, multi-spirali.*

Icon. Sowerby, Thesaurus Conch., pl. xxix. f. 211, 212.

*Hab.* Ad Meridam, Columbiae Occidentalis. From the collection of H. Cuming, Esq.

This very peculiarly striated shell was lately found by a gentleman whilst searching for Orchidaceous plants at the base of the Cordilleras Mountains.

#### GEOLOGICAL SOCIETY.

April 5, 1843.—“Notice of the occurrence of Beds containing Freshwater Fossils in the Oolitic Coal-field of Brora, Sutherlandshire.” By Alexander Robertson, Esq., F.G.S.

Among the reefs of shale and coal opposite the old salt-pans at Brora, Mr. Robertson has discovered two beds abounding in *Cyclas* and other freshwater fossils, approachable only at low water. The rise of the tide on the occasion of his visit to the locality, prevented a minute examination of their relations. Their position was however satisfactorily made out, and is, in the descending order, as follows:—

*a.* Beds of calcareous sandstone, considered by Mr. Phillips to represent the gray limestone of Cloughton and other localities in Yorkshire.

*b.* Shale and coal, several feet.

*c.* Shale with fossils about an inch.

*d.* Shale and coal similar to the beds *b*, two or three feet.

*e.* Clay with fossils about thirteen inches.

*f.* Shale with a few plants.

The bed *c* has yielded,—

Fishes.—Scales of a species of *Lepidotus*, strongly resembling *L. fimbriatus*, Ag. Scale of *Megalurus*?

Mollusca, *Paludina*, several new species. *Cyclas*, one or two new species.

Crustacea.—*Cypris*, new species. Plant, obscure impressions.

From the bed *e* the following have been obtained:—

Fishes.—Scales of two or three species of *Lepidotus*. Teeth of *Acrodus minimus*, Ag. ? Teeth of *Hybodus minimus*, Ag.

Mollusca.—*Paludina*, same species as in the upper bed. Two or three species of *Perna*, some of which are probably new. *Unio*, one new species. *Cyclas* numerous, new species chiefly belonging to Lamarck's genus *Cyrena*\*.

Crustacea.—*Cypris*, same species as in the upper bed.

Plants.—Minute fragments of carbonized wood.

Nearly the whole mass of both beds consists of fossils. No marine fossils (with the exception perhaps of the scales of *Lepidotus*) are found in the upper bed, and it seems therefore to be properly a freshwater deposit. The mixed nature of the fossils of the lower one conclusively point out its estuary character.

\* Among the specimens sent to the Society by Mr. Robertson were several examples of *Cyclas media*, identical with the Wealden shell. The *Perna* referred to is altogether new, and will probably form the type of a genus, bearing a relation to *Perna* analogous with that which *Dreissena* bears to *Mytilus*.

“Observations on the occurrence of Freshwater Beds in the Oolitic Deposits of Brora, Sutherlandshire; and on the British Equivalents of the Neocomian System of Foreign Geologists.” By Roderick Impey Murchison, Esq., F.G.S.

In this communication the author confirms the interesting discovery announced by Mr. Robertson in the preceding paper, and remarks, that as the reefs of rock exposed at low water at the mouth of the river Brora unquestionably lie beneath the Oxford clay, and are not far above the roof of the coal, there can be no doubt that the beds containing the freshwater shells, being fairly intercalated with the other strata, are thus inclosed in the heart of the oolitic series. They had escaped the notice of Mr. Murchison, probably from having been covered by sea sand at the time of his visit.

An examination of the freshwater specimens collected by Mr. Murchison and Professor Sedgwick at Loch Staffin, in the Isle of Skye, has identified the principal forms with Mr. Robertson's specimens from Brora, and has led the author to adopt a different view respecting the position of the beds from which they were derived. Instead of supposing that the oolitic series of the cliffs near Portree was overlaid by a true equivalent of the Wealden\*, the freshwater beds of Skye will it is now believed be found, like those of Inverbrora, to be interstratified with the middle oolite, a conclusion rendered probable by the natural sections and form of the coast, and by the circumstance that the fragments not found *in situ* which contained freshwater shells were collected near the escarpment and not on the dip of the oolitic strata. Mr. Murchison is inclined to take a similar view of the freshwater deposits near Elgin, compared by Mr. Malcolmson to the Purbeck beds of England.

The author remarks, that with the terrestrial evidences in the plants of Portland, Scarborough, Stonesfield and Brora, we might naturally expect at any day to hear of the associated lacustrine or river shells. But Mr. Robertson's discovery further compels us to believe, that the same species of freshwater shells prevailed, not only during the whole of the Wealden epoch, but that they were in existence at periods long antecedent, when the adjacent lands poured forth rivers into the sea in which the middle and lower oolites were accumulated, and thus we acquire a new element to enable us to reason upon the former conditions of the surface.

The facts stated by Mr. Robertson tend to confirm the idea, that the Wealden is more naturally connected with the Jurassic than with the cretaceous system, and must also have an influence in deciding that the Neocomian formation of foreign geologists ought not to be placed on the parallel of the Wealden. Mr. Murchison has for some years been of opinion that the Neocomian system is little more than an equivalent of the lower greensand of British geologists, a view which he upheld at the meeting of the Geological Society of France at Boulogne in 1839, on the ground of the identity of their stratigraphical relations and typical fossils. Further researches during last May along the coast of the Isle of Wight, in company with

\* Geol. Trans. vol. ii. p. 366.

Count Keyserling, led both that gentleman and the author to the same conclusion. Among the numerous fossils they there collected were many identical with, or analogous to, Neocomian species, particularly in that portion of the coast section so minutely described by Dr. Fitton and Sir John Herschel, viz. between Black Gang Chine and Atherfield rocks. Mr. Murchison observed that there seemed to be a gradual zoological as well as lithological passage from the Wealden beds below into the greensand and shales above them; for although the shale with *Cypris* occurs immediately beneath the marine deposit of Atherfield rocks, as remarked by Dr. Fitton, another band of flagstone with marine shells (*Ostrea* and *Terebratula*) also occurs beneath these uppermost beds of *Cypris*. In the still lower strata, however, we lose all traces of such marine alternations, and the whole becomes one great freshwater deposit. A similar phenomenon is seen in the southern part of the section at Red Cliff, extending into Sandown Bay, where beds with *Cypris* are intercalated between oyster beds. These alternations are indeed what we might expect to find, provided a former depression of the surface had converted a lake into an estuary, and subsequently into a marine bay. But notwithstanding the natural connexion between the Wealden and the lower greensand, it does not follow that the two formations ought to be merged in one system or natural series. Dr. Mantell as long ago as 1822 pointed out the analogy between the animals of the Wealden and those of the Stonesfield beds; and more recently Professor Owen has carried it out much further. Professor Agassiz has pronounced the Ichthyolites of the cretaceous system to be entirely dissimilar from those of the Wealden.

Mr. Murchison inquires, where are we to draw the line of separation which shall indicate precisely in our own country the base of the Neocomian of foreign geologists, or in other words, the base of the great continental cretaceous system? On this point he remarks that some small amount of compromise may eventually be found desirable; for whilst we have on the one hand full right to infer that the larger portion of the Wealden must be classed in the oolitic series, further inquiry may convince us that its uppermost part is of the same age as the lowest Neocomian strata; and thus we may connect that portion of it with the cretaceous system. In the mean time it is quite clear that a great part of the Neocomian is absolutely the lower greensand itself. This view is confirmed by Count Keyserling, who has identified fossils from the Neocomian strata of Kyslavodsk in the Caucasus, with specimens collected by him in company with Mr. Murchison in the lower greensand of the Isle of Wight.

April 26.—A paper was read "On the upright Fossil-trees found at different levels in the Coal strata of Cumberland, Nova Scotia." By Charles Lyell, Esq., F.G.S. &c.

The first notice of these fossil trees was published in 1829 by Mr. Richard Brown, in Haliburton's 'Nova Scotia,' at which time the erect trunks are described as extending through one bed of sandstone, twelve feet thick. Their fossilization was attributed by

Mr. Brown to the inundation of the ground on which the forest stood. Mr. Lyell in 1842 saw similar upright trees at more than ten different levels, all placed at right angles to the planes of stratification, which are inclined at an angle of  $24^{\circ}$  to the S.S.W. The fossil trees extend over a space of from two to three miles from north to south, and, according to Dr. Gesner, to more than twice that distance from east to west. The containing strata resemble lithologically the English coal-measures, being composed of white and brown sandstones, bituminous shales, and clay with ironstone. There are about nineteen seams of coal, the most considerable being four feet thick. The place where these are best seen is called the South Joggins, where the cliffs are from 150 to 200 feet high, forming the southern shore of a branch of the Bay of Fundy, called Chignecto Bay. The action of the tides, which rise sixty feet, exposes continually a fresh section, and every year different sets of trees are seen in the face of the cliffs.

The beds with which the coal and erect trees are associated are not interrupted by faults. They are more than 2000 feet thick, and range for nearly two miles along the coast. Immediately below them are blue grits used for grindstones, after which there is a break in the section for three miles, when there appear near Minudic beds of gypsum and limestone, and at that village a deep red sandstone, the whole having the same southerly dip as the coal at the Joggins, and being considered by Mr. Lyell as the older member of the carboniferous series.

Above the coal-bearing beds, and stretching southwards for many miles continuously along the shore, are grits and shales of prodigious thickness, with coal-plants, but without vertical trees.

Mr. Lyell next describes in detail the position and structure of the upright trees at the South Joggins. He states that no part of the original tree is preserved except the bark, which is marked externally with irregular longitudinal ridges and furrows, without any leaf-scars, precisely resembling in this respect the vertical trees found at Dixonfold on the Bolton Railway, described by Messrs. Hawkshaw and Bowman. No trace of structure could be detected in the internal cylinder of the fossil trunks, which are now filled with sandstone and shale, through which fern-leaves and other plants are scattered. Mr. Lyell saw seventeen vertical trees, varying in height from six to twenty feet, and from fourteen inches to four feet in diameter. The beds which inclose the fossil trees are usually separated from each other by masses of shale and sandstone many yards in thickness. The trunks of the trees, which are all broken off abruptly at the top, extend through different strata, but were never seen to penetrate a seam of coal, however thin. They all end downwards either in beds of coal or shale, no instance occurring of their termination in sandstone. Sometimes the strata of shale, sandstone and clay, with which the fossil trunks have been filled, are much more numerous than the beds which they traverse. In one case nine distinct deposits were seen in the interior of a tree, while only three occurred on the outside in the same vertical height.

Immediately above the uppermost coal-seams and vertical trees are two strata, probably of freshwater origin, of black calcareo-bituminous shale, chiefly made up of compressed shells of two species of *Modiola*, and two kinds of *Cypris*.

*Stigmariæ* are abundant in the clays and argillaceous sandstones; often with their leaves attached, and spreading regularly in all directions from the stem. The other plants dispersed through the shales and sandstones bear a striking resemblance to those of the European coal-fields. Among these are *Pecopteris lonchitica*, *Neuropteris flexuosa*?, *Calamites cannaeformis*, *C. approximatus*, *C. Steinhaueri*, *C. nodosus*, *Sigillaria undulata*, and another species.

The genera *Lepidodendron* and *Sternbergia* are also present. The same plants occur at Pictou and at Sydney in Cape Breton, accompanied with *Trigonocarpum*, *Asterophyllites*, *Sphænohyllum*, and other well-known coal fossils.

The author then gives a brief description of a bed of erect *Calamites*, first discovered by Mr. J. Dawson in the Pictou coal-field, about 100 miles eastward of the Cumberland coal-measures before described. They occur at Dickson's mills,  $1\frac{1}{4}$  mile west of Pictou, in a bed of sandstone about ten feet thick. They all terminate downwards at the same level where the sandstone rests on subjacent limestone; but the tops are broken off at different heights, and Mr. Dawson observed in the same bed a prostrate *Lepidodendron*, with leaves and *Lepidostrobi* attached to its branches.

From the facts above enumerated, Mr. Lyell draws the following conclusions:—

1. That the erect position of the trees, and their perpendicularity to the planes of stratification, imply that a thickness of several thousand feet of coal strata, now uniformly inclined at an angle of  $24^\circ$ , were deposited originally in a horizontal position.

2. There must have been repeated sinkings of the dry land to allow of the growth of more than ten forests of fossil trees one above the other, an inference which is borne out by the independent evidence afforded by the *Stigmariæ*, found in the underclays beneath coal-seams in Nova Scotia, as first noticed in South Wales by Mr. Logan.

3. The correspondence in general characters of the erect trees of Nova Scotia with those found near Manchester, leads to the opinion that this tribe of plants may have been enabled by the strength of its large roots to withstand the power of waves and currents much more effectually than the *Lepidodendra* and other coal plants more rarely found in a perpendicular position.

Lastly, it has been objected, that if seams of pure coal were formed on the ground where the vegetables grew, they would not bear so precise a resemblance to ordinary subaqueous strata, but ought to undulate like the present surface of the dry land. In answer to this Mr. Lyell points to what were undoubtedly terrestrial surfaces at the South Joggins, now represented by coal seams or layers of shale supporting erect trees, and yet these surfaces conform as correctly to the general planes of stratification as those of any other strata.

He also shows that such an absence of superficial inequalities,

and such a parallelism of successive surfaces of dry land, ought to be expected, according to the theory of repeated subsidence, because sedimentary deposition would continually exert its leveling action on the district submerged.

May 10.—A paper was read "On some new Ganoid Fishes." By Sir Philip Grey Egerton, M.P., F.G.S.

The specific characters of the fishes described are as follows:—

1. *Semionotus Pentlandi*, Egerton.—Body deep; pedicle of the tail thicker proportionally than in *Semionotus latus*. Anal fin long, with 5 or 6 rays, articulated, subdivided, and decreasing in length from the first. Bases distant; 3 or 4 fulcral rays on the margin. Caudal fin large; upper lobe invested with scales for some distance. Margins fringed by elongated imbricated scales. Rays: 20, articulated, subdivided. Bases at greater intervals near the centre. Scales rhomboidal, smooth, with entire margins. Stratum, Lias.

Found by Mr. Pentland in a black bituminous schist at Giffoni, near Castella Mare. In the cabinets of the Earl of Enniskillen and Sir Philip Egerton.

Of the six species of *Semionotus* described by Professor Agassiz, one is from the quader-sandstein, the other five from the lias of Lufeld, Boll, Lyme Regis, and Schoven in Sweden. From a comparison of Mr. Pentland's specimens of this and the two following species with all those described, Sir Philip Egerton considers they approximate more nearly the species of the lias than those of the greensand, and infers from this zoological evidence that the Giffoni beds belong to the former.

2. *Semionotus pustulifer*, Egerton.—Fish large; operculum arenated; humerus and scapula pustulated; scales thick and lustrous; surfaces slightly uneven; upper and lower margins deeply undulate. Stratum, Lias; found with last. Cab. Egerton.

3. *Semionotus minutus*, Egerton.—Fish small; body slender; caudal pedicle thick; scales extended over the upper lobe of the tail. Stratum, Lias; found with last. Cab. Egerton.

4. *Lepidotus pectinatus*, Egerton.—Fish oblong, subfusiform; length 9 inches; depth  $2\frac{1}{4}$ ; head small; fins small; scales marked with delicate radiating striæ; posterior margin finely pectinate; upper edge convex, lower one concave; dorsal, anal and caudal scales rhomboidal, with entire margins. Stratum, Lias. Locality, Whitby. Cab. Enniskillen.

5. *Pholidophorus Hartmanni*, Egerton.—Size of *Pholidophorus latiusculus*. Head rounded; orbit large; upper angle of operculum striated; preoperculum marked with few moniliform inequalities; humerus plicated; scales small, serrated on the posterior margin; its serrations decrease in number and increase in size on the posterior parts of the body. Stratum, Lias. Locality, Ohmden, in Wurtemberg. Cab. Enniskillen, Egerton.

6. *Pholidophorus crenulatus*, Egerton.—Rather larger than *Pholidophorus latiusculus*. Head rather pointed; humerus obliquely plaited; pectoral fins large, with 22 rays; caudal fins strong; the upper lobe bordered full two-thirds of its length with fulcral scales;

rays 28—30; scales ribbed vertically on their bases, furrowed horizontally on their exposed surface, and crenulated on the posterior margin; the ventral scales deeply incised. Stratum, Lias. Locality, Lyme Regis. Cab. Egerton.

June 7.—“On Ichthyopatolites, or petrified trackwings of ambulatory fishes upon sandstone of the Coal formation.” By the Rev. W. Buckland, D.D., F.G.S.

These impressions were discovered by Miss Potts of Chester, on a flagstone near the shaft of a coal-pit at Mostyn in Flintshire, and were communicated by her to Dr. Buckland, with a remark on the novelty of footsteps in any stratum older than the new red sandstone. As they present no trace of any true foot to which long claws may have been attached, Dr. Buckland rejects the notion of their having been made by a reptile. They consist of curvilinear scratches disposed symmetrically at regular intervals on each side of a level space, about two inches wide, which in his opinion may represent the body of a fish, to the pectoral rays of which animal he attributes the scratches. They follow one another in nearly equidistant rows of three scratches in a row, and at intervals of about two inches from the point of each individual scratch to the points of those next succeeding and preceding it. They are all slightly convex outwards, three on each side of the median space, or supposed place of the body of the fish. Each external scratch is about one inch and a half in length; the inner ones are about half an inch, and the middle one about an inch long. These proportions are pretty constant through a series of eight successive rows of triple impressions on the slab from the Mostyn coal-pit. The impressions of the right and left fin-ray are not quite symmetrically opposed to each other on a straight line of progression; but the path of the animal appears to have been curvilinear, trending towards the right: each impression or scratch is deepest on its supposed frontal side, and becomes more shallow gradually backwards. All these conditions seem to agree with the hypothesis of their having been made by three bony processes projecting from the anterior rays of the pectoral fin of a fish. They are not consistent with conditions that would have accompanied the impressions of claws proceeding from the feet of any reptile.

Dr. Buckland refers to the structure of existing Siluroid and Lophoid fishes, and of the climbing perch (*Anabas scandens*), and Hassar (*Doras costata*), as bearing him out in the conclusions he has come to regarding those markings. He also refers to the observations of Prof. Deslonchamps, on the ambulatory movements under water of the common Gurnard, as confirmatory of his views. He has been informed of a slab of coal sandstone bearing similar markings in the museum of Sheffield; and remarks, that there are several fossil fishes of the carboniferous system approximating the characters of Gurnards, and capable of making such markings as those described.

“Observations on certain Fossiliferous beds in Southern India.” By C. T. Kaye, Esq., F.G.S., of the Madras Civil Service.

The beds described in this paper are found at three localities; viz. Pondicherry, Verdachellum and Trinchinopoly.



1. *Pondicherry*.—This town, like Madras, is situated on a very recent formation of loose sand, which extends for a considerable distance along the eastern coast of India, and which in many places contains marine shells in such abundance that they are dug up and burnt for lime. They are all species which now inhabit the Indian seas, such as *Pyrula vespertilio*, *Purpura carinifera*, *Cardita antiquata*, *Arca granosa* and *Arca rhombea*. The sand is usually bounded by granite, which appears at the surface at Sadras, Madras and other places. Immediately beyond the town of Pondicherry, however, the recent beds rest upon some low hills of red sandstone. A bed of limestone containing numerous fossils succeeds, and at the distance of four miles due west the red sandstone is again met with and there abounds with silicified wood. At about sixteen miles from the sea the sandstone is bounded by hills of black granite.

The surface of the country does not offer any section exhibiting the relative positions of the limestone and sandstone. In the former, numerous fossils in a high state of preservation were discovered by Mr. Kaye, including species of *Baculites*, *Ammonites*, *Nautilus*, *Hamites*, *Ptychoceras*, *Ancyloceras*, *Voluta*, *Cypræa*, *Conus*, *Tornatella*, *Rostellaria*, *Pyrula*, *Aporrhais*, *Trochus*, *Solarium*, *Natica*, *Eulima*, *Scalaria*, *Cerithium*, *Turritella*, *Dentalium*, and *Calyptræ*; *Ostrea*, *Exogyra*, *Spondylus*, *Pecten*, *Trigonia*, *Mytilus*, *Pinna*, *Arca*, *Pectunculus*, *Nucula*, *Cardium*, *Isocardia*, *Anatina*, *Cytheræa*, *Solen*, *Pholadomya*, *Clavagella*, *Lutraria* and *Terebratula*. Also some fishes' teeth, *Echinodermata* and corals, accompanied by wood (calcareous) bored by *Teredo*.

The fossil wood found in the sandstone exhibits no traces of worm-borings, and occurs in the form of trees denuded of their barks, some of them as long as 100 feet, and all apparently *Conifera*.

2. Six miles from *Verdachellum* in Southern Arcot, about forty miles from the coast and fifty from Pondicherry, the valley of the river is formed of a limestone which underlies the sandstone and contains marine fossils, including species of *Ammonites*, *Nautilus*, *Melanopsis*?, *Pleurotomaria*, *Natica*, *Pecten*, *Arca*, *Artemis*, *Modiola*, *Exogyra*, *Lima*, *Cardita*, *Cardium*, *Lutraria* and *Terebratula*.

3. *Trinchinopoly*.—In this district, at about thirty miles from the town of the same name, one hundred from Pondicherry, and sixty from the sea, is a limestone formation which Mr. Kaye was unable to visit in person, but from which he procured a quantity of fossils belonging to twenty-seven species of various genera, including *Natica*, *Turritella*, *Triton*, *Fusus*, *Pyrula*, *Voluta*, *Melanopsis*? (same species as at Verdachellum), *Aporrhais*, *Strombus*, *Mactra*, *Psammobia*, *Arca*, *Pecten*, *Ostrea*, *Cytheræa* and *Cardium*. A fragment of an Ammonite accompanied them.

None of the species appear to be common to the three deposits. Three species are common to Trinchinopoly and Verdachellum. From the latter locality there are 28 species of mollusca identical with lower greensand fossils found in Britain. A single species appears to be identical with one of those from Pondicherry; but none of the testacea from the last mentioned locality agree with those

from Trichinopoly. The greater part of those from Pondicherry appear to be undescribed forms. Accompanying the very remarkable assemblage of molluscan genera at the latter locality was a single vertebrata of a Saurian, which Professor Owen regards as most nearly resembling that of *Monosaurus*.

Mr. Kaye presented to the Society a series of the fossils from the several beds, all in the most beautiful state of preservation.

### MISCELLANEOUS.

*On the production of Animalcules in great numbers in the Stomach and Intestines during the digestion of herbivorous and carnivorous Animals.* By MM. GRUBY and DELAFOND\*.

IN 1685 Leuwenhoeck first discovered three species of microscopic animalcules in the excrements of frogs †; Bory de Saint Vincent, Müller, and Ehrenberg have also ascertained the presence of animalcules in the excrements of salamanders ‡. Leuwenhoeck relates that he saw three species of infusoria in the excrements of pigeons, of chickens, and even of man; but a doubt was thrown upon this last discovery by other observers, and particularly by Ehrenberg.

Up to the present time no observer has proved the existence of living animalcules in the stomach and during the digestion of the superior animals. We shall now present to the Academy the observations which we have been making upon this subject for more than a year, reserving the communication of fuller details until we shall have the honour of laying before it the numerous researches which we have made concerning digestion.

1. The ruminating animals have, during the act of digestion, four species of living animalcules in the first and second stomachs.

*First species.*—Form long and flattened; the body provided with a granulated carapace which is convex above, flattened beneath, and indented towards its posterior part; head distinct; a girdle of vibrating cilia near the middle of the body; a long, conical, and mobile tail; motions of the vibrating cilia rapid; motions of the body slow; length nearly  $\frac{1}{4}$ th of a millimetre; width  $\frac{1}{8}$ th of a millimetre. This animalcule has no analogy with those already known.

*Second species.*—Form ovoid; body covered with a carapace indented anteriorly and posteriorly; a conical tail; a circlet of vibrating cilia at the anterior part of the body; movements very distinct; length  $\frac{1}{20}$ th of a millimetre, breadth  $\frac{1}{30}$ th. This species has some analogy with the *Brachionus polycanthus* of Ehrenberg §.

*Third species.*—Form elongated and cylindrical; a smooth carapace; no tail; vibrating cilia around the mouth; movements very rapid; length  $\frac{1}{30}$ th of a millimetre, breadth  $\frac{1}{30}$ th.

\* From the Comptes Rendus de l'Académie for Dec. 11, 1843.

† Anat. et Contempl., 1685, p. 38.

‡ Die Infusionsthierchen, p. 331; Leipzig, 1838.

§ Ehrenberg, *loc. cit.* p. 501.

This species has some resemblance to the *Enchelis nebulosa* of Ehrenberg, which M. Gleichen observed in an infusion of barley.

*Fourth species.*—Form oval; no carapace; vibrating cilia over the whole surface of the body; buccal orifice at one of the extremities; very rapid rotatory movements; length  $\frac{1}{12}$ th of a millimetre, breadth  $\frac{1}{20}$ th. This species has a great analogy with the *Leucophrys anodonta* of Ehrenberg, and which M. Müller observed in the water of the *Mytilus edulis* \*.

The carapace, or transparent envelope of these animalcules allows the alimentary molecules by which they are nourished, and which render their bodies more or less opaque, to be recognised in their interior.

The number of these animalcules is so considerable, that, in 5 centigrammes of alimentary matters taken from the first two stomachs of the sheep, for example, there are from fifteen to twenty of different species and various sizes. Considering that all these animalcules are principally composed of fibrin and albumen, we may reckon that the weight of the fifteen to twenty of them existing in every 5 centigrammes of stomachal liquid constitutes nearly the fifth part of the total weight of the liquid in which they live. Now sheep have, on an average, 3 to 5 kilogrammes of food in the first and in the second stomach after an ordinary repast; the total weight of the animalcules contained in these two stomachs will therefore be the fifth part, or from 600 to 1000 grammes.

In the third, and especially in the fourth stomach, these animals are dead, and are only to be recognised by the form of their carapace, which is then quite empty and transparent. As to those animalcules which possess no carapaces, not any trace of them can be detected.

In the small and in the large intestines we find only some fragments of carapaces.

2. The *Horse* has seven species of animalcules, in the cæcum and the dilated portion of the colon.

*First species.*—Form elongated and conical at its anterior part; head rather indistinct; the posterior part of the body terminated abruptly; without a tail; carapace granulated; two anterior members short, articulated, mobile, terminated by natatory filaments; movements slow and resembling those of the tortoise; length  $\frac{1}{8}$ th of a millimetre, breadth  $\frac{1}{10}$ th.

*Second species.*—Form elongated and somewhat flattened; a distinct head; a granulated carapace; body provided with four articulated members on its lateral parts, two of which are anterior and two posterior, all bearing fasciculi of natatory filaments; circle of vibrating cilia at the posterior part of the body; movements slow; length  $\frac{1}{10}$ th of a millimetre, breadth  $\frac{1}{30}$ th.

*Third species.*—Form ovoid; carapace granulated; a bundle of vibrating cilia at the anterior and posterior parts, both on the right and left of the body; the movements are slow; length  $\frac{1}{30}$ th of a millimetre, breadth  $\frac{1}{40}$ th.

\* Ehrenberg, *loc. cit.* p. 313.

*Fourth species.*—Body of a lengthened ovoid form; its anterior and posterior parts furnished with vibrating cilia; movements slow; length  $\frac{1}{30}$ th of a millimetre, breadth  $\frac{1}{60}$ th.

*Fifth species.*—Form spheroidal; vibrating cilia over the entire surface of the body; rotatory movements rapid;  $\frac{1}{12}$ th of a millimetre in diameter.

*Sixth species.*—This animalcule has some degree of resemblance to the form of the heart of certain tortoises; carapace flattened and having three notches or indentations, two of which are furnished with bundles formed of large vibrating cilia; breadth  $\frac{1}{15}$ th of a millimetre.

*Seventh species.*—A monad of the  $\frac{1}{100}$ th of a millimetre. The more or less hard and moulded alimentary matters contained in the latter portion of the contracted colon and in the rectum furnish nothing but the carapaces of all these animalcules.

3. The *Dog* has in its stomach two species of *Monads*.

*First species.*—Body pyriform, ending in a little tail; the upper surface of the body convex, the under flattened; movements very brisk; length  $\frac{2}{100}$ ths of a millimetre, breadth  $\frac{1}{100}$ th.

*Second species.*—Body filiform; the to-and-fro movements performed slowly; length  $\frac{1}{200}$ th of a millimetre. The duodenum and the anterior third of the middle region of the narrow bowel contain some of these monads. The last third portion, the jejunum, the cæcum, the colon and the rectum, do not furnish any.

4. The *Pig* has but one species of animalcule in its stomach; form flattened, oval; the hinder part ending in a conical tail; the thin edges of the body furnished with vibrating cilia; movements very brisk; length  $\frac{2}{100}$ ths of a millimetre, breadth  $\frac{1}{100}$ th. This animalcule greatly resembles the *Monadina* of Ehrenberg.

The small intestines do not contain any of them.

5. The animalcules of digestion are born, live and swim in the acid liquid contained in the stomach. By placing the stomachal matters in glass tubes kept at a constant temperature of from 30° to 35° centigrade, they may be kept alive for two or three hours, and more.

6. The very great number of these animalcules in the first two stomachs of ruminants, the presence of their empty carapaces in the third, in the fourth, and in the excremental matters, their equally great number in the cæcum and dilated colon of the horse, as also the existence of their empty carapaces in the contracted colon and rectum, lead us to conclude that the organic matter of these animalcules is digested in the fourth stomach of the ruminants, that it is absorbed in the contracted colon of the horse, and that in both bowels it supplies an animal matter for digestion.

7. The consequence, then, of this fact is, that although the herbivorous animals, as the sheep and the horse, in a state of nature, take only vegetable matters into their stomachs, nearly a fifth part of these matters is destined to give birth and sustenance to a great number of animals of inferior development, which, digested in their turn, will contribute some *animal matter* to the general nutrition of

these two herbivorous animals ; a consequence rendered more probable by the fact, that in the dog and the pig, which feed on both animal and vegetable substances, the animalcules are minute, of one or two species only, and not at all numerous.

#### DEVELOPMENT AND PROPAGATION OF SERPENTS.

The young, on leaving the egg, usually differ from their parents, besides their size, by a system of colouring more vivid and more contrasted, by a head more blunt and more rounded, by the largeness of the eyes, and by the less perfect state of the epidermis and its appendages. They are, however, provided with teeth perfectly resembling those of the adult, of which they are ready to make use ; and the venomous kinds, instructed by instinct with the power of their weapons, alternately elevate and lower their fangs, and defend themselves against attacks with that fury which is innate in their race. It was long believed that the tail of the young was shorter in proportion to the trunk than in the adult, and that this member presented consequently in them a smaller number of subcaudal plates. If this were the case, we must suppose that new plates develop themselves with age ; but as the number of plates corresponds to the number of vertebræ, we must equally suppose the production of new osseous pieces, as is seen in the *Julus*, a circumstance little probable in animals so high in the scale of being as those of which we treat. Besides, the researches which I have made on this subject have proved the contrary ; since among a great many individuals the young did not show any difference from the adults in the number of plates but what might be considered as accidental. To be sure of the fact, I have repeated these observations on a great number of the most dissimilar species, and have always obtained the same results.

Shortly after their birth, the young Ophidians undergo their first moult. This operation is repeated in our climate, according to the observations of Lenz, five times in the year, viz. every month from the end of April to the beginning of September ; whence it results, that there is no casting of the skin during the hybernation. It would be very interesting to know how many moults serpents undergo in warm climates, where the state of sleep does not take place. A state of domesticity, a mode of life little natural to these animals, remarkably influences the functions of the skin, the epidermis of which does not renew itself in fixed and determinate periods ; frequently this operation is very long and so painful that the animal suffers much, or it is sometimes followed by death. In order to reject the old epidermis, which begins to detach itself at the head, and especially along the borders of the lips, the serpent passes itself through mosses, grasses, or heath, and contrives, by means of slow and continued movements or frictions, to disengage gradually the exterior layer of the skin, which is already replaced below by a new epidermis. The spoils thus removed are found inverted from one end to the other, forming a sac with a reticulated surface more or less diaphanous, more wide than the body of the snake, because of the dilata-

tion of the membranous intervals, and presenting, with the exception of the mouth and nostrils, no other orifice than the anus; for it is well known that the hemispherical membrane which protects exteriorly the globe of the eye is part of the integuments, and comes off along with the rejected skin. This skin, at first soft, soon dries, and is easily preserved in cabinets; but it is rare to find it entire, because it is often torn in the operation we have described. We possess some specimens of several foreign species which prove that the moulting is produced in the same manner in all serpents.—*From Dr. Schlegel's Essay on the Physiognomy of Serpents, translated by Dr. Traill.*

ON A NEW SPECIES OF HÆMATOZOON, TRYPANOSOMA SANGUINIS.

BY M. GRUBY.

This new species of parasite, which is extremely remarkable from its form and its motions, occurs in the blood of living adult frogs during the spring and summer months. Its elongated and flattened body is transparent, and in shape resembling an auger; its cephalic portion terminates in long minute filaments; its caudal portion also terminates in pointed filaments. The length of the animal is from forty to eighty thousandths of a millimetre, its breadth from five to ten: the cephalic filamentary portion is endowed with the greatest mobility; the length of the cephalic filaments is from ten to twelve thousandths of a millimetre; its body is elongated, flattened and dentated like the blade of a saw the whole length of one of its margins; it is smooth, and turned continuously twice or thrice round its axis like a gimlet or corkscrew, for which reason I propose to call this Hæmatozoon *Trypanosoma*.

The locomotion of the *Trypanosoma* is very remarkable; the rapidity with which it moves every part to produce the motion around its longitudinal axis, *i. e.* the boring movement, and then the address which it shows in avoiding every obstacle it meets in its course, is admirable: we may count four revolutions around its axis in a second, or 14,400 in an hour.

When this animal is still, it contracts so as to form a compact and smooth cylinder, one end of which is rounded, while the other terminates in a brush. At first sight it appears to be quite a different animal, so much is its form changed; but on observing it when it is in the act of contracting itself, it is seen to place itself so that the smooth margin of its body shall form the surface and the rounded end of the cylinder, while the appendages are partly inclosed and pressed in the interior of the cylinder, and moreover form with their elongated points the other extremity, which has the appearance of a brush.

The *Trypanosomata* of the blood are not so common as the *Filaria*; they occur in two or three out of a hundred frogs, and in each drop of blood will be found two or three *Trypanosomata*. They are sometimes met with in the blood of frogs along with *Filaria*, but these latter are always more numerous. Young frogs have no *Trypanoso-*

*mata* in the blood; they are more frequently met with in the blood of the females than of males.

These observations, in connexion with those of MM. Valentin\* and Gluge†, place beyond doubt the existence of different species of animalcules in the blood of cold-blooded animals. Their peculiar form, and the motions with which they are endued, prove that these animalcules are peculiar to the blood, and not animalcules of some tissue, carried by chance into the current of the circulation; and a proof not less conclusive is, that they are never met with in any solid substance of the animal. The organs of the frogs in which they occur, examined attentively, exhibit no pathological lesion. These animals even present no symptoms whatever of any disease; and as it is ordinarily in the adults that they occur, their presence in the blood must be attributed to a peculiar and physiological state of the animals.—*Comptes Rendus*, No. 20 for Nov. 1843, p. 1138.

\* M. Valentin discovered a peculiar Hæmatozoon in the blood of a *Salmo*, which he supposes to belong to the genus *Amoeba* of Ehrenberg.

† M. Gluge observed in the heart of a frog a peculiar animalcule with three lateral appendages. See 'Annals,' vol. x. p. 49, where are also detailed the observations of M. Vogt on *Filaria* in the blood of frogs. The author's paper on *Filaria* in the blood of a dog will be found at p. 403, vol. xi.—Ed.

#### METEOROLOGICAL OBSERVATIONS FOR DECEMBER 1843.

*Chiswick*.—December 1. Overcast: clear. 2. Frosty haze: very fine: hazy. 3. Hazy: cloudy and mild. 4. Drizzly. 5. Cloudy and fine. 6. Clear and fine. 7. Drizzly. 8. Very fine. 9. Foggy. 10. Foggy: fine. 11. Very fine. 12. Dense fog. 13. Foggy: hazy clouds. 14. Clear and fine. 15, 16. Fine, with clouds. 17. Slight haze: clear and fine: foggy. 18. Foggy. 19, 20. Hazy. 21. Overcast. 22. Very fine: thickly overcast. 23. Cloudy and mild. 24. Clear and fine. 25. Hazy: overcast. 26. Drizzly: foggy. 27. Hazy. 28. Cloudy and fine: hazy. 29. Hazy. 30. Overcast: rain. 31. Cloudy: squally with rain.—Mean temperature of the month  $2\cdot26^{\circ}$  above the average.

*Boston*.—Dec. 1. Cloudy. 2. Fine. 3. Fine, beautiful halo round the moon eight o'clock P.M. 4. Fine. 5. Cloudy. 6. Fine. 7. Rain. 8. Fine. 9. Fine: rain P.M. 10. Foggy. 11, 12. Cloudy. 13. Foggy. 14. Fine. 15. Fine: rain early A.M. 16. Cloudy. 17. Fine. 18—20. Foggy. 21. Cloudy. 22—24. Fine. 25—28. Foggy. 29, 30. Cloudy. 31. Fine.—N.B. This is the driest month since February 1832.

*Sandwich Manse, Orkney*.—Dec. 1, 2. Cloudy. 3. Drizzle. 4. Fine. 5, 6. Heavy showers. 7. Rain: showers. 8. Showers: clear. 9. Cloudy. 10, 11. Cloudy: clear. 12. Clear. 13. Cloudy. 14. Cloudy: heavy showers. 15, 16. Showers. 17. Drizzle. 18. Showers. 19. Cloudy: fine. 20. Fine. 21. Fine: cloudy: fine. 22. Showers: fair: showers. 23. Showers: fair: damp. 24, 25. Clear: fair. 26. Damp: drizzle. 27. Clear: fine. 28. Clear. 29. Cloudy. 30. Rain: drizzle. 31. Showers: hail-showers.

*Applegarth Manse, Dumfries-shire*.—Dec. 1. Hoar frost. 2. Thick fog. 3—7. Showers. 8. Fair. 9. Fog and rain P.M. 10—13. Cloudy and rain. 14. Fair. 15. Slight shower. 16. Fair. 17. Fair and fine. 18. Fair though dull: shower P.M. 19. Fair. 20. Showery. 21. Fair, but thick fog. 22. Very wet and stormy. 23. Slight showers. 24. Slight showers A.M. 25. Showers. 26. Rain P.M. 27. Fair, but cloudy. 28. Slight showers. 29, 30. Fair. 31. Rain.

Mean temperature of the month .....  $46^{\circ}\cdot4$   
 Mean temperature of December 1842 .....  $46\cdot05$   
 Mean temperature of spring-water .....  $46\cdot1$









THE ANNALS  
AND  
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No. 83. MARCH 1844.

XXI.—*Description of a new Genus of Nudibranchiate Mollusca, with some new Species of Eolis.* By JOSHUA ALDER and ALBANY HANCOCK, Esqrs.

[With a Plate.]

ALTHOUGH the British Fauna has been investigated more carefully perhaps than that of any other country, fortunately for the naturalist of the present day, much still remains to reward his search, especially among the Marine Invertebrata of our island: of this the Nudibranchiate Mollusca afford a striking example, the number of known British species having been nearly doubled within the last few years. We now have the pleasure of offering a further contribution to the knowledge of this interesting tribe.

Gen. VENILIA\*.

*Body* limaciform, ovate-oblong, depressed, tapering to a point behind. *Head* anterior and inferior, covered by a semicircular veil; mouth with a pair of corneous jaws. *Tentacula* 4, linear, non-retractile; 2 dorsal, erect, and 2 small oral ones attached to the sides of the veil. *Branchiæ* papillary, elongated, arranged on a projecting margin down each side of the back, with a few papillæ extending round the head in front of the dorsal tentacula. *Anus* posterior, on the medial line of the back. Aperture of the generative organs on the right side.

This curious animal unites several of the characters of the two principal divisions of the order *Nudibranchiata*, and may be considered, in some respects, intermediate between them. In its general appearance it reminds us at once both of *Eolis* and *Euplocamus*. With the latter it agrees in general form, and in the broad, flattened back, produced at the sides, and surrounded by appendages which are continued round the front of the head. The form of the head and veil is also similar; and the posterior dorsal position of the vent indicates a still nearer approach to this and the other genera of the family *Doridae*, from all of which

\* The name of a wife of Neptune.

however it differs in the absence of branchial plumes round the latter organ\*.

Its true position appears to be in the family *Tritoniadae* and next the genus *Eolis*, with which it agrees in the form, character and position of the branchiæ and of the dorsal tentacula, and in the possession of corneous jaws, and of a true gastro-vascular system. Its form is ovate-oblong, tapering to a point behind; without cloak, but having a projecting margin down the sides of the back making an approach to the pallial form. The head is anterior and inferior, covered by a small semicircular veil, from the sides of which arise two short tentacula, held laterally. The dorsal tentacula are linear, erect, and non-retractile; without sheaths; behind them are the eyes. The branchiæ are papillary, and are arranged on the projecting margin down each side of the back. These are united by similar processes continued round the head in front of the dorsal tentacula. The anus is tubular, situated on the medial line of the back near the posterior termination of the branchiæ, without plumes. Behind this the flattened portion of the back terminates and the body tapers down to the tail. The foot is rather expanded at the edges and produced posteriorly. The aperture of the generative organs, which are of the usual form, is on the right side.

The corneous jaws (present in nearly all the genera of *Tritoniadae*, but, as far as we know, never found in the *Doridae*) are largely developed in this genus, and assume a very complicated structure†. Each jaw (Pl. II. fig. 3 and 4) consists of a pair of triangular plates, united down the sides and open behind. At the anterior angle is a third plate, not quite one-third the size of the others, which forms a kind of cap over that end, the posterior edge standing out considerably from the surface. Underneath each of the larger plates, at the same end, arises another expansion forming a small segment of an arch. These are united to each other by a corneous strap, which binds the jaws together in front, and acts as a spring to keep the cutting edges asunder when the muscles are relaxed. The whole exposes a large surface with many points of support for the insertion of the muscles, indicating the powerful character of these instruments of destruction and the rapacious habits of the animal. The jaws are placed nearly horizontally within the mouth. Beyond them is a strap-

\* We have been kindly favoured by J. E. Gray, Esq. of the British Museum with Leuckhart's description of his genus *Idalia*, to which this bears, at first sight, a considerable resemblance. The same characters, however, that distinguish it from *Euplocamus* will also sufficiently distinguish it from *Idalia*.

† The anatomical details, necessarily taken from a single species, may possibly be found to require some slight modification should additional species be discovered.

shaped tongue (fig. 5) thickly covered with transverse rows of hooked spines (fig. 6), with the points turned backwards. The stomach is situated rather backward and low in the body. The gastro-vascular system (fig. 7) passes out of it in several directions, dividing and branching into the papillæ. The vessels which pass into the branchial papillæ are in the form of blind sacs (fig. 8 *a*, and fig. 9), having no ovate vesicle communicating externally through the end of the papilla as in *Eolis*. A large vessel (fig. 8 *b*), however, is observable enveloping the former and extending the whole length of the papilla, through which the blood probably circulates. In other respects the internal anatomy of this little animal, as far as we could make it out from the examination of a single specimen, appears to agree with that of *Eolis*, excepting in the position of the alimentary canal and the posterior dorsal anus. The heart is placed much further back than in *Eolis*, and nearer the position which it occupies in the *Dorida*. When examined under the compressor of a microscope the auditory capsules (fig. 10) were observed in the usual position, containing nearly thirty otolites.

The species for which it has become necessary to form this new genus we have called

*V. mucronifera*.—Yellowish brown on the back, marbled and spotted with darker brown. *Dorsal tentacula* tuberculated. *Branchiæ* ovate, crystalline, covered with tubercular points; set in twelve transverse rows of three papillæ each on the sides of the back, with four large papillæ in front.

It is nearly half an inch long. The back and dorsal tentacula are of a pale yellowish brown colour, clouded and freckled with darker brown, and sprinkled with minute white spots. The rest of the body is of a hyaline white, nearly colourless, having a few small brown spots on the head and on the margin of the foot, mixed with more numerous opaque white ones. The back is depressed and slightly roughish; the sides smooth and rather concave. The veil is small and strongly notched in front; from its sides arise two small cylindrical oral tentacula. The dorsal tentacula are linear, subconical, and covered with tubercular points. The branchiæ are ovate or inversely pear-shaped, produced into blunt points at the apex, and having rather distant tubercular points over the whole surface, giving the more slender of them a pinnacled appearance. They are very crystalline and almost colourless, having only a small yellow tube with undulated margins in the centre, and are sprinkled with numerous opaque white spots over the surface. They are set along the projecting sides of the back in about twelve ill-defined transverse rows of three papillæ each, very close at the base; those next the back being large and inflated, the exterior ones very small: two larger than the rest are

placed posteriorly. These lateral rows are united anteriorly by four large elliptical tuberculated papillæ, passing round the head in front of the dorsal tentacula on the same line with the branchiæ. Five smaller ones alternate with these below. The foot is deeply grooved in front and bilobed; the sides rounded; it tapers to a fine point behind.

A single perfect specimen of this very curious little animal was obtained by dredging in shallow water at Malahide, near Dublin, in September last, adhering to the common sponge (*Halichondria panicea*), which is there found in very large masses. It turned sickly soon after it was caught, and during the first night lost several of its larger appendages. It revived however afterwards, and lived with us two or three weeks, during which time many of the branchiæ were reproduced and grew very rapidly. The papillæ in front of the head, which were among the parts that had fallen off, never re-appeared, but fortunately a sketch of them had been taken when perfect. As they were observed not to contain the central coloured vessel, they were probably not connected with the gastro-vascular system. From not having examined them under the microscope, we are unable to say whether or not they performed the office of branchiæ. On the papillæ down the sides, however, vibratile cilia were detected.

At the same time with the above, the two following new species of *Eolis* occurred.

*E. alba*.—*Body* very slender, pellucid, white, with a faint tinge of yellow from the viscera shining through. *Dorsal tentacula* smooth, approximating at the base, dark brown and slightly tapering for about two-thirds up, where there is a bulb or button-like expansion, above which they are white and more slender, terminating in a blunt point. *Oral tentacula* long, white, tapering to a fine point. *Branchiæ* linear-oblong, opaque white, with a dark olive-coloured ring near the termination, having another circle of opaque white above it. They are set in five or six distant clumps down the sides; the opposite ones approaching each other in the centre and having a ruff-like appearance. The first two clumps contain two rows of six or seven papillæ each; the rest are in single series decreasing towards the tail. *Foot* linear, pellucid, the anterior angles produced into long, slender tentacular processes, terminating posteriorly in a fine point. Length half an inch.

This is an extremely graceful animal. Two specimens were obtained.

*E. Farrani*.—*Body* slender, transparent white, with a delicate tinge of yellow; a few spots of bright orange occur on the head and back, and a streak of the same colour at the tail. *Dorsal*

*tentacula* rather long, smooth, nearly linear, the lower portion transparent white, the upper orange. *Oral tentacula* about half the length of the dorsal ones and of the same colour. *Branchiæ* elliptical, inflated, of a pale straw-colour, with a ring of orange near the apex; set in nine or ten transverse rows of three or four papillæ each on the sides; those nearest the centre of the back large and much inflated, the side ones small. *Foot* linear, transparent; the anterior portion not produced into angles. Length four-tenths of an inch.

A single individual only of this pretty species was found with the preceding. We have named it after Dr. Farran of Dublin, a gentleman well known for his love of natural history, and for his fine collection of Irish shells. To his kindness we are indebted for the opportunity of procuring these interesting additions to the British Fauna.

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We add the descriptions of four new species of *Eolis* found at Cullercoats, Northumberland\*.

*E. angulata*.—*Body* depressed, subangulated, broad in front and terminating rather abruptly behind, of a pale pellucid orange. *Dorsal tentacula* short, conical, obtuse, orange tipped with white. *Oral tentacula* rather longer than the dorsal, white. *Branchiæ* cylindrical, rather long, obtusely pointed, orange coloured with white apices, the surface covered with opaque white blotches; arranged in ten or twelve close-set rows of about five papillæ each on the sides, leaving a broad naked space on the back. *Foot* broad, produced into lateral angular points in front, and suddenly tapering to a point behind. Length four-tenths of an inch.

On a stone brought in from deep water by the fishermen.

*E. Northumbrica*.—*Body* slender, transparent white tinged with green. *Dorsal tentacula* rather long, truncated, irregularly ringed in the upper portion, and tipped with white. *Oral tentacula* smooth, of the same length and colour as the dorsal ones. *Branchiæ* subclavate, dark green with white tips; set in nine distant transverse rows of three to five papillæ each down the sides of the back. *Foot* slender, not much produced behind; the anterior portion slightly angulated. Length not quite three-tenths of an inch.

On a coralline from deep water.

This species differs from the *Montagua viridis* of Forbes in not having the papillæ continuous across the back, in having nine rows of these instead of five, and in some other minor characters.

\* Three of these were described and drawings of them exhibited at the British Association Meeting at Manchester in 1812.

*E. gracilis*.—*Body* very slender, pellucid white. *Dorsal tentacula* very long, linear, transparent, the upper portion opaque white. *Oral tentacula* of nearly equal length with the dorsal ones. *Branchiæ* long, slender, elliptic-oblong or nearly linear, of a ginger-orange colour, with a minute ring of opaque white near the apex; arranged in four or five clusters down each side of the back. The first cluster contains seven papillæ, the others diminishing gradually in number. *Foot* long and slender, extending considerably beyond the branchiæ behind; the anterior angles much produced and tentacular. Length nearly half an inch.

Found under a stone between tide-marks. A very delicate and graceful species.

*E. violacea*.—*Body* short, white. *Dorsal tentacula* moderately long, linear and obtuse, pale fawn-coloured. *Oral tentacula* short, thickish and linear. *Branchiæ* elliptic-oblong, inflated, semitransparent white, with a linear central vessel of a violet colour, the apices encircled by a ring of opaque golden yellow. They are set in ten or twelve indistinct transverse rows of three or four papillæ each on the sides; those next the back large, long and inflated, the side ones very small. They extend forward as far as the dorsal tentacula. *Foot* rather short, not extending much beyond the branchiæ, the front portion a little enlarged and rounded. Length three-tenths of an inch.

On a coralline from deep water.

#### EXPLANATION OF PLATE II.

*Fig. 1.* *Venilia mucronifera*, viewed from above. [The line on one side shows the natural size.]

*Fig. 2.* Portion of the under side of the same, showing the head and veil.

*Fig. 3.* Corneous jaws, upper side.

*Fig. 4.* The same, under side.

*a.* Large plates united down the sides.

*b.* Small plate.

*c.* Arch supporting the corneous strap *d.*

*e.* Cutting edge.

*Fig. 5.* Tongue.

*Fig. 6.* Two spines of the same, more highly magnified.

*Fig. 7.* Stomach and gastro-vascular system.

*a.* Œsophagus.

*b.* Intestine leading to the anus.

The junction of the vessels with the stomach, where marked with dotted lines, could not be very distinctly made out.

*Fig. 8.* One of the branchial papillæ.

*a.* Central vessel connected with the gastro-vascular system.

*b.* Larger vessel inclosing it and reaching the whole length of the papilla.

*Fig. 9.* Central vessel, more highly magnified.

*Fig. 10.* Auditory capsule and otolites.



XXII.—*Catalogue of Irish Entozoa, with observations.* By O'BRYEN BELLINGHAM, M.D., Fellow of and Professor of Botany to the Royal College of Surgeons in Ireland, Member of the Royal Zoological, Geological and Natural History Societies of Dublin, &c.

[Continued from p. 105.]

### Order 1. NEMATOIDEA.

#### Genus 8. ASCARIS.

(Derived from ἀσκαρίζω, *salio*.)

Body cylindrical and elastic, attenuated more or less at the extremities. Mouth terminal, provided with three tubercles, one of which is superior, two inferior. Anus a transverse cleft close to the posterior extremity. Male organ a double spiculum without any sheath. Female organ opening externally about the junction of the anterior with the middle third of the body.

The name *Ascaris* was given to this genus by Linnæus on account of the liveliness of the motions of some of the species, and it has been adopted by all zoologists since. The species are very numerous, 140 being enumerated by Rudolphi in his 'Synopsis.' They occur in mammalia, birds, reptiles and fish; their most common habitat is the alimentary canal.

Rudolphi has made three divisions of the genus.

The first contains the species which are equally attenuated at each extremity.

The second, those in which the anterior extremity has a greater diameter than the posterior.

The third, those in which the posterior extremity has a greater diameter than the anterior.

Each of these divisions Rudolphi has again subdivided according as the head is provided with lateral membranes (what he calls winged), or as this part is naked or destitute of these appendages.

*Corpore utrinque æqualiter attenuato; capite nudo.*

1. *Ascaris lumbricoides*\*. Small intestines of man (*Homo*).

\* The *Ascaris lumbricoides* (or common round worm of the human intestines) has been known longer than any other species of Entozoon; it is included in Pennant's and Turton's list of the British species; it is not peculiar however to the human subject, for it occurs also in the intestines of the ass, wild-boar, pig and ox: the species found in the horse, although for a long time confounded with it, and resembling it in some points, is now known to be distinct.

The *Ascaris lumbricoides* inhabits the small intestines of the human subject; the female is much larger than the male, and is much more

2. { *Ascaris megalcephala* \* (Cloquet). { Small intestines of horse  
 ——— *Equi* (Turton) . . . . . { (*Equus Caballus*).
3. ——— *vesicularis* † { Cæca of partridge (*Perdix cinerea*).  
 { Cæca of quail (*Perdix Coturnix*).  
 { Cæca of pheasant (*Phasianus Colchicus*).  
 { Cæca of chicken (*Gallus domesticus*).  
 { Cæca and rectum of shieldrake (*Tadorna Bel-  
 lonii*).  
 { Cæca of peacock (*Pavo cristatus*).

common : this species is more frequently met with in early life than in the adult, and is said to have been found in one-fifth of the individuals examined between the ages of three and ten ; it is very rare in old age. In ninety cases in which I examined the intestinal canal of patients who died in St. Vincent's Hospital, Dublin, I found this species only twice, and then only a single specimen; the subjects were both adults ; of these ninety cases however only five were under ten years of age, the period at which this species is most frequent. The *Ascaris lumbricoides* occurs sometimes in considerable numbers, and its size is in general in an inverse ratio to the number which exist in the same individual. The penis of the male is very frequently found projecting ; it is double, and it appears strange that so accurate an observer as Cloquet should have described it as being single.

\* The *Ascaris megalcephala* (*Ascaris Equi* of Turton's 'British Fauna') is a common inhabitant of the small intestines of the horse, and was considered by many to be identical with the *Ascaris lumbricoides*, until M. Jules Cloquet (in a memoir which obtained the prize of the Royal Academy of Sciences of Paris in the year 1818) pointed out several material particulars in which it differs from it, and being satisfied that it is a distinct species, he named it *Ascaris megalcephala*, from the large size of the tubercles which surround the mouth ; indeed any one who places the two species side by side must be struck with their dissimilarity. Thus the body of the *Ascaris megalcephala* is much thicker in proportion to its length, and the tubercles surrounding the mouth are considerably larger than in the *Ascaris lumbricoides*. The vulva and the circular depression upon the body of the female are nearer the anterior extremity, the vagina is also longer, and the intestinal canal much larger than in the *Ascaris lumbricoides*.

† The females of the *Ascaris vesicularis* from the cæca of the domestic fowl resemble the female *Ascaris vermicularis* of the human subject, the posterior extremity being subulate ; in the males it is obtuse, terminates in a short mucro, and the body at this part appears to be edged by a lateral membrane. The penis, apparently a single filament, projected externally in all.

The specimens of *Ascaris vesicularis* from the pheasant agree with Rudolphi's description of the species, except that in the females the body has a greater diameter anteriorly than posteriorly. The anterior extremity is inflexed, the concavity towards the abdominal sur-

- |                               |  |
|-------------------------------|--|
| 4. <i>Ascaris inflexa</i> . . | Small intestine of chicken ( <i>Gallus domesticus</i> ).         |
|                               |  |
| 5. ——— <i>constricta</i>      | Peritonæum of dab ( <i>Platessa Limanda</i> ).                   |
|                               |  |
| 6. ——— <i>rotundata</i>       | Peritonæum of pouting ( <i>Gadus luscus</i> ).                   |
|                               |  |
| 7. ——— <i>osculata</i> . .    | Stomach of skate ( <i>Raia Batis</i> ).                          |
|                               |  |
| 8. ——— <i>acuminata</i> *     | Œsophagus and posterior nares of seal ( <i>Phoca vitulina</i> ). |
|                               |  |
|                               | Small intestine of water-newt ( <i>Triton palustris</i> ).       |

*Capite alato.*

- |   |   |   |
|---|---|---|
| 9. { <i>Ascaris marginata</i> † . .     | Small intestine of dog ( <i>Canis familiaris</i> ).             |   |
| 10. { ——— <i>Canis</i> (Turton) . . . . |   |   |
| 11. { ——— <i>triquetra</i> . . . .      | Small intestine of fox ( <i>Canis Vulpes</i> ).                 |   |
| 11. { ——— <i>mystax</i> † . . . .       |   |   |
| 12. ——— <i>depressa</i> . . . .         | Stomach and small intestine of cat ( <i>Felis maniculata</i> ). |   |
|   |   | Small intestine of moor-buzzard ( <i>Buteo rufus</i> ).             |
|   |   | Small intestine of sparrow-hawk ( <i>Accipiter fringillarius</i> ). |
|   | Small intestine of eared owl ( <i>Otus vulgaris</i> ).          |   |

face; in the males it is in the opposite direction. The posterior extremity of the body of the female is subulate; in the male it is more abrupt, but ends in an exceedingly fine and short mucro. The penis, which appeared to be single in some, double in other specimens, was commonly protruded. The males and females are very nearly of the same length, viz.  $4\frac{1}{2}$  lines; their colour is white. The œsophagus is long, straight, and nearly of the same diameter until it joins the stomach, where it increases in size; the stomach is globular or pyramidal. The intestine is straight, diminishes slightly in diameter posteriorly; it is surrounded by the convolutions of the ovary, which are long; in the male it is surrounded by a shorter spermatic tube.

\* The *Ascaris acuminata* is very common in the small intestine of the frog (*Rana temporaria*): I have found a species in the intestinal canal of the common water-newt (*Triton palustris*) which appears to be identical with it. The longest measure 8 lines; they are very slender, colour white, equally attenuated at each extremity. The posterior extremity is acuminate, the mucro long and somewhat triangular; the head is obtuse, the tubercles of the mouth distinct.

† The *Ascaris marginata* is probably the *Asc. Canis* of Turton's 'British Fauna'; it is very common in the small intestine of the dog.

‡ The *Ascaris mystax* is the *Asc. Felis* of Turton and Pennant, who

- |                                |   |  |
|--------------------------------|---|--|
| 13. <i>Ascaris ensicaudata</i> | } | Small intestine of blackbird ( <i>Turdus Merula</i> ).         |
|                                |   | Small intestine of missel-thrush ( <i>Turdus viscivorus</i> ). |
| 14. ——— <i>nigrovenosa</i> *   |   | Lungs of frog ( <i>Rana temporaria</i> ).                      |
| 15. ——— <i>acus</i> † . . . .  | } | Intestines of herring ( <i>Clupea Harengus</i> ).              |
|                                |   | Intestines of salmon-trout ( <i>Salmo Trutta</i> ).            |
| 16. ——— <i>angulata</i> ..     | } | Intestine of fishing-frog ( <i>Lophius piscatorius</i> ).      |

*Parte antica crassiore ; capite alato.*

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|-----------------------------------|---|
| 17. <i>Ascaris vermicularis</i> ‡ | Large intestine of man ( <i>Homo</i> ).             |
| 18. ——— <i>obelata</i> § ..       | Cæcum of mouse ( <i>Mus Musculus</i> ).             |
| 19. ——— <i>maculosa</i> ..        | Small intestine of pigeon ( <i>Columba Livia</i> ). |

describe the head as having a white oblong vesicle upon each side. It is extremely common in the stomach and small intestine of the domestic cat.

\* The *Ascaris nigrovenosa*, named so from its colour, is not unfrequent in the lungs of the frog (*R. temporaria*). This species is described as being viviparous: I have not observed that it is so; on some occasions, when cut across, I have seen a number of bodies resembling ova protruded, which were white and oblong, but hardly visible to the naked eye.

† The *Ascaris acus* from the intestine of the salmon-trout (*Salmo Trutta*) lived in water for some days after being removed; they are an inch and upwards in length, white, slender, and very elastic; the alæ of the anterior extremity are very narrow and appear to be crenate. The tubercles of the mouth are prominent and of a moderate size; the posterior extremity is sharp and subinflected in the male; the male is shorter and slenderer than the female.

‡ The *Ascaris vermicularis*, maw or thread-worm of English writers (*Oxyuris vermicularis* of Bremser), is the smallest species which inhabits the intestinal canal of the human subject, and has been known from a very remote period. It inhabits only the large intestine: the male is extremely minute and very rare; the female is much larger in proportion, and is very common. The three tubercles which surround the mouth and characterize the genus are minute, and if the specimen has been kept in spirits for some time, indistinct; indeed Bremser, from not having been able to distinguish these parts, and from the general resemblance of the animal to the *Oxyuris ambigua* of the rabbit, has removed it from the genus *Ascaris*; while Rudolphi, an equally high authority, has retained it in this genus, and succeeding writers have referred it to the genera *Oxyuris* or *Ascaris*, as they followed Rudolphi or Bremser. I have on several occasions satisfied myself that it is an *Ascaris*, and consequently Bremser was mistaken in placing it in the genus *Oxyuris*.

§ The *Ascaris obvelata* is a rare species; it resembles generally the *Ascaris vermicularis* of the human subject, and like it inhabits chiefly

*Capite nudo.*

20. *Ascaris dentata*. Intestine of bearded loach (*Cobitis barbatula*).

*Parte postica crassiore ; capite nudo.*

21. *Ascaris brevicaudata* \*. Large intestine of frog (*Rana temporaria*).
22. { *Ascaris spiculigera* †  
       — *Carbonis*  
       (Turton) . . . . .
- |   |  |
|---|--|
| } | Œsophagus and crop of cormorant<br>( <i>Phalacrocorax Carbo</i> ).   |
|   | Crop of crested cormorant ( <i>Phalacrocorax cristatus</i> ).        |
|   | Crop of <i>Mergus Merganser</i> .                                    |
|   | Œsophagus and crop of pomarine skua<br>( <i>Lestris pomarinus</i> ). |

the cæcum ; the tubercles of the mouth are however more distinct. The vagina is prominent, seated nearer the anterior than the posterior extremity of the body ; the posterior extremity is subulate and incurved in some specimens. In none of my specimens was I able to distinguish the lateral membranes of the head.

\* The *Ascaris brevicaudata* is not unfrequent in the large intestine, and in the small intestine near the large of the frog (*Rana temporaria*). In the months of June and July I have kept this species alive for four days in a vessel of water. When first placed in it they moved about very briskly, and many of the females soon protruded numerous young ; these were expelled singly from the vulva and immediately began to move about ; they were white, very small, and hardly visible to the naked eye ; hence the *Asc. brevicaudata* is viviparous.

The females of this species are about  $3\frac{1}{2}$  lines in length, the males from 2 to  $2\frac{1}{2}$  lines ; the body of the male is nearly of the same diameter throughout ; in the female it is slightly thicker posteriorly ; they are short and thick in proportion to their length, the male being slenderer than the female. In both sexes the posterior extremity terminates in a short mucro ; in some of the males this is curved inwards, in others it is straight. The penis does not project in any of the males, but a short tube does in several ; no lateral membrane is visible on the head.

This species appears to be perfectly distinct from the *Ascaris acuminata* which occurs in the small intestine of the same animal ; 1st, in being viviparous ; 2nd, in not being equally attenuated at each extremity, and in being short and thick in proportion to its length ; the *Ascaris acuminata* is double the length and more slender, and the mucro which terminates the body is long.

† The *Ascaris spiculigera* is the *Ascaris Carbonis* of Turton and Pennant, and is very common in the crop of the cormorant (*Phalacrocorax Carbo* and *cristatus*) ; it sometimes occurs in immense numbers. It has probably been named *spiculigera* from the length of the penis of the male, which is generally found projecting. On one occasion I found this species firmly adherent by the anterior extremity to the mucous membrane of the crop ; this was the only instance in which I met with an *Ascaris* adherent ; they are almost always free in the alimentary canal.

- |     |                                 |   |   |
|-----|---------------------------------|---|---|
| 23. | <i>Ascaris variegata</i>        | { | Esophagus of <i>Colymbus septentrionalis</i> .<br>Esophagus and crop of kittiwake gull ( <i>Larus tridactylus</i> ).<br>Esophagus and crop of razor-bill ( <i>Alca Torda</i> ).   |
| 24. | ——— <i>obtusocaudata</i>        | { | Stomach and intestine of trout ( <i>Salmo Fario</i> ).  |
| 25. | ——— <i>labiata</i> ..           | { | Intestines of eel ( <i>Anguilla acutirostris</i> ).<br>Peritonæum of herring ( <i>Clupea Harengus</i> ).<br>Peritonæum of lump-fish ( <i>Cyclopterus Lumpus</i> ).<br>Peritonæum and intestine of salmon ( <i>Salmo Salar</i> ).<br>Peritonæum of cod ( <i>Gadus Morrhua</i> ).<br>Peritonæum of whiting ( <i>Merlangus vulgaris</i> ).<br>Peritonæum of hake ( <i>Merluccius vulgaris</i> ).<br>Peritonæum of ling ( <i>Lota Molva</i> ).<br>Peritonæum of holibut ( <i>Hippoglossus vulgaris</i> ).<br>Peritonæum of turbot ( <i>Pleuronectes maximus</i> ).<br>Peritonæum of conger-eel ( <i>Anguilla Conger</i> ).<br>Peritonæum of frog-fish ( <i>Lophius piscatorius</i> ).<br>Peritonæum of gurnard ( <i>Trigla Gurnardus</i> ).<br>Peritonæum of mackerel ( <i>Scomber Scomber</i> ).<br>Peritonæum of pipe-fish ( <i>Syngnathus Acus</i> ).<br>Stomach, intestine, peritonæum and gall-bladder of dog-fish ( <i>Squalus Acanthias</i> ). |
| 26. | ——— <i>capsularia</i> *         | { | Small intestine of golden plover ( <i>Charadrius pluvialis</i> ).   |
| 27. | ——— <i>heteroëura</i> (Creplin) | { | Intestine of gudgeon ( <i>Cyprinus Gobio</i> ).   |
| 28. | ——— <i>cuneiformis</i> .        | { |   |

\* The *Ascaris capsularia* is mentioned by Rudolphi as occurring only in a single species of fish (the salmon), whereas I have found it in *fifteen different species*; it inhabits almost exclusively the peritonæum. This species is very common in the peritonæal cavity of the herring (*Clupea Harengus*); it is exceedingly active, and so tenacious of life, that I have kept it alive in a vessel of fresh water for twenty-nine days. The three tubercles which surround the mouth are very small; the whole tract of the intestinal canal can be seen through the parietes when the animal is alive, but there is no appearance of a convoluted ovary surrounding it. The stomach is whiter and more opake than any other part of the alimentary canal, and is visible through the parietes as a longitudinal white and short line, which is very characteristic of this species.

*Capite alato.*

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|-----|----------------------------|--|
|     |                            | Intestine and peritonæum of salmon ( <i>Salmo Salar</i> ).                     |
|     |                            | Intestine of salmon-trout ( <i>Salmo Trutta</i> ).                             |
|     |                            | Stomach and peritonæum of cod ( <i>Gadus Morrhua</i> ).                        |
|     |                            | Stomach and intestine of haddock ( <i>Gadus Eglefinus</i> ).                   |
| 29. | <i>Ascaris clavata</i> *   | Intestines of whiting ( <i>Merlangus vulgaris</i> ).                           |
|     |                            | Stomach and intestine of hake ( <i>Merluccius vulgaris</i> ).                  |
|     |                            | Stomach and intestine of whiting-pollach ( <i>Merlangus Pollachius</i> ).      |
|     |                            | Intestines of coal-fish ( <i>Merlangus Carbonarius</i> ).                      |
|     |                            | Stomach and intestine of conger-eel ( <i>Anquilla Conger</i> ).                |
|     |                            | Peritonæum of mackerel ( <i>Scomber Scomber</i> ).                             |
| 30. | ——— <i>collaris</i> ..     | Intestine of turbot ( <i>Pleuronectes maximus</i> ).                           |
|     |                            | Intestines and pyloric appendages of holibut ( <i>Hippoglossus vulgaris</i> ). |
| 31. | ——— <i>tenuissima</i> .    | Intestine of whiting ( <i>Merlangus vulgaris</i> ).                            |
| 32. | ——— <i>succisa</i> ..      | Intestine of lump-fish ( <i>Cyclopterus Lumpus</i> ).                          |
| 33. | ——— <i>alata</i> , mihi †. | Intestines of man ( <i>Homo</i> ).   |

\* The *Ascaris clavata* is mentioned by Rudolphi as occurring in only three species of fish; I have found it in *ten different species*; it is extremely common in the cod, and sometimes grows to a large size. This species lived in a vessel of fresh water for four days after being removed from its natural habitat.

† The species of *Ascaris* to which I have ventured to give the name *Asc. alata*, from the distinctness of the lateral membranes of the head, is very rare; I only met with it once, and then obtained only two specimens. These are both females; they measure  $3\frac{1}{2}$  inches in length, and are half a line in width anteriorly, and three-fourths of a line posteriorly; the anterior extremity is inflexed, the posterior straight. The anterior extremity is provided upon each side with a very distinct semitransparent membrane a line and a half in length. In general appearance the *Ascaris alata* resembles the *Asc. mystax*, which is common in the domestic cat; it differs however in being of a greater diameter posteriorly than anteriorly.

Although this species has not been previously described, it would appear that one closely resembling it had been already observed in this country. In the fourth and fifth vols. of the 'Transactions of the Association of the King and Queen's College of Physicians' is contained a very interesting case, in which great numbers of insects and their larvæ were voided by a female residing in the county Cork; upon several occasions the *Ascaris lumbricoides*, and a species resembling this, were voided also by the same female. Dr. J. V. Thom-

*Species dubiæ.*

34. *Ascaris*. Small intestine of plover (*Charadrius Hiaticula*).  
 35. ———. Crop of shearwater (*Procellaria Anglorum*).  
 36. ———. Small intestine of sea-swallow (*Sterna Hirundo*).  
 37. ———\*. Peritonæum of loach (*Cobitis barbatula*).  
 38. ———. Peritonæum of heron (*Ardea cinerea*).  
 39. ———. Œsophagus of *Mergus Merganser*.  
 40. ———†. Stomach and intestine of skate (*Raia Batis*).  
 41. ———. Intestine of lump-fish (*Cyclopterus Lumpus*).  
 42. ———. Small intestine of widgeon (*Mareca Penelope*).

son, who examined and figured it, says it resembled the *Ascaris* of the cat, but may probably prove to be a distinct species. A full account of this species, with a figure of the head and anterior extremity, is contained in the first vol. of the 'Dublin Medical Press.'

\* This species, of which I found several specimens in the peritonæum of the common loach (*Cobitis barbatula*), differs in many respects from the *Ascaris dentata* which inhabits the intestine of the same animal. It is equally attenuated at each extremity, while in the other the anterior extremity is thicker than the posterior; the head is winged, while that of the *Asc. dentata* is naked. They are about three lines in length, very slender, and of a white colour; they lived in a vessel of fresh water for twenty-four hours. They are remarkable in this respect, and differ from most species which I have seen in the length of the lateral membranes of the head, which extend along the anterior third of the body, and are of the same width throughout. The posterior extremity of the animal has a somewhat triangular shape.

† In the stomach and intestine of the skate (*Raia Batis*) I have found, upon different occasions, specimens of an *Ascaris* which differ somewhat from one another, and do not seem to have been previously observed. In all the posterior extremity is thicker than the anterior, and the head is naked; they are about an inch or a little more in length; colour very white; the tubercles of the mouth are small, in some specimens slightly prominent, and appear to be surrounded by a prominent margin, which is wanting in other specimens; the anus projects considerably in some; at the junction of the anterior with the posterior three-fourths of the body, a circular contraction of its diameter is observed (as in the *Ascaris lumbricoides*) in the centre of the abdominal surface of which the vulva is situated, in the form of a little papilla; this appearance is not to be seen in the specimens found at a different period. Both, however, have so many characters in common that they can hardly be considered to be distinct species.

[To be continued.]



XXIII.—Descriptions of some new species of Birds found in the neighbourhood of Calcutta. By EDWARD BLYTH, Esq., Curator to the Museum of the Asiatic Society of Bengal.

To Richard Taylor, Esq.

DEAR SIR,

November 14th, 1843.

THE Hindoostan steamer direct from Calcutta to Suez departs tomorrow, by which opportunity I shall forward the present communication. I have obtained several rare species of birds since penning the first part of this paper\*, but only one novelty, which I proceed to describe. It is a gigantic species of true heron.

*Ardea nobilis*, nobis. Length of a male in first plumage 50 inches by  $7\frac{1}{2}$  feet in alar expanse; wing from bend  $22\frac{1}{2}$  in.; bill to frontal plumes  $7\frac{5}{8}$  in., and to gape  $9\frac{3}{8}$  in.; bare part of tibia  $6\frac{1}{4}$  in.; tarsi 10 in.; middle toe and claw  $6\frac{1}{2}$  in.; hind toe and claw 4 in. General form robust, but otherwise as in *A. cinerea*, which latter is a mere pygmy beside the new species, and the dimensions given of this would probably be considerably exceeded in a mature specimen. Colour of the upper parts pure ashy, somewhat darker than in *A. cinerea*; all the wing-coverts tipped with brown, denoting, with other indications, the immature dress: crown, ear-coverts, nape, and hind-neck to near its base a fine cinnamon rufous, deepest on the coronal feathers, which are elongated, but contain no slender attenuated crest-plumes, as would probably be the case in the adult; nevertheless, a full massy crest is formed by them, the longest feathers of which measure  $4\frac{1}{2}$  in.: the frontal feathers immediately over the bill are dark ashy: throat white; front of the neck the same, variegated in the usual manner of this genus with dark ashy, passing into nigrescent about the angular bend of the neck: shoulder-tuft varied with brown, having a white mesial streak on each feather: under parts dull white, laterally margined with mingled brown and ashy. Irides pale yellow. Beak blackish, the lower mandible dull white except towards the tip and along the edge: cere dusky, the orbits and a band in front of the eye yellowish: legs blackish: labial feathers deeply stained with cinnamon-brown. This superb heron was shot on the salt-water lake above Calcutta. It is probably the largest of the genus, exceeding considerably, I think, an immense and robustly formed African heron which I saw in the collection of Dr. Andrew Smith. Possibly it may be the *A. sumatrana* of Raffles, 'Lin. Trans.' xiii. 325, vaguely described as "a large sub-crested heron, with long slender neck and bill (that of *A. nobilis* is by no means long and slender), of a bluish gray, variegated

\* See our last Number, page 113.

with ferruginous ; white on the chin." The most conspicuous feature of the bird before me is its cinnamon-coloured crown and hind-neck, next to its gigantic size and generally robust proportions.

I lately described another fine heron from Arracan, which, in course of time, I shall probably also obtain here, by the name

*A. fusca*, nobis. Size of the larger specimens of *A. cinerea*, but more robustly formed, with a much longer bill, the lower mandible of which inclines conspicuously upward towards its extremity. Length of closed wing 17 in. ; of bill to frontal feathers  $6\frac{5}{8}$  in., and to gape  $8\frac{1}{4}$  in. ; bare part of tibia  $2\frac{1}{2}$  in. ; tarsus  $6\frac{5}{8}$  in. ; middle toe and claw  $4\frac{1}{2}$  in., and hind toe and claw  $2\frac{1}{2}$  in. General colour blackish or dusky tinged with ashy, with the acuminate portion of the dorsal and lower nuchal feathers whitish gray, contrasting with the rest ; crest of very slender elongate plumes, the longest measuring  $7\frac{1}{2}$  in., of a whitish colour to near their base ; throat white, tinged with rufous inferiorly ; under parts dusky gray ; bill and feet black, the lower mandible whitish along its ridge.

The following are the Indian herons known to me :—

#### Subgenus ARDEA.

1. *A. nobilis*, nobis.
- 1 a. *A. fusca*, nobis. Arracan.
2. *A. cinerea*.
3. *A. purpurea*.

#### Subgenus HERODIAS, Boié.

4 and 4 a. *A. flavirostris*, Wagler, and *A. modesta* (?), Gray. Vide preceding remarks.

5. *A. putea*, B. Hamilton.
6. *A. garzetta* ; *A. orientalis*, Gray, in Hardwicke's drawings.
7. *A. asha*, Sykes. A true egret, although not white. Southern India.

8. *A. caboga*. A very aberrant egret, feeding chiefly on grasshoppers, in quest of which it is often observed following cattle.

*A. nigrirostris*, Gray, is unknown to me.

Subgenus ARDEOLA, Boié, not of Bonaparte, following Brisson.

9. *A. leucoptera* (Bodd.), G. R. Gray ; *A. malaccensis*, Gm. ; *A. speciosa*, Horsfield ; *A. Grayi*, Sykes.

#### Subgenus ————— ?

10. *A. flavicollis*, Wagler ; *A. nigra*, Vieillot. This beautiful species was figured in different states of plumage by the late Dr. Buchanan Hamilton, probably from Bengal specimens ; I have re-

ceived it from Mr. Jerdon in Southern India, and also a fine specimen from Chusan.

11. *A. javanica*.

Subgenus ————— ?

12. *A. lepida*, Horsfield.Subgenus ————— ? ARDEOLA (*Brisson*), *Bonap.*13. *A. cinnamomea*.Subgenus BOTAURUS (*Brisson*), *Stephens*.14. *A. stellaris*, Lin.Subgenus NYCTICORAX (*Brisson*), *Stephens*.

15. *A. Gardeni* (Gm.), *Jardine*. *N. manillensis* may perhaps also occur as a straggler.

Among other species lately obtained, may be mentioned a second example of *Aquila pennata*, both specimens being females, but in very different plumage; the last contained the remains of a house pigeon in its stomach, confirmatory of Mr. Jerdon's observations on the usual prey of this pigmy eagle;—Osprey, two specimens; *Calliope Lathamii* appears to be very numerous this season; *Chaitaris rubeculoides*, two; *Ædicnemus crepitans*, another; *Pluvianus cinereus*, several; *Terekia javanica*, several.

I am about to describe another new *Manis* from Arracan, additional to *M. brachyura*, *javanica*, and *leptura* (nobis); also a new Badger (true *Meles*) from Assam; and I have various other undetermined species of mammalia, several of which are probably new, besides abundance of novelties in other classes.

But the most interesting fact which I have lately determined is decidedly the existence of three distinct species of true Crocodile in the estuary of the Ganges; one however of which I as yet know by the skull alone, of which I have three specimens; of these I shall pack up one in a collection I am now about to despatch to the India-house, and with it a stuffed specimen of the young of the other which is additional to the common *C. biporcatus*; and I will also send with them the sternal apparatus of my new huge heron, with that of *A. cinerea* to show the comparative size. At the close of the present cool season I purpose to resume my notices of the ornithology of this neighbourhood, which will afford time for the return hither of this paper in a printed form; but I do not anticipate more than a few accessions to the list of birds which I have now supplied you with, the more especially as I expect to have no leisure for personal quest of specimens.

Nov. 16th.—My shikaree has just come in, with six specimens of the genus *Phylloscopus*, all of different species, and two of them new, viz.

*Ph. nitidus*, nobis. Resembles *Ph. sibilatrix*, but is smaller in all its proportions, and has the entire under parts, with the lower tail-coverts, tinged with yellow. Bill carneous dusky, the lower mandible pale; and feet light brownish, tinged with yellow on the toes. Length  $4\frac{3}{4}$  in. by  $7\frac{1}{2}$  in. in alar expanse; closed wing  $2\frac{5}{8}$  in., and tail 2 in.: bill to gape  $\frac{5}{8}$  in.; tarsi  $\frac{3}{4}$  in. A male.

*Ph. tristis*, nobis. Closely allied to *Ph. rufus*, but devoid of any greenish or yellowish tinge on the plumage, except on the fore part of the wing underneath, and very faintly margining the quills and tail externally: general colour grayish brown, beneath paler and albescent, with a faint rufous tinge on the breast, and no trace of yellowish on the lower tail-coverts nor elsewhere than as stated: the legs and claws dull black, much darker than in *Ph. rufus*, except the under surface of the toes which is yellow; bill also blackish, tinged with yellow at base of lower mandible, the gape yellow. Length  $4\frac{1}{2}$  in. by  $6\frac{1}{2}$  in. across; wing  $2\frac{1}{8}$  in.; tail  $1\frac{5}{8}$  in.: bill to gape  $\frac{1}{2}$  in., and tarsi  $1\frac{3}{4}$  in. A female.

The other species brought are *Ph. fuscatus*, nobis, being only the second example of it which I have yet obtained; *Ph. lugubris* and *Ph. affinis*, nobis, both of which are very abundant; and *Ph. modestus* (*Regulus modestus*, Gould), which is also common, and appears generally to have the central coronal streak inconspicuous. Two other species have been procured by me in this vicinity—*Ph. reguloides*, nobis, which is not rare, and *Ph. magnirostris*, nobis (“*Ph. trochilus*?” of xii. 230 ante), of which I have yet obtained but one specimen. Mr. Hodgson has several additional Nepalese species of this well-marked group.

Of other species worthy of mention, I may notice the occurrence of a second specimen of *Ædicnemus crepitans*, a second of *Larus ridibundus*, and several of *Sterna Anglica*, to which species Nos. 400 and 403 of Mr. Jerdon’s list must be referred, his 404 being *Viralva indica* of Stephens, and both appertaining to *Gelochelidon* of Brehm. I learned also a day or two ago, that a subordinate of mine, recently deceased, secreted and disposed of at least one fine specimen of the rare *Eurhinorhynchus griseus*, apud Pearson, doubtless procured in the bazar, about three years ago, which was previous to my arrival. I detected this party setting aside other rare birds in the course of last cold season, upon which occasion I first obtained the *Turdus Whitei*, which it was not intended that I should have seen; but I do not think that since that time any business of the kind has been going on. I greatly doubt whether this curious bird (a Spoon-billed Tringa), described by Dr. Pearson in ‘As. Res.’ xix. 69, be identical with the *Platalea pygmæa*, Auct., or *Eurhinorhynchus griseus* of Nilsson. The latter is described by Shaw as “scarcely equalling a sparrow in size,” and to inhabit Surinam and Guiana; whereas the di-

mensions of the Bengal bird, according to Dr. Pearson, are, length 6 in. by 11 in. in alar expanse, and the wing measures  $3\frac{3}{4}$  in., the stuffed specimen showing it to be scarcely smaller than *Tringa platyrhyncha*. I would therefore provisionally style it *Eu. orientalis*.

Nov. 17th.—*Terekia javanica* continues to be brought to the bazar, one or two every morning; also *Tringa platyrhyncha*, or *Limicola pygmea* of Nilsson; and I obtained a third specimen of the Kentish plover this morning, together with a lot of *Glaucopis orientalis*.

I herein inclose skins of *Culicipeta Burkkii*, *Phylloscopus reguloides*, *Ph. modestus*, two, *Ph. affinis* and *Ph. lugubris*, which kindly show to Mr. Gould and Mr. G. R. Gray, and ask their opinion of them. I request Mr. Gray's acceptance of them for the British Museum, but will send him better and mounted specimens by and by. I cannot delay this note for the departure of the express, as the specimens make it too bulky to be then received; but if anything should turn up in the meanwhile worthy of being recorded I will let you know.

Believe me ever, very truly yours,  
E. BLYTH.

XXIV.—*Descriptions of some newly discovered species of Araneidea.*

By JOHN BLACKWALL, Esq., F.L.S.

Tribe OCTONOCULINA.

Family AGELENIDÆ.

Genus TEGENARIA, Walck.

1. *Tegenaria sava*. Cephalo-thorace pallide flavescenti-brunneo; linea tenui mediana antice, fascia lata, irregulari longitudinali, ad utrumque latus marginibusque lateralibus obscure brunneis; mandibulis saturate fusco-brunneis; maxillis labroque rufescenti-brunneis; sterno fascia mediana rufescenti-brunnea, postice gradatim tenuiore, et ad latera fascia lata semilunari saturate brunnea puncta varia rotunda rufescenti-brunnea pedum versus insertionem includenti; pedibus longis, pilosis rufescenti-brunneis nisi ad femora 2<sup>di</sup> 3<sup>tii</sup> 4<sup>ti</sup>que ubi color obscure viridescenti-brunneus; coxis subtus maculis plurimis nigris, pedum pari 4<sup>to</sup> longissimo, dein 1<sup>mo</sup>, 3<sup>tio</sup> brevissimo; lineis medianis ad partem abdominis superiorem angulatis flavescenti-brunneis, ad filatoria brevioribus et obscurioribus, quarum vertices prorsum spectantes prope seriei anteriorem partem fascia longitudinali fusco-lutea intercepti; extremitates autem valde dilatatae maculis nigris irregularibus alternantes; lateribus fusco-luteis dense nigro-maculatis; abdomine subtus medio flavescenti-brunneo, inter strigas duas obscuras, e maculis plurimis nigris compositas, ad filatoria junctas.

Mas foemina minor, pallidior, maculis fasciisque obscurioribus : maris par pedum primum 4<sup>to</sup> longius.

Length of the female, not including the spinners,  $\frac{7}{10}$ ths of an inch ; length of the cephalo-thorax  $\frac{5}{16}$  ; breadth  $\frac{7}{32}$  ; breadth of the abdomen  $\frac{1}{4}$  ; length of a posterior leg  $1\frac{1}{4}$  ; length of a leg of the third pair 1.

The anterior part of the cephalo-thorax is compressed, and the posterior part is marked with furrows diverging from a narrow indentation in the medial line to the lateral margins, which are rounded ; it is thickly covered with hairs, and is pale yellowish brown, with a fine line extending along the middle of the anterior part, a broad, irregular, longitudinal band on each side, and lateral margins of a dark brown colour. Eyes almost equal in size, disposed in two transverse rows on the anterior part of the cephalo-thorax ; the anterior row is rather the shorter and nearly straight ; the posterior row is curved and has its convexity directed backwards ; the intermediate eyes of both rows form a square nearly, the anterior ones being rather the largest of the eight ; the eyes of each lateral pair are seated obliquely on a small eminence, but are not contiguous. Mandibles powerful, conical, vertical, provided with two rows of teeth and some long hairs on the inner surface ; they are of a dark reddish brown colour approaching to black. Maxillæ straight, increasing in breadth from the base to the extremity, which is rounded on the outer side, and obliquely truncated and supplied with long hairs on the inner side : lip quadrilateral, longer than broad, slightly notched at the apex : these parts are reddish brown, the lip being the darkest, and are palest at their extremities. Sternum heart-shaped, with a red-brown band extending along the middle, which decreases in breadth to its posterior extremity, and a large dark brown semilunar band on each side, comprising several circular red-brown spots opposite to the insertion of the legs. Legs long, hairy and reddish brown, with the exception of the thighs of the second, third and fourth pairs, which are of a dull greenish brown colour ; several black spots occur on the under side of each haunch ; fourth pair the longest, then the first, third pair the shortest. Each tarsus is terminated by three claws ; the two superior ones are curved and pectinated, and the inferior one is inflected near its base, which is furnished with several fine teeth. Palpi dark reddish brown, with a curved pectinated claw at the extremity. Abdomen oviform, hairy, convex above, projecting over the base of the cephalo-thorax ; along the middle of the upper part extends a series of yellowish brown angular lines, which become shorter and less conspicuous as they approach the spinners ; their vertices, which are directed forwards, are interrupted at the anterior part of the series by a longitudinal band of yellowish brown, and with

their extremities, which are greatly enlarged, black blotches of an irregular figure alternate; the sides are yellowish brown thickly spotted with black; the middle of the under part, which is yellowish brown, is comprised between two obscure bands, composed of numerous black spots, which meet at the spinners. The superior spinners are long, hairy, triarticulate, and have the spinning tubes disposed on the under side of the terminal joint, which tapers to its extremity and is reddish brown; the second joint is black. Plates of the spiracles dull yellow. This species and some others of the same family, *Tegenaria domestica*, *Tegenaria civilis*, and *Agelena labyrinthica*, for example, have the body and limbs supplied with numerous compound sessile hairs. Similar hairs occur also on *Dolomedes mirabilis*, belonging to the *Lycosidæ*.

The male is smaller, slenderer, paler, and less distinctly marked than the female, and the relative length of its legs is different, the first pair being longer than the fourth; their absolute length also is greater, an anterior one measuring 1 inch and  $\frac{1}{20}$ ths. The palpi are yellowish brown, with the exception of the radial and digital joints, which are reddish brown; the radial joint is longer than the cubital and has two apophyses at its extremity, one large, black and obtuse, situated on the outer side, the other smaller, red-brown and acute, situated on the under side; the digital joint is of an elongated pyriform figure pointed at the extremity; it is convex and hairy externally, concave within, at the upper part only, comprising the palpal organs, which are moderately developed, prominent, rather complicated in structure, with a strong, black, pointed process projecting boldly from the upper part, a prominent scaly process at the inner side of the upper part, and a long, slender, curved black spine originating near the extremity on the inner side, and directed obliquely upwards towards the outer side; their colour is red-brown.

Living specimens of *Tegenaria sæva*, which ranks among our largest British spiders, were obligingly presented to me in the autumn of 1843 by Miss Gertrude Buller Elphinstone, of East Lodge, Enfield, Middlesex, who captured them in the immediate neighbourhood in which she resides. In reply to some inquiries relative to the habits of this fine species, Miss Elphinstone informs me that it frequents the interior of buildings; and I have ascertained, from observations made on individuals in a state of captivity, that it constructs a horizontal sheet of web of a compact texture, with a short tube at one of its margins serving the spider for a retreat.

Baron Walckenaer, in the Supplement to the second volume of his 'Histoire Naturelle des Insectes Aptères,' p. 407, ascribes to M. Dugès the discovery of the true structure and function of the elongated superior spinners of certain spiders denominated anal

palpi by arachnologists, referring at the same time to the original observations of M. Dugès on the subject, published in the 'Annales des Sciences Naturelles,' 1836, seconde série, t. vi. Zoologie, p. 166. When the paragraph comprising the statement of this opinion was penned, M. Walckenaer doubtless was not aware that a paper of mine, including a correction of the erroneous impression that the superior pair of spinners when considerably elongated and pointed at the extremity perform the office of feelers merely, and distinctly detailing the particulars of their external organization and use, was published in the 'Report of the Third Meeting of the British Association for the Advancement of Science, held at Cambridge in 1833,' p. 445; and republished in 1834 in my 'Researches in Zoology,' pp. 298—300. Additional evidence of the accuracy of the conclusions here referred to is afforded by the structure of the superior spinners of *Tegenaria seva*.

#### Family THERIDIIDÆ.

##### Genus NERIËNE, Blackw.

2. *Neriëne flavipes*. Mas niger, pedibus sordide luteis; pedum pari 1<sup>mo</sup> et 4<sup>to</sup> longissimis, æqualibus, 3<sup>to</sup> brevissimo.

Length of the male  $\frac{1}{12}$ th of an inch; length of the cephalo-thorax  $\frac{1}{24}$ ; breadth  $\frac{1}{32}$ ; breadth of the abdomen  $\frac{1}{32}$ ; length of an anterior leg  $\frac{1}{8}$ ; length of a leg of the third pair  $\frac{1}{10}$ .

Cephalo-thorax oval, glossy, convex, with a slight indentation in the medial line of the posterior region: mandibles powerful, conical, divergent at the extremities, armed with a few minute teeth on the inner surface, and inclined towards the sternum, which is convex and heart-shaped: maxillæ strong, enlarged where the palpi are inserted, and inclined towards the lip, which is semicircular and prominent at the extremity: abdomen oviform, sparingly covered with hairs, convex above, projecting over the base of the cephalo-thorax: all these parts are black. The intermediate eyes form a trapezoid whose anterior side is rather the shortest; the posterior eyes of the trapezoid are the largest, and the anterior ones the smallest of the eight. Legs of a dull yellowish hue; first and fourth pairs the longest and equal in length, third pair the shortest. This spider, like the rest of the genus, has the tarsi terminated by three claws; the two superior ones are curved and pectinated, and the inferior one is inflected near its base. Palpi black, with a tinge of brown; the cubital and radial joints are short, the latter being much the larger; the digital joint is somewhat oval, with a bold conical prominence in front, and a small one at the upper part on the inner side; it is convex and hairy externally, concave within, comprising the palpal



organs, which are highly developed, complicated in structure, and of a dark reddish brown colour.

This species was taken on rails at Oakland in February 1841.

3. *Neriëne timida*. Cephalo-thorace, mandibulis, maxillis, labio, sternoque saturate fusco-brunneis; pedibus palpisque pallide rufescenti-brunneis, abdomine nigro; pedum pari 1<sup>mo</sup> et 4<sup>to</sup> longissimis, æqualibus, 3<sup>to</sup> brevissimo.

Quoad colorem pedumque longitudinem mas fœminæ similis.

Length of the female  $\frac{1}{2}$ th of an inch; length of the cephalo-thorax  $\frac{1}{4}$ ; breadth  $\frac{1}{2}$ ; breadth of the abdomen  $\frac{1}{4}$ ; length of an anterior leg  $\frac{1}{8}$ ; length of a leg of the third pair  $\frac{1}{2}$ .

Cephalo-thorax oval, glossy, convex, with the sides depressed, and a small indentation in the medial line of the posterior region: mandibles powerful, conical, rather divergent at the extremities, armed with teeth on the inner surface, and inclined towards the sternum, which is broad and heart-shaped: maxillæ strong, enlarged where the palpi are inserted and at the extremity, and inclined towards the lip, which is semicircular and prominent at the apex: these parts are very dark brown. The intermediate eyes form a trapezoid, the anterior ones of which are the smallest of the eight. Legs and palpi pale reddish brown. First and fourth pairs of legs the longest and equal in length, third pair the shortest. Abdomen oviform, convex above, projecting over the base of the cephalo-thorax; it is thinly clad with hairs, glossy and black. Plates of the spiracles dark brown.

The male is rather smaller than the female, but resembles her in colour and in the relative length of its legs. The cubital and radial joints of the palpi are short, the latter being much the stronger; the digital joint is oval, convex and hairy externally, concave within, comprising the palpal organs, which are moderately developed, complicated in structure, with a short prominent spine enveloped in a transparent membrane at their extremity, and are of a dark reddish brown colour.

Mature males and females of this species were found on rails at Oakland in April 1841.

4. *Neriëne saxatilis*. Mas cephalo-thorace, mandibulis, maxillis, labio, sterno, pedibus, palpisque brunneis, sterno labioque saturatioribus, pedibus pallidioribus; abdomine nigro-fusco; pedum pari 1<sup>mo</sup> et 4<sup>to</sup> æqualibus, longissimis, 3<sup>to</sup> brevissimo.

Length of the male  $\frac{1}{2}$ th of an inch; length of the cephalo-thorax  $\frac{1}{4}$ ; breadth  $\frac{1}{8}$ ; breadth of the abdomen  $\frac{1}{8}$ ; length of an anterior leg  $\frac{1}{7}$ ; length of a leg of the third pair  $\frac{1}{10}$ .

The two intermediate pairs of eyes form a trapezoid whose anterior side is rather the shortest. Cephalo-thorax oval, glossy,

convex, with an indentation in the medial line of the posterior region: mandibles strong, conical, armed with teeth on the inner surface, and inclined towards the sternum, which is heart-shaped: maxillæ inclined towards the lip, which is semicircular and prominent at the extremity: first and fourth pairs of legs the longest and equal in length, third pair the shortest: these parts, with the palpi, are brown, the sternum and lip being the darkest, and the legs much the lightest coloured. The radial joint of the palpi is much larger than the cubital, and projects from its extremity, in front, a pointed apophysis which is curved outwards; the digital joint is somewhat oval, with a bold protuberance at the upper part, which is deeply indented on the outer side; it is convex and hairy externally, concave within, comprising the palpal organs; they are highly developed, complicated in structure, and of a reddish brown colour. Abdomen oviform, convex above, projecting over the base of the cephalo-thorax; it is thinly covered with hairs, glossy and brownish black. Plates of the spiracles brown.

In June 1841 this spider was captured among fragments of rock in a wood near Hendre House.

5. *Neriëne sulcata*. Mas fovea parva longitudinali pone oculorum par utrumque laterale; cephalo-thorace, mandibulis, maxillis, labio, sternoque nigro-fuscis, mandibulis et maxillis sub-rufescentibus, his pallidioribus; pedibus palpisque rufis, fuscoque tinctis; abdomine nigro-fusco; pedum pari 1<sup>mo</sup> paullo longiori, dein 4<sup>to</sup>, 3<sup>to</sup> brevissimo; oculis seriei anterioris intermediis cæteris multo minoribus.

Length of the male  $\frac{1}{12}$ th of an inch; length of the cephalo-thorax  $\frac{1}{4}$ ; breadth  $\frac{1}{8}$ ; breadth of the abdomen  $\frac{1}{8}$ ; length of an anterior leg  $\frac{1}{8}$ ; length of a leg of the third pair  $\frac{1}{2}$ .

The legs and palpi are provided with hairs, and are red with a tinge of brown. First pair of legs rather the longest, then the fourth, third pair the shortest. Cephalo-thorax oval, glossy, convex, with a small longitudinal indentation immediately behind each lateral pair of eyes, and a slight depression in the medial line of the posterior region: mandibles powerful, conical, convex in front, near the base, divergent at the extremities, armed with teeth on the inner surface, and inclined towards the sternum, which is broad and heart-shaped: maxillæ strong, enlarged where the palpi are inserted, and inclined towards the lip, which is semicircular and prominent at the extremity: these parts are brown-black, the maxillæ, which are the palest, and the mandibles having a tinge of red. Anterior eyes of the trapezoid much the smallest of the eight; eyes of each lateral pair contiguous and seated on a prominence. The cubital and radial

joints of the palpi are short, the latter, which is the stronger, projecting a pointed apophysis from its extremity, in front; the digital joint is somewhat oval, with a lobe near the middle of the outer side; it is convex and hairy externally, concave within, comprising the palpal organs, which are highly developed, prominent, complicated in structure, with a long, black, filiform, convoluted spine, enveloped in a delicate membrane, extending from the upper part beyond their extremity; they are of a red-brown colour. Abdomen oviform, convex above, projecting over the base of the cephalo-thorax; it is thinly covered with hairs, glossy, and brownish black. Plates of the spiracles yellow.

My son, John Blackwall, discovered an adult male of this species, which is nearly allied to the spiders constituting the genus *Walckenaëra*, on the steps at Oakland in June 1841.

6. *Neriëne avida*. Oculis seriei anterioris intermediis minimis; cephalo-thorace, mandibulis, maxillis, labio, sternoque brunneis, pedibus palpisque pallidioribus; mandibulis, maxillis et labii apice paululum rufo-tinctis; abdomine fusco-nigro; pedum pari 1<sup>mo</sup> et 4<sup>to</sup> longissimis, æqualibus, 3<sup>to</sup> brevissimo.

Colore pedumque longitudine mas fœminam refert; cephalo-thoracis pars anterior gibbosior, et pone oculos duabus lateralibus parva fovea.

Length of the female  $\frac{1}{2}$ th of an inch; length of the cephalo-thorax  $\frac{1}{4}$ ; breadth  $\frac{1}{2}$ ; breadth of the abdomen  $\frac{1}{4}$ ; length of an anterior leg  $\frac{1}{2}$ ; length of a leg of the third pair  $\frac{1}{2}$ .

Legs and palpi provided with hairs; first and fourth pairs of legs the longest, and equal in length, third pair the shortest: cephalo-thorax oval, glossy, convex, with a small indentation in the medial line of the posterior region: mandibles powerful, conical, rather divergent at the extremities, armed with teeth on the inner surface, and inclined towards the sternum, which is broad and heart-shaped: maxillæ strong, enlarged where the palpi are inserted, and inclined towards the lip, which is semi-circular and prominent at the extremity: these parts are brown, the legs and palpi, which are the palest, the mandibles, maxillæ, and tip of the lip having a tinge of red. Anterior eyes of the trapezoid the smallest of the eight; eyes of each lateral pair seated on a prominence and almost contiguous. Abdomen oviform, convex above, projecting over the base of the cephalo-thorax; it is thinly covered with hairs, glossy, and brownish black. Plates of the spiracles yellowish brown.

The male is rather smaller than the female, but it resembles her in colour and in the relative length of its legs. The anterior part of the cephalo-thorax is more gibbous, and immediately behind each lateral pair of eyes there is a small indentation. The

radial joint of the palpi, which is larger than the cubital, projects a pointed apophysis from its extremity, in front; the digital joint is somewhat oval, the superior part, which is slender, being curved outwards, and a lobe occurring on the outer side, near the middle; it is convex and hairy externally, concave within, comprising the palpal organs, which are highly developed, prominent, complicated in structure, with a bold projection near the upper part, on the inner side, and a long, black, convoluted, filiform spine, enveloped in a delicate membrane, extending from the upper part beyond their extremity; they are of a reddish brown colour.

Males and females of *Neriëne avida* in a state of maturity were captured on rails at Oakland in April 1839. A close affinity subsists between this species and *Neriëne sulcata*, which form the link connecting *Neriëne* with *Walckenaëra*, and show by how easy a transition the one genus passes into the other.

#### Family EPEÏRIDÆ.

#### Genus EPEÏRA, *Walck.*

7. *Epeïra similis*. Maris cephalo-thorace flavescenti-brunneo, fascia nigrescenti mediana in anteriori parte dilatata; mandibulis fusco-rufis; maxillis labioque rufescenti-brunneis, apicibus flavescenti-brunneis, ad labri basin saturatoribus; sterno fusco-nigro fascia mediana longitudinali flavescenti-brunneo postice angustiore. Pedibus flavescenti-brunneis nigro-maculatis, pari 1<sup>mo</sup> longissimo, dein 2<sup>do</sup>, 3<sup>do</sup> brevissimo, palpis brevibus fusco-luteis articulo digitali rufo-brunneo, articulis cubitalibus radialibusque brevibus, his paululum majoribus. Abdominis superiori parte macula lata ovali phylloidea fusco-grisea, apice anteriori lineis flexuosis transversis ad filatoria gradatim in longitudine decrescentium argenteo-griseis; marginibus angulatis nigris, antice utrinque macula ovali brunnea; vitta attenuata argenteo-grisea margini nigræ parallela lateribus subtusque fuscis luteo-tinctis punctis nigris minimis interspersis, infra fascia lata mediana nigra utrinque striga lutea.

Length of the male  $\frac{1}{3}$ th of an inch; length of the cephalo-thorax  $\frac{1}{10}$ ; breadth  $\frac{1}{12}$ ; breadth of the abdomen  $\frac{1}{11}$ ; length of an anterior leg  $\frac{7}{12}$ ; length of a leg of the third pair  $\frac{1}{4}$ .

Eyes disposed in two transverse rows on the anterior part of the cephalo-thorax; the intermediate ones of both rows form a square, the two anterior ones, which are seated on a small protuberance, being the largest of the eight; the eyes constituting each lateral pair are placed obliquely on a prominence, and, though near together, are not in contact. Cephalo-thorax somewhat oval, compressed before, rounded in front, convex, glossy, with an indentation in the medial line of the posterior region; it is of a yellowish brown colour, with a blackish band, which is broadest at its anterior extremity, extending along the middle. Man-

dibles powerful, conical, vertical, armed with teeth on the inner surface; they are of a red-brown colour. Maxillæ short, strong, straight, and broad at the extremity, which is rounded: lip nearly semicircular, but somewhat pointed at the apex: these parts are reddish brown, with yellowish brown extremities, the base of the lip being much the darkest. Sternum heart-shaped, with small protuberances on its sides opposite to the articulation of the legs; it is brownish black, with a longitudinal band of yellowish brown in the middle, which diminishes in breadth to its posterior extremity. Legs long, provided with hairs and black spines; they are yellowish brown spotted with black; first pair the longest, then the second, third pair the shortest. Palpi short and yellowish brown, with the exception of the digital joint which is red-brown; the cubital and radial joints are short; the latter is rather the larger and is provided with some long hairs; the digital joint is short, oval, convex and hairy externally, concave within, comprising the palpal organs, which are moderately developed, prominent, complicated in structure, with a curved black spine at their extremity directed upwards, a projecting process at the upper part, towards the inner side, and are of a dark red-brown colour. Abdomen sparingly clad with hairs, oviform, somewhat depressed, projecting over the base of the cephalo-thorax; on the upper part is a large, oval, leaf-shaped figure of a brownish gray colour comprising a longitudinal row of small, black, slightly indented spots on each side of the medial line; the anterior part of the leaf-shaped mark and a series of curved transverse lines, diminishing in length as they approach the spinners, are silver-gray; its margins are festooned and black, and an oval brown spot occurs on each side of its anterior extremity; following the undulations of the black border is a narrow band of silver-gray; sides and under part brownish with a tinge of yellow and minute blackish spots interspersed; a broad black band extends along the middle of the under part, on each side of which is a stripe of yellow. Plates of the spiracles yellow.

The spider from which the foregoing description was made was discovered at East Lodge, Enfield, by Miss Gertrude Buller Elphinstone, to whom I am indebted for it and for numerous interesting species of Arachnida and Insecta; indeed, the liberality of Miss Elphinstone in transmitting to me specimens of living spiders collected by her in Middlesex demands the tribute of my grateful acknowledgments.

At present I am acquainted with the male only of *Epeïra similis*, which bears so close a resemblance to the male of *Epeïra calophylla* as scarcely to be distinguished from it except by the palpi and palpal organs. By way of contrast, I shall briefly point out some of the more remarkable particulars in which the latter dif-

fers from the former. Its palpi are long and red-brown, with a black annulus at the base of the cubital and radial joints; the cubital joint gradually increases in bulk to its extremity and is curved downwards, and the radial, which greatly exceeds it in length, projects a minute bifid apophysis from its extremity, on the outer side; the palpal organs have a prominent bifid process at their upper part, on the inner side, and a long, slender, curved, black spine at their extremity, which is directed upwards.

A collection of living spiders sent to me in September 1843 from Ellesmere, in Shropshire, by Miss Margaret B. Lewis, of Cichle, Anglesey, contained a young male *Epeïra similis*, which, as the digital joints of its palpi were very tumid, had to undergo its final change of integument before it arrived at maturity. On comparing this individual with males of *Epeïra calophylla* in the same state, I perceived that its palpi were much shorter, and that the protuberance at the upper part of the under side of the digital joint was decidedly smaller than in the latter species. The sides of the cephalo-thorax in the specimen received from Miss Lewis were finely bordered with black.

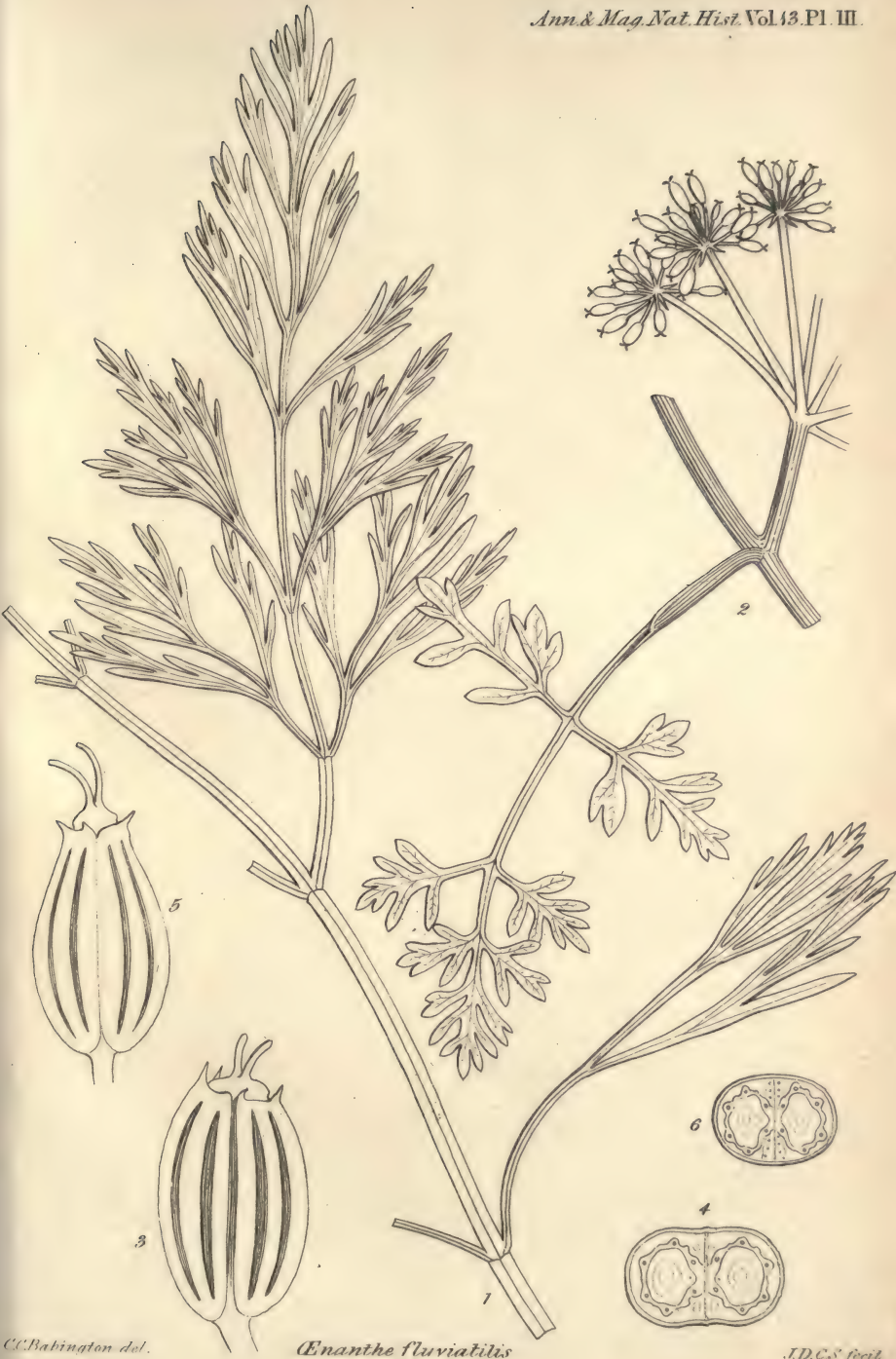
XXV.—*Observations on a new species of Cœnanthe.* By the Rev.  
W. H. COLEMAN, M.A., F.B.S.\*

[With a Plate.]

UNDER the name of *Cœnanthe Phellandrium*, two distinct forms have long been confounded. The first, which is the *Phellandrium aquaticum* of Linnæus, and the *Cœnanthe Phellandrium* of Smith and others, is figured in 'E. B.' (t. 684); the other, though frequent in the rivers of the south-east of England, has hitherto been much overlooked; not being noticed even as a variety in any work to which I have access, except by Dillenius in his edition of 'Ray's Synopsis,' until I drew the attention of Mr. C. C. Babington to it. It is noticed in that gentleman's 'Manual of British Botany' (p. 131), under the name of *Cœ. Phellandrium β fluviatilis*; and I now venture to propose it as a distinct species, with the title of *Cœ. fluviatilis*, offering the following characters for it and its ally:—

1. *Cœnanthe Phellandrium* ("Lamk."); caule erecto deorsum incrassato, fibris ad genicula verticillatis; foliis tripinnatis, segmentis simplicibus pinnatifidisve, submersorum capillaceis, superiorum divaricatis; umbellis oppositifoliis; fructu ovato stylis suberectis duplo longiore. Biennis. Habitat in aquis stagnantibus.
2. *Cœnanthe fluviatilis*; caule fluitante sursum incrassato basi repente ad genicula radicante; foliis bipinnatis, segmentis simplicibus pinnatifidisve, submersorum pellucidis cuneatis fassis, nervis plu-

\* Read before the Botanical Society at Edinburgh, 11th Jan. 1844.



C.C. Babington del.

*Enanthe fluviatilis*

J.D.C.S. fecit.





ribus parallelis ; umbellis oppositifoliis ; fructu late-elliptico stylis divaricatis triplo longiore. Perennis. Habitat in fluminibus planitierum et rarius floret.

Our plant would probably not have passed so long unnoticed but for the circumstance that it seldom produces flowering stems, and still more rarely fruit. Its propagation under these circumstances is of itself a strong proof of its distinctness from *Æ. Phellandrium* ; for that species is indubitably biennial, having appeared in abundance in some ponds near Hertford in the years 1839, 1841 and 1843, while in 1840 and 1842 there was not a trace of it till the seedlings began to appear about Midsummer. I have never been able to find stolons in *Æ. Phellandrium*, and conclude that what Koch says concerning them arises from his confounding *Æ. fluviatilis* with it.

The usual habitat of the true *Æ. Phellandrium* is in stagnant ditches or shallow ponds partially overgrown with willows. Here, when the water is at the lowest, its seeds germinate on the uncovered or barely covered mud ; and though the segments of its earliest leaves thus produced out of the water have some little breadth, those expanded beneath the surface have the segments perfectly capillary. The flowering stem is remarkably fistulose, furnished under water with frequent joints, which become more distant upwards : it attains its greatest thickness two or three internodes from the base, where it is often an inch or more in diameter. From the joints proceed numerous whorled pectinated fibres, of which the lower ones are as stout as the original fusiform root : these, descending in a conical manner to the bottom of the water, form a beautiful system of shrouds and stays to support the stem like a mast in an erect position, while the pressure on the soft mud is lessened by the buoyancy of the hollow internodes.

*Ænanthe fluviatilis* on the contrary delights in running water ; and though it sometimes grows and even flowers in marsh ditches, the plants always appear unhealthy, are attacked by insects, and produce no fruit. As far as I have been able to ascertain, it flowers most freely where there is a depth of about 2 feet of water with a moderately strong current. Here the stems creep upon the surface of the mud, and send out rootlets into it from each joint : they are about the thickness of a quill and not quite solid, with their ends floating and leafy. The aquatic leaves are on stalks about their own length, solid and rather dense, sheathing at the base : they are pinnate or bipinnate, their divisions expanded in still water, but in a current drawn up nearly parallel ; but in all cases the ultimate segments are wedge-shaped, about one-fifth of an inch broad, pellucid, with from 5 to 9 nearly paral-

lel nerves, lobed and unequally cut at the apex with sharp lacinations.

When circumstances are favourable to the flowering of the plant, the stem is elongated in the direction of the current, and ascends in a curve through the water for 4 or 5 feet or more according to the depth, gradually thickening and becoming more fistulose upwards, till at the surface of the water it attains a diameter of nearly an inch, with a central hollow of more than half its thickness. It is here rather angular, its substance cellular and fragile. This buoyant dilated stem forms a boat at anchor to support the flowering part erect above the surface of the water.

The aërial portion of the plant rises about 18 inches above the water: it is of a dark green colour, very different from the delicate pale hue of its congener, to which it bears a general resemblance, but is in all respects coarser and less elegant. Petioles about one-third of the whole length of the leaf, half composed of sheath, then solid, very cellular, nearly cylindrical, but above among the leaflets the rachis is compressed and channeled. Leaves twice pinnate, the leaflets pinnatifid, trifid or simple; the segments lanceolate (much broader than in *C. Phellandrium*), cleft, the laciniae rather blunt and callous at the tip. The whole leaf is pendent, the petiole and rachis curving downwards, but not bent back at each joint as in *C. Phellandrium*: the primary divisions leave the rachis at right angles, the secondary point a little forwards. Umbels lateral opposite the leaves, on angular stalks of various lengths; there are about 10 rays to the umbel, with seldom more than one general bractea, often none. Partial involucre of numerous linear-lanceolate leaves, shorter than the pedicels. Pedicels about the length of the fruit. Flowers white, like those of *C. Phellandrium*, but more generally perfect. Fruit one-third larger, its ribs narrower and channels broader than in *C. Phellandrium*, broadly elliptical, concave at the sides when young, three times as long as the stylopodium and somewhat spreading styles.

*Cenante fluviatilis* begins to flower about the end of June, and, if allowed, would ripen its seeds by the beginning of September. It is however almost invariably submerged or broken off before the middle of August by the masses of loose weed which float down the stream. In former years I have been unable to obtain fruit, but in September last I succeeded after long search in procuring a few tolerably perfect ones in the little river Ash, near its confluence with the Lea below Ware, where it had escaped drowning by the failure of the current in the dry season. From one of these the figure is taken; and its differences from the fruit

of *Æ. Phellandrium*, both in form and proportion, have added a satisfactory character to those previously observed.

P.S. I should add that *Æ. fluviatilis*, removed to such a pond as *Æ. Phellandrium* grows in, has preserved the character of its submersed leaves for twelve months, but has not flowered.

Christ's Hospital, Hertford, Dec. 7, 1843.

EXPLANATION OF PLATE III.

- Fig. 1. Submersed leaf of *Ænanthe fluviatilis*.  
 — 2. Upper stem, leaf and umbel of do.  
 — 3. Ripe fruit.  
 — 4. Section of unripe fruit.  
 — 5. Ripe fruit of *Æ. Phellandrium*.  
 — 6. Section of unripe fruit of do.

Note.—Mr. Borrer has observed *Æ. fluviatilis* in several parts of England, and when a young botanist, and unacquainted with *Cicuta virosa*, he mistook it in the young state for that plant, and it is published on his authority as such as growing at Canterbury and Ashford, in Turner and Dillwyn's 'Botanist's Guide.' I have seen what I believe to be the same plant, but without flowers, in a brook at Cherry Hinton and in the river Cam at Granchester, Cambridgeshire.—C. C. B.

XXVI.—*The Musci and Hepaticæ of Teesdale.* By RICHARD SPRUCE, Esq., F.B.S.\*

THERE is not perhaps in the British Islands a lover of wild plants who has not heard of Teesdale, and who does not preserve in his herbarium, as objects of especial interest, *some*, at least, of its many rarities; and there are not many, with the means in their power, who have denied themselves the exquisite pleasure of seeing these "gems of Flora" in their native wilds, and of gathering them with their own hands. Yet half a century ago no botanist had set foot in Teesdale, and it is little more than thirty years since "old Binks, the miner," discovered *Gentiana verna*, "doomed" till then "to blush unseen," though existing in the greatest profusion. To this beautiful plant he and his friend the late Mr. Oliver of Middleton shortly afterwards added the no less rare *Saxifraga Hirculus*; and within the space of a few years they had become acquainted with nearly every flowering-plant and fern known to grow in Teesdale at the present day. A district so fertile in uncommon Phanerogamous plants might reasonably be expected to produce an equal abundance of Cryptogamia, and a reference to the second volume of Hooker's 'British Flora' will show that it has been very successfully explored for lichens,

\* Read before the Botanical Society at Edinburgh, 11th Jan. 1844.

especially by Mr. Robertson and the late Rev. J. Harriman ; but if we consult the descriptions of *Musci* and *Hepaticæ* in the same volume, we shall find only a single species (the *Gymnostomum Donianum* of Smith) recorded to grow in Teesdale ! Even Baines's 'Yorkshire Flora' contains only four Teesdale mosses, of which the one above mentioned is the only rare species. In order to decide whether this lack of bryological intelligence relative to a tract of country of such promising aspect arose from its real poverty in objects of that class, or, as was more probable, from its having never been properly explored, I have devoted nearly three weeks during the past summer to a careful examination of what is called Upper Teesdale, viz. that portion of the vale of the Tees which lies *above* Middleton in Teesdale ; at the same time exploring, but less minutely, the district between Middleton and Barnard Castle, extending in a contrary direction. As I anticipated, Teesdale has proved not less rich in mosses than in flowering-plants and ferns ; for besides ascertaining it to produce many of the rarest mosses previously known as British, I have had the pleasure of discovering *six* species quite new to our islands ; these are *Bartramia calcarea* (Bruch and Schpr.), *Bryum acuminatum* (Bruch and Schpr.), *Br. obconicum* (Hornsch.), *Br. pallescens* (Schwægr.), *Orthotrichum stramineum* (Hornsch.), and *Hypnum confervoides* (Brid.). Other mosses will be found in the following list, not previously described in any work on British bryology, but in the discovery of which I have been anticipated by other botanists. Amongst the *Hepaticæ*, though few species fructify in the summer months, and the search is consequently prosecuted with diminished interest, I have met with considerable success. A *Jungermannia*, originally discovered near Bantry by Miss Hutchins, and called at first by Hooker *J. Bantriensis*, but afterwards referred by him to *J. bidentata* as a variety, I have, by finding it with male and female fructification, demonstrated to be a very distinct species.

What is above stated will suffice to show that few districts rival Teesdale in their bryological productions ; in fact it wants only *wood*, in which it is remarkably deficient, to render it equal to any in the British isles\*. Cromaglow, near Killarney, is the only locality I have seen superior to it : in that *Paradise of mosses* every rock is moss-clad, mosses drink the spray of every little waterfall, and the trunk of almost every tree is so thickly begirt with mosses as to appear of double its real diameter ! Teesdale can show nothing like this ; but the rocky banks of its wild river

\* The few trees which exist in Upper Teesdale produce some mosses of such real excellence, that one may well be allowed to regret the destruction of the forests which tradition reports to have once extended over the whole of that region.

nourish many a moss unknown to Cromaglow, and yielding to none in beauty and rarity.

Amongst the mosses which most conspicuously ornament the rocks in Teesdale may be mentioned the various species of the genus *Bartramia*, all of which, with the exception of *B. arcuata*, were covered with their elegant pomiform capsules at the time of my visit. By far the most striking of these is the new *B. calcarea*, and it is besides of such frequent occurrence that the most casual observer could not fail to notice it. The *Brya*, too, were in the greatest variety and perfection, and in this genus alone I gathered not fewer than a hundred forms. Among all the tribes of mosses there is none more difficult than the *Bryaceæ*, and perhaps none has been more imperfectly studied by English botanists; at least, a perusal of the 'Bryologia Europæa' of Bruch and Schimper has shown me how little I was previously satisfied to know concerning it; and it is to be hoped that the publication of this unrivalled work will give a new impulse to the progress of bryology in this country,—a country which, as Bruch and Schimper themselves confess, possesses "la plus belle végétation cryptogamique" of any in Europe.

As I had not studied the *Brya* very extensively before the present year, I had failed to remark any peculiar beauty in the generality of the species, and I read with a smile that portion of the introduction to the genus *Bryum* in the 'Bryol. Europ.' which relates to their habits and geographical distribution, where their charms are eulogized in the most glowing terms; but what I have seen in Teesdale compels me to admit, that in variety of colour and elegance of appearance the *Brya* yield to no other mosses. In their sixth Fasciculus the authors of the 'Bryol. Eur.' have the following remarks on the alpine *Brya*: "Mountains of moderate height give birth to only a small number of species; there we find in the clefts of rocks *Br. pallescens* and *cæspititium*, on the earth *Br. argenteum* and *atro-purpureum*; but arrived in subalpine and alpine regions, a new and rich vegetation presents itself to the bryologist. Here, where on heights beaten by the winds, in ravines filled with snow, and at the moving foot of eternal glaciers, plants of superior orders disappear or only exist in a diminutive state, many species of *Bryum* render less dreary those isolated solitudes, and charm from afar the eyes of the dejected traveller. And who does not recall with delight the fine swelling tufts of *Bryum turbinatum* var. *Schleicheri*, whose tender green borders the dissolving snows, or conceals fountains clear as crystal? or the deep-green velvet of *Br. Ludwigii*, which lines, alternately with the sombre patches of *Br. cucullatum*, the wintry ravines of the Alps? Even before attaining the alpine region we are agreeably surprised by the fine *Br. alpinum*, which begins to

be covered with its purple capsules, so rare in the low countries, where this beautiful species is only of accidental occurrence; here, in company with the magnificent *Br. pseudo-triquetrum*, it spreads over rocks moistened by the water which trickles from the heights. The hollow ways are decked with the elegant *Br. longicollum* (*Br. elongatum*, Dicks.), with its slender and graceful capsules," &c. &c. Though Teesdale possesses no mountains whose height can be compared to those of Switzerland and "Rheinland,"—no eternal snows and glaciers, its more northerly latitude renders it capable of producing many alpine plants at a less altitude than in the Vosges and Alps, or even in the mountains of the more southern parts of our own islands. Thus while my friend Dr. Taylor has to ascend to the summit of Brandon mountain for *Br. Zierii*, I have seen it in Teesdale growing in the greatest luxuriance at the altitude of a thousand feet, which is more than two-thirds less than the former.

For a complete geographical and geological description of Teesdale, I must refer to the second Part of Phillips's 'Geology of Yorkshire,' but the following sketch of part of the course of the Tees, extracted from page 153 of that work, may be acceptable:—

"The Tees rises on the east part of Crossfell, which is 2901 feet high, flows eastward four miles, through the Yoredale limestones to the Tyne bottom limestone, and receives on its right bank a stream called Trout beck, which flows north-eastward from a hollow in the Penine chain on the main limestones 2400 feet above the sea. The united stream flows south-east, first in Tyne bottom limestone, and afterwards in Whin sill, to the Weel, 1489 feet above the sea, then falls over the basaltic rocks of Caldron Snout, about 200 feet, and receives Maize beck. The general course of Maize beck is east-north-east. From Caldron Snout the Tees still runs east-north-east till it receives the long stream of Harewood beck, flowing south-east, which direction it takes and continues in basalt to below the miners' bridge, thence south-eastward in Yoredale limestone, grits and plates, to near Egglestone, having received on the right the Lune flowing east-by-north, thence to Egglestone abbey in plates and grits above main limestone, receiving on the right the waters of Balderdale and Deepdale, east-by-north. Two miles below it receives the Greta."

Of the other streams alluded to in the following list, Ettersgill beck runs into the Tees, on the Durham side, between the High Force and Winch Bridge; its course is almost entirely in limestone. "Hell Cleft" is the name given to a ravine (excavated in the limestone) above the village of Newbiggen; it is also traversed by a considerable stream. Blea beck comes tumbling down over basaltic rocks on the north side of Green Fell

(in Yorkshire) and joins the Tees a little above the High Force. The beautiful cascade called White Force is formed by a stream which falls over Cronkley Scarr, and joins the Tees not far from Winch Bridge; here the granular or "sugar limestone" may be seen both above and below the basalt: according to Professor Phillips, "portions of the upper members, limestone and shale, are raised up and enveloped in the Whin, which penetrates in two wedge-shaped expansions between the limestones and shale." The High Force is well known to be one of the finest waterfalls in England, and it is scarcely necessary to mention that here the whole body of the Tees is hurled over a precipice of 63 feet in height\*, the lower portion of which consists of limestone and the upper of basalt.

The triangular space between the Tees, the Lune and Maize beck, constituting the north-west angle of Yorkshire, is occupied by a mountain range which stretches from west to east, and of which Mickle Fell, the westernmost and loftiest summit, is 2600 feet high. Proceeding hence in an easterly direction, we come successively upon Cronkley Fell, Green Fell and Holwick Fell, each of which is less lofty than the one preceding, until we finally descend to the eastern angle of the triangle, at the junction of the Lune and Tees, which may be 900 feet above the level of the sea. Cronkley and Holwick Fells terminate to the north in a long and lofty range of basaltic cliffs, called "Scarrs;" and Falcon Clints or Widdy-bank Scarr is a similar range (but with a southern aspect) extending from Caldron Snout about a mile down the left or Durham bank of the Tees. The mountain limestone formation expands over the whole of this triangle, except where the basalt is interposed, which it is indeed "in such masses as to predominate in the general aspect of the region, and give to Upper Teesdale the character of a basaltic formation."

I am not aware that I gathered a single moss in Teesdale on any other rock than those above mentioned, and I was from the first careful to note which of the two every species appeared to prefer; but it was with some degree of disappointment I ascertained that very few mosses were absolutely confined to either, and there are not more than half-a-dozen species in the following list which I expect would obstinately refuse to grow on one or other of them. Even the flowering-plants which we most usually find on limestone, such as *Avena alpina* and various *Orchidea*, appear equally partial to the basalt. *Helianthemum canum*, which is confined to the "sugar limestone" on Cronkley Fell, is perhaps the only one which it would surprise me to see growing on the basalt; but as to *Bartsia alpina*, *Ēlyna caricina*, *Carex capil-*

\* The height of the fall may be a few feet less than this.

*laris*, *Polygonum viviparum*, *Saxifraga stellaris* and *aizoides*, and many other of the "glories" of Teesdale, which it gave me great pleasure indeed to see, but which I was content to leave untouched, they assuredly grow in equal luxuriance on both formations.

But my object was not so much to ascertain the distribution as to determine the limits of the different species; and what follows is not a mere list of localities, but contains the result of extensive observation in the field, and careful investigation and comparison in the cabinet. I have adopted the generic distribution of the 'Bryologia Europæa,' so far as the published numbers of that work extend, because it is by far the most natural of any I have seen, and I have no doubt will be adopted, in great part at least, by the bryologists of this country, when its merits come to be fully known\*. I have also in many cases quoted from the same work the specific characters of such mosses as have not been previously described in any work on British bryology; but the numerous analyses and descriptive remarks are entirely deduced from my own observations.

The total number of species observed in Teesdale amounts to 208, of which 167 are *Musci* and 41 *Hepaticæ*; but this can only be regarded as an approximation to the existing number; and a residence of three or four years in the centre of the district, with an attentive examination of localities at all seasons, would not more than suffice to ascertain the exact amount of its treasures. I have to add, that my collection contains a few mosses which from their imperfect state I have been unable to determine satisfactorily; these are not included in the foregoing enumeration.

#### *Musci.*

1. *Andræa alpina*, Hedw. Limestone rocks on Cronkley Fell.
2. *A. Rothii*, Mohr. Cronkley Fell, on limestone; Falcon Clints, on basalt.
3. *A. rupestris*, Hedw. Frequent on rocks and stones. I gathered a large var. on Cronkley Fell, growing with *A. alpina*, and scarcely to be distinguished from it at sight.
4. *Anictangium ciliatum*, Hedw. White Force, Falcon Clints and other places, yet nowhere abundant.
5. *Anomodon curtispiculum*, H. and T. Walls near Romaldkirk and below the High Force inn. Especially abundant in the wood by the Tees' side below Holwick, and in fruit, but out of season.
6. *A. viticulosum*, H. and T. Trees and rocks, frequent.
7. *Aulacomnion palustre*, Schwægr. (*Bryum palustre*, H. and T.) Bogs and moist rocks.

\* Wherever the nomenclature differs from that of 'Musc. Brit.,' the synonyms of this work are always added.



8. *Aulacomnion androgynum*, Schwægr. (*Bryum androgynum*, Hedw.; *H. and T.*) Shaded rocks below the High Force, with gemmæ.

9. *Barbula fallax*, Hedw. (*Tortula fallax*, *H. and T.*) By the Tees' side.

10. *B. muralis*, Timm. Walls.

11. *B. ruralis*, Hedw. Walls, &c. between Middleton and Barnard Castle.

12. *B. subulata*, Brid. Banks and rocks, both in the high and low grounds.

13. *B. tortuosa*, W. and M. Frequent on limestone rocks. A small var. occurs on the sugar limestone near the summit of Cronkley Fell, which forms low spreading patches of a brownish hue; the leaves are shorter than in the ordinary form, their nerve less broad and strong, and the capsules are always curved.

14. *B. unguiculata*, Hedw. Common.

15. *B. vinealis*, Brid. "Cæspitosa, dioica; foliis recurvo-patentibus, ovato-et elongato-lanceolatis; capsula ovato-oblonga vel oblongo-cylindrica, erecta, annulata, brevirostra; peristomii membrana conjunctiva longiore, dentibus semel contortis."—*Bryol. Europ.*

*B. vinealis*, Brid. *Bryol. Univ.* i. *Suppl.* p. 830.

On a wall by the road leading from Barnard Castle to Lartington, with capsules just coming to maturity, June 23rd. It grows intermixed with *Weissia curvirostra*, and the reddish stems are so much alike in both, that a casual observer would hardly distinguish them.

*B. vinealis* is very closely allied to *B. fallax*, but differs from it as follows. *Leaves* longer and narrower, spreading and somewhat recurved (but not squarrose), with nearly plane margins; the inner perichætil leaves scarcely differing from the rest, but in *B. fallax* much broader in their lower half and loosely sheathing the pedicel: *capsule* annulate: *operculum* shorter: *peristome* only *once* (in *B. fallax* *three or four times*) twisted. Besides, as Bruch and Schimper observe, "les fruits mûrissent en été, époque à laquelle ceux de *B. fallax* sont passés depuis longtemps." At the time I now write (Nov. 9th) the capsules of *B. fallax* are just beginning to ripen.

I cannot account myself the discoverer of this moss in Britain, for Mr. Wilson has lately sent me specimens gathered by himself at Nant-y-Belan, near Wrexham, in 1833; and he suggests that even the *Zygotrichia cylindrica* described by Dr. Taylor in the 'Flora Hibernica' may be the same species.

16. *Bartramia arcuata*, Brid. Heathy and rocky situations, abundant, but I did not succeed in finding capsules.

17. *B. calcarea*, Br. and Sch. "Procera, foliis secundis vel subsecundis, confertis, longioribus, crassicostatis, laxius reticulatis; perigonialibus omnibus acute acuminatis, solidi-costatis; peristomii minoris dentibus remote articulatis."—*Bryol. Europ.*

Moist springy places, frequent, both on the limestone and basalt.

Very fine by the road-side between the High Force inn and Winch Bridge.

This magnificent species was detected a few years ago by Bruch near Deux Ponts, and it has since been observed in the Vosges, Jura, and other mountain regions of continental Europe. The authors of 'Bryol. Europ.' state that they have never found intermediate states between it and *B. fontana*, and that it constantly preserves the characters they have assigned to it. I have similar testimony to offer; for I distinguished the two, by habit alone, almost on my entering Teesdale, and during my stay I continued to observe them almost daily without detecting any feature calculated to shake my conviction of their being specifically distinct. I shall now state the differences which appear amply to justify their separation. In *B. calcarea* the stems are stout, densely cæspitose; leaves secund (usually patent in the other), of larger size, narrower, and tapering to a longer point, all lanceolato-acuminate (not ovato-acuminate and lanceolate on the same plant): areolation wider: nerve remarkably strong and solid, and offering a great contrast to that of *B. fontana*. These differences are most striking on the floriferous branches of the male plants. The male flowers consist of fewer leaves, all of which are acuminate and nerved throughout; but the inner perigonal leaves in *B. fontana* are very obtuse, with an abbreviated or obsolete nerve\*. The peristome is smaller, the outer teeth shorter and broader, and the texture of the outer paries of the capsule is less dense near its mouth.

18. *B. fontana*, Sw. Less frequent than the last, but fruiting beautifully in Hell Cleft.

19. *B. gracilis*, Flörke. At the White Force, attaining a large size; rocks below the High Force.

20. *B. Halleriana*, Hedw. In the clefts of basaltic rocks near the High Force, with fruit in a good state.

21. *B. ithyphylla*, Brid. Frequent on basaltic rocks, especially on Cronkley and Holwick Scars.

22. *B. pomiformis*, Hedw. Rocky situations near the High Force, &c.; less frequent than the last. Var.  $\beta$ . *crispa*, intermixed with *B. Halleriana*.

23. *Bryum acuminatum*, B. and S. "Monoicum; caule simpliciter innovationibus ramoso, basi radicante; foliis caulinis inferioribus parvulis, remotis, ovato-lanceolatis, erectis, superioribus fastigiatis, confertis, duplo-majoribus, lineari-lanceolatis, 1—2 plicatis, margine valde revolutis, apice serratis, costa ad apicem producta; capsula longicolla, gracili, horizontali, operculo conico."—*Bryol. Eur.*

\* The term 'ecostata' applied to them by Bruch and Schimper is too strong.

*Pohlia acuminata*, Hoppe and Hornsch, *Bot. Zeit.* 1819, p. 94; *Brid. Bryol. Univ.* i. p. 610.

Near the west end of Holwick Scarr, very scarce, and I did not succeed in finding more than a few *dead* capsules.

It has also been discovered more lately by Mr. Wilson in Wales ("Cwm Idwel, Aug. 1843"), and from a comparison of his specimens, which are in very good state, with others of *Br. elongatum*, Dicks., I am inclined to regard them distinct. In both species the inflorescence is monoicous, but in the former the *antheridia* are included in *gemmæ* seated at the base of the female flower; whereas in the latter, they stand in pairs in the axils of the perichæatial leaves. Besides, in the former the *leaves* are of a deeper green, shorter and broader yet with a more slender point, less decidedly serrate, with margins more strongly recurved, a much stronger nerve and smaller areolation. In the form of the capsule, the two mosses present scarcely any difference.

*Br. acuminatum* appears to be of frequent occurrence on the continent, and many varieties and subvarieties are described in the 'Bryol. Europæa.'

24. *Bryum albicans*, Wahl. Near the High Force and other places, but barren.

25. *Br. alpinum*, L. Frequent on low moist rocks; I saw no fruit.

26. *Br. annotinum*, Hedw. In fruit near the High Force inn, and on the moor as you go to Cronkley Bridge, but scarce.

27. *Br. argenteum*, L. Frequent.

28. *Br. cæspitium*, L. On a wall near Barnard Castle. The only station observed in Upper Teesdale was upon a wall near the farmhouse on the hill above the High Force.

29. *Br. capillare*, L. On walls between Barnard Castle and Middleton; on rocks in Upper Teesdale.

30. *Br. carneum*, L. Moist sandy situations.

31. *Br. cernuum*, B. and S. "Caule ramoso, radicante; foliis patulis ovato-acuminatis, concavis, costa excurrente mucronatis; capsula in pedicello elongato magis minusve curvato nutante vel pendula, pyriformi, operculo parvulo, convexo, acuminato, annulo magno; peristomio interno externo adglutinato."—*Bryol. Europ.*

On walls by the road-side all the way from Barnard Castle to the High Force inn, especially abundant about Romalldkirk and Mickleton; it is also frequent on the rocky banks of the Tees, growing along with *Br. inclinatum*.

Hedwig, having failed to observe the inner peristome (in consequence of its being closely soldered to the outer), included this moss in his genus *Cynodontium*, to which he assigned the following character: "Peristomium simplex octo aut sedecim parium. Sporangium absque apophysi. Flos terminalis hermaphroditus."

By Swartz it was placed in *Didymodon*! Hornschuch formed of it his genus *Ptychostomum*, and divided it into several spurious species. But I am doubtful whether it can be considered distinct from *Br. inclinatum*; the adhesion of the inner peristome to the outer is often only partial, and if this character be abstracted little is left to separate them. After having compared a great many states of both mosses, I can only find that the leaves of *Br. cernuum* are broader, yet tapering more suddenly into a slender point, and that the outer peristome is shorter. If these characters prove constant, *perhaps* they may suffice to maintain *Br. cernuum* in the rank of a species, but at present I hardly expect such will prove to be the case.

32. *Bryum crudum*, Huds. Abundant, especially in the crevices of shady rocks. This species, though in habit one of the most marked of all *Brya*, varies considerably in the direction of its capsules: sometimes, as in specimens gathered by Ettersgill beck, they are nearly or quite erect; at others perfectly pendulous, as on Cronkley Fell.

33. *Br. inclinatum*, B. and S. "Hermaphroditum; caule breviusculo, radiculoso-tomentoso, parce ramoso; foliis ovato-lanceolatis, longius acuminatis, integris; capsula nutante vel pendula, ventricosum-vel ovato-pyriformi, microstoma, annulata, operculo convexo, apiculato; peristomio interno libero, ciliis rudimentariis seu nullis."—*Bryol. Europ.*

*Pohlia inclinata*, Swartz, *Musc. Suec.*, pp. 45, 96. t. 5. f. 11; *Brid. Mant. Musc.*; *Schwægr. Suppl.* i. pt. ii. p. 73. t. 63.

*Br. turbinatum*, var. *Muscol. Brit.*; *Walker-Arnott, Dispos. meth.*

However questionable may be the propriety of disuniting *Br. cernuum* and *inclinatum*, I cannot doubt that the latter is a very distinct species. I gathered in Teesdale, between the two, above twenty varieties, all equally distinct from *Br. cæspitium*, to which, in point of fact, *Br. inclinatum* is far more closely allied than to *Br. turbinatum*, whither it has been referred by Walker-Arnott and the authors of 'Musc. Brit.' *Br. inclinatum* may be distinguished at sight from *Br. cæspitium* by its capsule tapering nearly equally to each extremity (often exactly spindle-shaped) and by its far smaller and more pointed operculum; besides, the leaves have less of that silky appearance to be observed in the other, their nerve is less produced, and they are furnished with a border of three rows of narrow cellules. The inflorescence is constantly hermaphrodite (dioicous in *Br. cæspitium*); the inner peristome wants the intermediate cilia, or, if present, they are imperfect and destitute of the large and well-developed lateral hooks (appendiculæ) so remarkable in *Br. cæspitium*; and lastly, the seeds are three times the diameter of those of *Br. cæspitium*.

Although *Br. inclinatum* and *cernuum* exist abundantly in Teesdale, only a single alpine habitat was observed for *Br. cæspitium*.

In accordance with this is the remark of Bruch and Schimper on the latter species, "montes editiores vix apud nos ascendere videtur."

34. *Bryum julaceum*, Smith. Caldron Snout, very scarce.

35. *Br. nutans*, Schreb. Heathy situations, as well as on walls and stones.

36. *Br. obconicum*, Hornsch. in litt. "Dioicum, innovando ramosum; foliis ovatis, oblongo-ovatis, acuminatis, costa procurrente cuspidatis, submarginatis, margine non incrassato revoluto-recurvis, integris, concavis, apicem versus carinatis, erectiusculis, siccis vix tortilibus; capsula subpendula, pendula, longicolla, clavata, operculo hemisphærico, papillato."—*Bryol. Eur.*

On a wall, under the shade of trees, by the road leading out of Barnard Castle to Lartington, along with *Br. capillare* and *cernuum*.

This beautiful species, which is mentioned by the authors of 'Bryol. Eur.' as being "e rarioribus," is distinguished from *Br. capillare* at first sight by its long slender capsule, emulating that of *Br. elongatum*, yet "plurimo tempore perfecte pendula," and by the pedicel being curved in its upper portion into a much wider arc. It may be further distinguished by the following characters. *Leaves* tapering more gradually to a point, less distinctly margined, of a fine deep green (those of *B. capillare* mostly with a yellowish or brownish tinge), their nerve stronger and always excurrent. *Texture* of the outer paries of the capsule very compact near its mouth, the 4—5 uppermost rows of cellules being far smaller than the rest, while in *B. capillare* only one or two of the rows near the mouth are slightly contracted in dimensions. *Operculum* larger, more convex. *Annulus* very large, nearly twice the breadth of that of *B. capillare*. *Teeth* of outer peristome with a broader red base, within the capsule.

*Br. torquescens*, B. and S. (of which I have not yet seen any specimen), is mentioned by Bruch and Schimper as a species which might be confounded with *Br. obconicum*, but the latter (say they) may be distinguished by its more slender capsule, with a longer neck, and by the leaves, which are of a different form and twist less regularly in drying. Besides, the inflorescence of *Br. torquescens* is hermaphrodite.

37. *Br. pallescens*, Schwægr. "Monoicum, cæspitosum; caule ramoso, radiculoso-tomentoso; foliis ovato-lanceolatis, integerrimis, margine reflexis, costa sub vel paulo ultra apicem evanida; capsula horizontali, inclinata, pyriformi-oblonga, collo longiusculo, operculo convexo, longius acute acuminato."—*Bryol. Eur.*

*Br. pallescens*, Schwægr. *Suppl.* i. pt. ii. p. 67. t. 75; *Brid. Bryol. Univ.* i. p. 645.

*Br. speciosum*, Voit.

On rocks as well as on sandy deposits, by the Tees below Winch Bridge; Hell Cleft, very sparingly.

Var.  $\beta$ . *boreale*. (*Br. boreale*, Schw.) Rocks in Ettersgill beck.

Although fully satisfied that this is the moss described in the 'Bryol. Eur.,' having compared it with an original specimen from Bruch (given me by Mr. Wilson), I have had great difficulty in persuading myself of the validity of its specific claims; but this has chiefly arisen from my having got hold of some puzzling varieties, and I now think it may prove a genuine species; at the same time leaving it to further observation finally to decide the question. Bruch and Schimper's remark, "Cette espèce varie infiniment," would prepare one to expect some anomalies.

From *Br. inclinatum*, growing along with it and not very dissimilar in habit, *Br. pallescens* is to be distinguished by the following characters:—The *leaves* are cuspidate (not acuminate), except on the ramuli and innovations, where they are often narrower and run out into a longer point; their margins only *reflexed*, not *revolute* as in the other: the *inflorescence* is normally monoicous: the *capsule* has a longer neck and is mostly subclavate: the operculum is longer: the peristome is larger: the outer teeth far longer, tapering to a very slender point, and closely trabeculate; and the *seeds* are somewhat smaller. To this may be added, that the outer teeth are *strongly inflexed* by drying, while the processes of the inner *stand erect* between the interstices: this never occurs in the other.

The form which grows on the sandy margin of the Tees has the inner peristome very fragile, and the cilia scarcely appendiculate.

The large and beautiful var. from Ettersgill beck has the pedicels widely curved, and twisted just below the collum so as to bring the lower face of the capsule uppermost. I have found *antheridia* mixed with *archegonia* in two out of five or six fertile flowers that I have examined; yet separate gemmaceous male flowers are abundant on the same plants; and in all the other states of this species I have been unable to detect a single hermaphrodite flower\*.

*Bryum intermedium*, Brid., is considered the nearest ally of *Br. pallescens* by Bruch and Schimper, from whom I quote the following diagnosis: "Quelque grande que soit la ressemblance, même dans les variétés, du *Br. pallescens* avec le *Br. intermedium*, ces deux espèces ne sauroient cependant pas se confondre, vu la différence dans la fleuraison. La première espèce se reconnaît en outre, et déjà à la première vue, à la couleur plus pâle de la

\* I do not conclude from the accidental occurrence of androgynous flowers in a monoicous species, that the authors of 'Bryol. Eur.' have been altogether in error in adopting the inflorescence as a character for discriminating species: nature always refuses to be bound by our artificial rules, and there is no character *taken singly* which may not admit of exception. Sexual anomalies exist amongst flowering-plants as well as mosses: e. g. in the genus *Carex*, *Myrica Gale*, *Lychnis dioica*, *Bryonia dioica*, &c.

capsule, dont l'opercule ne porte toujours qu'une pointe mousse très-courte, et se détache facilement quand le fruit est mis en contact avec l'humidité. Il faut encore remarquer que la capsule est toujours symétrique, et que son col n'est jamais courbé vers le bas, comme cela se voit si souvent dans le *Br. intermedium*; à l'état sec, même quand elle est encore fermée par son opercule, elle se trouve toujours rétrécie sous l'orifice. Le péristome est plus grand, *et tous les fruits mûrissent à la même époque.*"

38. *Bryum pseudotriquetrum*, Schwægr. (*Br. ventricosum*, Dicks.; *H. and T.*)

Abundant on the rocky banks of streams, and in moist springy places on the mountains. I gathered numerous forms, varying chiefly in habit and in the length of the capsule, but presenting no essential difference.

39. *Br. turbinatum*, Swartz. Rocky situations near streams, but with fruit scarcely mature. A small and broad-leaved var. of this occurs below Winch Bridge, in which the tufts are beautifully zoned with red and purple, their upper portion being green. A similar var. of *Br. pseudotriquetrum* grows on Cronkley Fell.

40. *Br. Zierii*, Dicks. Basaltic rocks at the High Force, Holwick Scarr, Caldron Snout, &c., in moist shaded situations: the capsules immature at the time of my visit. The vinous tinge of the foliage on the lower part of the stem distinguishes this species at sight from *Br. argenteum* and *julaceum*.

[To be continued.]

XXVII.—*On the Nidi of Purpura lapillus and of Buccinum reticulatum.* By Mr. CHARLES WM. PEACH.

*Purpura lapillus.*

IN my former communication relating to this shell, I had only noticed it depositing its nidi from January to June of that year; since that time I find that it deposits them all the year round, but is most active from January to April. The young leave the nidi in about four months from the time of their being fixed on the rocks; they are fixed to rocks only. My eldest boy took one of the whelks from the rock, when it deposited a nidus on his hand in my presence which was perfectly formed, quite transparent; and although the granular marks were plainly to be seen, *no appearance of shells could be traced under a powerful pocket lens on the bursting of the nidus.* The nidus was so frail, that it fell to pieces on being touched.

*Buccinum reticulatum.*

This shell differs from the former in fixing its nidi on rocks, algæ, and the wicker-work of "hullies," or the store-pots of the

crab-catchers, and also in depositing them in shore only, where they are seldom or ever left dry by the tide. They are frequently strung together in single lines, and overlie each other like scales: the young escape from them in the upper part by an opening which yields to their pressure when they are of sufficient strength: the nidi are horn-colour and semitransparent, and of the shape of the spade on playing cards. This nidus I have been observing for the last three or four years, and from careful investigation I am quite satisfied that it belongs to the *Buccinum reticulatum*. The following I think speaks strongly in favour of that opinion: the "hullies" are frequently (round the lower part) nearly covered with these nidi, and *great numbers of the Buccinum reticulatum are found on and in the "hullies,"* but no other shell of any kind.

The young shells are very much like those of other whelks in having the apex unfinished.

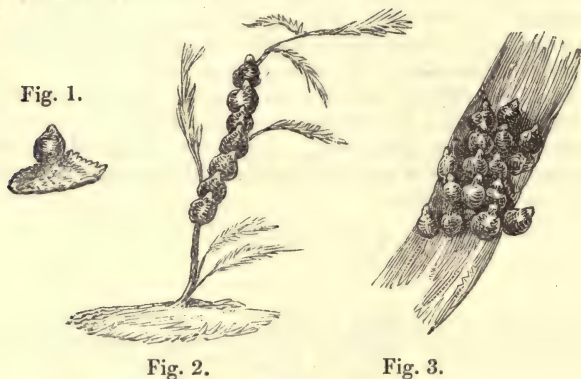


Fig. 1. A single nidus of *Buccinum reticulatum*.

Fig. 2. Several strung together attached to a sea-weed.

Fig. 3. A quantity on a piece of wicker.

XXVIII.—*Notes on Mr. Blyth's "Further notice of the species of Birds occurring in the vicinity of Calcutta."* (*Ann. Nat. Hist.* vol. xiii. p. 113.) By H. E. STRICKLAND, M.A.

No. 21, page 114 *supra*. If Mr. Blyth be right in uniting *Milvus Govinda* to *M. atolius*, Lesson (which I see no reason to doubt), it ought to stand as *Milvus ater* (Gm.), and *Falco aegyptius*, Gm., *F. Forskahli*, Gm., *Accipiter Milvus*, Pall., *Milvus niger*, Bon., and *Milvus Cheele*, Jerdon, are additional synonyms. But it cannot be the *Falco Cheela* of Latham, as that is said to have a white bar  $1\frac{1}{2}$  inch wide across the tail.

25 a. Mr. Blyth frequently uses specific names without annexing the authority. It is consequently uncertain whether by "*Polypteryx cinereus*" he intends the *Vultur cinereus* of Gmelin,—by "*Vultur in-*



*dicus*”—the *V. indicus* of Scopoli and Latham, or the *V. indicus* of Temminck, and whether by “*Vultur bengalensis*” he means the *V. bengalensis* of Gmelin, or the bird so called by Gray. In fact, the *Vulturidæ*, though few in number, are still in great confusion, and we are much in want of exact descriptions and exact synonyms of the Indian species.

31. What are the distinctions between the “*Buceros malabaricus*” of Southern, and the “*B. albirostris*” of Northern India? Latham’s figure and description of *malabaricus*, and Shaw’s description of *albirostris*, both exactly agree with a specimen in my collection, and I have therefore always considered them as synonymous.

43. The generic value of *Brachypternus* as distinct from *Tiga* depends on the amount of importance which we attach to the presence of a rudimental hind toe, as compared with its total absence. Now it is true, that when this member is reduced to a minimum, in one set of species, it often disappears altogether in another, without involving any other structural difference. But in this respect *Brachypternus* is certainly as good a genus as *Tridactylia*, *Rissa*, *Calidris*, *Squatarola*, &c., and a far better one than many which are distinguished by the mere form or even the colour of the feathers.

77. The distinction of the *Iora tiphia*, *zeylonica* and *scapularis* into three species is an interesting fact, and I hope Mr. Blyth will soon publish the characters of them. I had long suspected that *I. scapularis* was distinct from *zeylonica*, Dr. Horsfield having informed me that the black-headed specimens never occur in Java.

112. For *melanotus* read *melanotis*. This Bengal bird is probably the *Lanius cristatus* of Linnæus (which is said to be from Bengal). In the ‘Ann. Nat. Hist.’ p. 36 *supra*, I had referred to this species the *L. superciliosus*, Lath., of the Malay countries (which is probably also the *L. magnirostris*, Less., and *L. strigatus*, Eyton). But as Mr. Blyth considers his *melanotis* to be distinct from the latter, it would appear that *L. superciliosus*, Lath., is not the same as *L. cristatus*, Lin. The Indian bird will therefore stand as *Lanius melanotis* (Linnæus’s name *cristatus* being decidedly erroneous), and the Malay species will be *L. superciliosus*. A third allied but distinct species is the *L. lucionensis*, Lin., from the Philippine Islands.

130. *Motacilla indica* is described by Sonnerat as yellow beneath, but Raffles states that his specimens were white beneath, and my own specimen is also of the latter colour. Does this difference indicate two species, or only a change resulting from season?

154 a. The *Vinago chlorigaster* of Mr. Blyth was named almost simultaneously by myself *Treton Jerdoni* (p. 38 *supra*). The yellow of the lower belly seems to be a more distinctive character than the green of the ventral region.

206. *Himantopus asiaticus*, Lesson, seems to be the same as *H. leucocephalus*, Gould, 1837.

The two following notes refer to Mr. Blyth’s paper in the present Number of the ‘Annals,’ which furnishes another proof of that gentleman’s zeal and activity in the cause of science.

Page 175 *supra*. I suspect from the description of *Ardea nobilis* that it is identical with the *A. Goliath*, Temm. Pl. Col. 474, from Abyssinia.

Page 176. *Ardea Caboga* belongs to the genus *Ardeola*, Boié, 1822 (*Buphus*, Boié, 1826). This bird is decorated with no less than *eleven* synonymous names, the earliest of which is *Ardea Bubulcus*, Savigny, and the following is, I believe, the chronological order of the remainder:—*A. lucida*, Rafinesque; *A. æquinoctialis*, Mont.; *A. coromandelensis*, Steph.; *A. bicolor*, Vieill.; *A. russata*, Temm.; *A. affinis*, Horsf.; *A. coromandelica*, Licht.; *A. Veranii*, Roux; *A. leucocephala*, Cuv.; and *A. Caboga*, Franklin.

XXIX.—Notes on British species of the genus *Bruchus*, with Descriptions of two species not hitherto recorded as indigenous.

By JOHN WALTON, Esq.\*

*These are not in Walton's Cell — B.M. (Circ.) (copy)*

Section CURCULIONITES.

Fam. BRUCHIDÆ.

1. *Bruchus Pisi*, Linn. (Mus. Linn.), Germ., Schönh.

Oblong-ovate, black, densely clothed with cinereous and white pubescence: antennæ with the four basal joints rufo-testaceous: thorax transverse, *much broader than long*, and armed on each side with a *distinct* acute tooth: elytra *elongate*; each elytron with a somewhat arched fascia near the apex, composed of white spots: pygidium with two *large* ovate black spots; anterior femora *entirely black*; the anterior tibiæ and tarsi; the intermediate tibiæ at the apex and the tarsi rufo-testaceous; the posterior femora armed with an *elongate spine* beneath, near the apex. Length  $2\frac{1}{3}$  lines.

The two examples (one being pinned through the name) in the Linnæan cabinet with a white pea appended to each pin containing the insect, I have not the least doubt, are the genuine *B. Pisi* of Linnæus. In all the British cabinets that I have examined I could only detect one true example of this species, and that in the collection of Mr. Waterhouse. I consider it very doubtful whether the *Bruchus Pisi* of Linnæus should be regarded as a British species. It occurs in Germany and the southern parts of Europe, and likewise in North America.

\* In my paper published in the last number of the 'Annals,' some errors in the punctuation have caused one of the paragraphs to be obscure: p. 88, line 5 of the last paragraph, insert a semicolon after the word "straight," and take out the stop after the next word: in line 12, for "rugose; punctate anteriorly; under both sides," read "rugose-punctate; anteriorly under both sides," &c.

2. *B. rufimanus*, Schönh., Germ., Steph. Man.— *Pisi*, Fab., Mus. Banks.\*— *granarius*, Marsh. (not Linn.\*), Steph.— *Pisi*, Steph.— *Pisi*, Kirb. MSS. et Mus.— *granarius*, Kirb. MSS. et Mus.

This species resembles the preceding, with which it has been confounded, nevertheless it is essentially distinct: it is a *shorter* and a *smaller* insect than the *B. Pisi* of Linnæus, and differs moreover in having the thorax longer in proportion to the breadth; the teeth at the sides *smaller*, sometimes indistinct; the elytra *shorter*, and the white spots differently disposed; the oblong fuscous spots on the pygidium frequently obsolete; the anterior femora *rufo-testaceous*, and the posterior femora *subdentate*, or more or less distinctly dentate. (Length  $1\frac{3}{4}$ —2 lines.)

The large varieties (which are probably the females) have the thorax proportionately longer and broader in front than the smaller varieties: the former are the *B. Pisi*, and the latter the *B. granarius* of the British cabinets, a fact which was first observed by myself. I sent examples of this species to Schönherr and Germar, and possess foreign specimens forwarded to me by these authors under the name of *B. rufimanus*.

In this country it is the most abundant species of the genus. I have taken numerous individuals of the perfect insect alive out of the interior of the large garden bean, the horse bean, and from several other varieties; the larva evidently completes its metamorphosis within these seeds, consuming a considerable portion of the interior; I have examined many varieties of the pea, which had been eaten, I think, by the larvæ of this species, but never found in the interior a perfect insect: Mr. Marshall observed in a barn in Kent a quantity of peas infested by this beetle which had destroyed nearly half the crop; in every pod that he opened he found an insect, and the exterior part of the peas was more or less consumed.

3. *B. flavimanus* (Megerle in Litt.), Schönh.?— *Pisi*, Fab., Mus. Banks.

Oblong-ovate, black, densely clothed with a yellowish brown pubescence, and variegated with whitish spots: the antennæ with the four basal joints rufo-testaceous: thorax subtransverse or rather broader than long, the lateral margins, behind the middle, deeply sinuated, and before the sinus armed on each side with a distinct acute tooth, above moderately convex, closely and

\* I have many times carefully examined the species of the genus *Bruchus* contained in the Linnæan and the Banksian cabinets, and intend to publish in a separate paper some observations upon them.

minutely punctured, with larger interspersed impressions, and having a cuneiform white spot at the middle of the base: elytra elongate, with the sides nearly straight, finely punctate-striate, the interstices minutely punctured, about the middle with a transverse fascia composed of eight whitish spots on the alternate interstices, and between the middle and the apex with another transverse fascia which is flexuous: pygidium with two obscure fuscous spots: anterior legs rufo-testaceous; posterior femora subdentate, or armed with a short tooth which is more or less distinct. Length  $2\frac{1}{3}$  lines.

This species very closely resembles the large varieties of the preceding, and is rather difficult to distinguish without a close examination. I have no doubt, however, it is perfectly distinct; it is of equal magnitude with No. 1, and invariably larger and longer than the *B. rufimanus*; it also differs from the last-named insect in having the thorax at the apex rounder and fuller, the teeth at the sides more distinct, the sinus deeper, and the elytra longer; it differs moreover in having the sculpture on the thorax and elytra distinctly finer, and this is very evident when the pubescence is scraped off. I received four examples of this species with the collection of the late Mr. Millard of Bristol, but without any of the preceding. I can vouch for the integrity of this collection being faithfully a British one; and as it is an European species, I have ventured to introduce it. Dr. Germar, to whom I sent specimens, regards it as a new species, yet I have a strong impression that it is the same which Schönherr has described under the name of *B. flavimanus*.

4. *B. seminarius*, Linn., Mus. Linn.

- *seminarius*, Fab., Mus. Banks.
- *granarius*, Payk., Gyll., Germ., Schönh., not Linn.
- (var.) *seminarius*? Marsh., Steph.
- *affinis*, Steph.
- *Vicia*, Kirb. MSS. et Mus.
- *immaculatus*, Kirb. MSS. et Mus.

This species has the four basal joints of the antennæ (rarely three) rufo-testaceous, the remainder black: the thorax in the middle armed on each side with a minute tooth frequently concealed by the pubescence—distinct in the males, but obsolete in the females; the anterior legs rufo-testaceous, with the femora more or less black, sometimes entirely black; the anterior tarsi generally pale, but piceous in some individuals; the intermediate tibiæ near the apex within, armed in the males with a small but distinct tooth placed at right angles with the tibiæ; the posterior femora before the apex, beneath, deeply emarginated; the acute angle before the sinus in some examples is not produced, in others

it is more or less developed into a small tooth, modified in the sexes.

The type of the *B. seminarius* of Marsham is mutilated and difficult to determine; it has the thorax and the posterior femora subdentate, and the elytra variegated with white spots—characters which lead me to regard it as a variety, with pale intermediate legs, of No. 4, to which Marsham has referred it. *B. immaculatus* is a worn and rubbed specimen, but it is specifically the same as the present species. Mr. Kirby in his MS. has the following note to this insect: “an alt. sex *B. seminarius*.”

According to M. Schönherr and Dr. Germar, to whom I sent specimens, the present species is certainly the *B. granarius* of Paykull, Gyllenhal, Germar and Schönherr, but it is truly the *B. seminarius* of Linnæus and Fabricius; I have therefore no hesitation in adopting the latter name for this insect. *B. seminarius* is plentiful in Sweden. I have frequently met with it in Yorkshire, but only now and then in the south: Mr. Kirby in his MS. gives the habitat “in *Vica sepium*,” and I have taken, in the first week of August, several larvæ in the pods of this plant.

##### 5. *B. luteicornis*, Illiger, Schönh.

Ovate, black, sparingly clothed and variegated with a fine griseous and white pile: head finely rugose-punctate, with a white pubescent spot behind the eyes; mouth rufo-testaceous; antennæ, in the males, entirely rufo-testaceous except the terminal joints, which are a little dusky at their apices: thorax transverse, anteriorly a little narrowed; on each side, about the middle, armed with a distinct tooth; behind deeply emarginated; above with large deep scattered punctures, the spaces between minutely punctured, the lobe at the base white: elytra irregularly variegated with white pubescent spots at the base, rather broader than the thorax, the humeral angles rounded; behind, at the middle, a little dilated; above punctate-striate, with the interstices flat and coriaceous, the suture at the base white: pygidium covered with white pubescence, immaculate; the breast laterally, and the segments of the abdomen on each side densely covered with white pile: the *four anterior legs* rufo-testaceous; the intermediate tibiæ of the males at the apex, within, armed with two minute teeth, diverging and placed nearly at right angles with the apex; the females are without these appendages, and differ also from the males in having the intermediate joints of the antennæ (6th—10th) black, the apical joint rufo-testaceous; the posterior legs black, with the femora more or less acutely dentate. (Length  $1\frac{1}{3}$  line.)

This insect resembles *B. seminarius*, but is readily distinguished from that species by the very distinct difference in the *form* of

the *thorax*, the *colour* of the joints of the *antennæ*, and the *pale intermediate legs*.

I am indebted to Dr. Germar for two foreign male specimens of this species, and these, upon comparison, I find agree (with the exception of a slight difference of size) with certain British specimens, viz. a male and female, captured on Cove Common, Hampshire, in the middle of July last, a specimen in the cabinet of Mr. Samuel Stevens, and one in my own collection; that belonging to Mr. Stevens was found at Coombe Wood.

6. *B. Lathyri* (Kirb. MSS. et Mus.), Steph.

— *Loti*? Payk., Gyll., Steph., Schönh.

Thorax transverse, at the sides slightly but visibly sinuated, and behind the middle, on each side before the sinus, with a very minute tooth or tubercle, which in some examples is scarcely observable without a powerful lens; elytra *immaculate*; posterior femora acutely dentate. This species varies considerably in bulk, the largest being nearly twice the size of the smallest. (Length  $1-1\frac{1}{3}$  line.)

I have very little doubt that *B. Loti* of Paykull and Gyllenhal is identical with this insect: this opinion is based upon the description given in Schönherr's 'Syn. Ins.' v. p. 88, compared with my specimens; but as I have not at present any means of proving this, by the examination of a Swedish type, a note of interrogation is put to the name. Dr. Germar observes upon the specimens sent to him: "*Br. Lathyri*, a peculiar species, new to my collection." Of this species I have in my cabinet a fine series of eight specimens, seven of which I found on the *Lathyrus pratensis* in the first week of August last, near Cowes in the Isle of Wight; they agree with the two examples now in the collection of Mr. Kirby, taken by him according to his MS. from the same plant.

7. *B.* (♂) *pectinicornis*, Linn. (Mus. Linn.), Fab.

— (♀) *Theobromatis*, Linn. ?

— (♂ ♀) *scutellaris*, Schönh.

— (♀) *scutellaris*, Fab., Steph. Man.

— (♀) *analisis*, Fab., Mus. Banks.

Mr. Stephens, by inserting this species in his 'Manual of British Coleoptera,' appears to consider it as indigenous to England; he states, "On *Heracleum Sphondylium* (fl.): Penge Wood." Mr. Waterhouse took it at Old Brompton crawling upon a gate; but I believe it has been introduced with its food. *B. pectinicornis* has a very extraordinary wide geographical range, being found, according to authors, in China, Barbary, East and West Indies, Cape of Good Hope, Japan, Brazil and Mexico, and by

Mr. Doubleday in East Florida. The male has the antennæ pectinated, and the female serrated. I have between sixty and seventy examples, with many varieties, of this truly protæan insect, taken out of the interior of the common chickpea (*Cicer arietinum*, so named from its striking resemblance to a ram's head), which I obtained from the East India and China ships, lying in the London and St. Katherine's Docks; it is called 'Gram' by the sailors: there is a fine series of the *B. pectinicornis* in the foreign cabinet of the British Museum and likewise in that of Mr. Kirby, who found them in the same kind of seeds\*.

8. *B. villosus*†, Fab. (1792), Mus. King of Denmark.

— *Cisti*, Payk. (1792), Gyll., Steph., Schönh., Curt. not Fab.

— *ater*, Marsh. Syst. Cat., Steph.

— *ater*, Kirb. MSS. et Mus.

This insect, which varies much in size, differs from the following in having the antennæ with the *four* basal joints *small*, and of a *dull red* or *piceous colour within*; the thorax *transverse*, &c. I possess foreign specimens sent to me by Schönherr; and I have carefully examined the four examples in the collection of Mr. Kirby, which are all of this species; Mr. Kirby gives them in his MS. as the *B. ater* of Marsham. On the 14th of October last, at Shirley Common, near Croydon, I beat sixteen specimens of this insect decidedly from the broom (*Spartium scoparium*).

9. *B. Cisti* Fab. (1781), Mus. Banks.‡

— *canus*? Germ., Schönh., Steph. Man.

— *ater*, Curt. not Marsh.

This species was separated by Mr. Curtis from the preceding, with which it had been confounded in this country; it differs in having the *three* basal joints only of the antennæ *small*, and *entirely black*; the thorax *subconical*, &c. It varies considerably in size, like its congener *B. villosus*. (Length 1—1½ line.)

"Habitat in floribus *Cisti Helianthemi*. Mus. Dom. Banks."—  
Fab. Ent. Syst. i. p. 372.

\* See Introd. to Ent. by Kirby and Spence, i. p. 177.

† I am aware of the inconvenience of changing the specific name of a species that has been very generally used for fifty years; but it must be observed that Fabricius first employed the name *Cisti* for an insect differing from the *Cisti* of Paykull, and consequently the latter name must sink into a synonym. The *B. villosus* of Fabricius, according to his Museum, is identical with the *Cisti* of Paykull.—See Schönherr's Syn. Ins. v. p. 109.

‡ Of this remarkable and very distinct species there are now two examples preserved in the Banksian cabinet, pinned through the name: short as the description is ("ater immaculatus; femoribus muticis"), by Fabricius, it agrees with these insects, and not at all with any other of the six species in the cabinet: therefore they cannot have been transposed, and are undoubtedly the authentic types of the species referred to in the 'Ent. Syst.'

Taken at Birch Wood from the *Cistus Helianthemum* by Mr. S. Stevens, Mr. Smith and myself, from the middle of June to the middle of July ; also at Mickleham and Dorking off the same plant.

The *Bruchus tibiellus*, and the *B. debilis* of Schönherr and Stephens's 'Manual,' I have not been able to obtain sight of ; the cabinet of the first author appears to be without them ; from the descriptions I take them to be small varieties of the true *B. Cisti* of Fabricius.

#### BIBLIOGRAPHICAL NOTICES.

*Anatomical Manipulation ; or, the Methods of pursuing Practical Investigations in Comparative Anatomy and Physiology.* By Alfred Tulk, M.R.C.S., M.E.S., and Arthur Henfrey, A.L.S., M.Mic.S. Van Voorst. 8vo. pp. 414.

A SCIENTIFIC system of taxidermy and a guide for the zoologist in his anatomical inquiries have long been wanted by the British naturalist. We have hitherto had no work, professing to supply the requisite information, of any authority. Our anatomists who have written on those subjects have not been naturalists, and our naturalists, who, conscious of the necessity of such a guide as the volume before us, have assayed the task, have too often been ignorant of the very foundation of their science, the knowledge of structure.

The 'Anatomical Manipulation' of Messrs. Tulk and Henfrey is exactly the work required. It is based in part on the admirable treatise of Straus-Durckheim, than which a better groundwork could not have been selected. The original portion of the volume is equally excellent, and evidently executed with the greatest care and a thorough practical knowledge of the subject. The treatise on the microscope is full and clear, and in these days, when that instrument has become indispensable to the zoologist, this portion of the work is most welcome. The dissection and preservation of animal structures is entered into in the minutest manner, each system being treated of separately, and with respect to the several classes of animals. Much that relates to the invertebrate tribes is new, and evidently the result of original inquiries. The style of the whole is highly perspicuous, sufficiently full, and never prolix.

We rejoice to see such a work as this appearing among British naturalists, for other reasons besides its evident utility. We hail it as one of the symptoms which have appeared of late of a better state of things in the natural-history sciences in Britain. When the naturalist takes to anatomical manipulation he is in the right path. The discovery of the laws of structure, function and distribution, of affinity and of analogy, are the great ends of natural history, and to get at them we must pursue our researches anatomically and physiologically. The habits of animals and plants may be narrated but cannot be understood without reference to those laws. The "Peter



Parley" school of naturalists is fast becoming extinct, and with it its opposite, the purely technical. A more philosophical spirit is abroad, and we trust ere long naturalists will be able to hold up their heads on an equality with astronomers and mathematicians. Gladly we hail in the authors of the volume before us fresh aspirants to scientific honours, working in the right way; they have already done good service, and their book should be constantly open on the table of every zoologist.

*Entwicklung des Hummereies, &c.*:—On the Development of the Ovum of the Lobster. By Dr. M. P. Erdl. Munich, 1843.

To those who are acquainted with the elaborate researches of Dr. Rathke upon the development of the river Cray-fish, the present treatise will be one of peculiar interest, from its furnishing a parallel history in respect to another species of the genus *Astacus* so closely allied to the above. It would be impossible however, within the limited space allotted in our Journal, to do justice in an abstract to the masterly and lucid details which our author has given us upon this subject; their general bearing will be best understood by a careful perusal of the work itself, and a comparison of the text with the four beautiful coloured quarto plates, illustrating chiefly the early periods of embryonic existence, *i. e.* prior to the exclusion of the young lobster from the egg; periods which, according to Dr. Erdl, have been hitherto passed over in silence by most writers. We shall be content therefore with noticing those facts only which will be best appreciated by the general reader.

"It is well known that the eggs of crabs, when they have issued from the sexual orifice of the female, become attached to her sub-abdominal false legs, the inner and outer edge of which chiefly are fringed with hairs placed near to each other like the teeth of a comb. The fastening of the eggs takes place in the following manner:—While the eggs are being laid, or even before they reach the external sexual aperture in such crabs as *Maja*, where the oviduct is very short, they have to pass the orifice of a thick sac opening into the lowest part of the oviduct, and which is enlarged at the time of laying and filled with a tenacious slimy fluid. At the very instant in which the eggs are propelled through the oviduct, this slime is pressed out of the sac over the eggs, so that they come out covered with it. In other Crustacea (*Astacus*) this sac is wanting, and the oviduct appears large enough to furnish a sufficient quantity of viscous fluid from its internal surface. Upon coming in contact with the water the slime immediately hardens and forms a covering round each egg, which, by the contraction of the tail upon the false feet and their hairs, become pressed together, and adhere not only to the extremity but the whole length of the latter. The tail is again extended after the eggs are laid and attached, and they then sink down slightly by their own weight, so that the slime is lengthened out and thus forms a cord passing from the hairs to the ova, where it diverges to be continued over them as an external envelope. The cord being hardened

collapses throughout: its outer surface is thrown into many irregular folds, which give it an appearance as if composed of fibres; and it is frequently rolled up spirally. The folds generally radiate upon the upper part of the egg and become lost in its external covering."

Still more interesting is the important physiological fact, observed by Dr. Erdl, "that the nerves take their origin from the central ganglions in the form of simple loops which are prolonged into the rudimentary parts of the body, and that as they become developed, secondary loops proceed from these primary, and produce in their turn tertiary loops, and in this manner the nerves are distributed wherever they are met with. It is thus evident that their ultimate termination must be looped also, and finally that each nerve proceeding from its centre to the periphery of the body returns without any interruption in the reverse direction."

In the last part of the treatise, which is devoted to a consideration of the differences in the progress of development in different crabs, the author agrees with Rathke in regarding the lobster as lower in the scale of creation than the cray-fish; and then contrasting the development of the *Brachiura* and *Macroura* with each other, he observes that the latter must rank as the inferior of the two, "since in them the peripheral parts of the body, such as the tail and claws, are most extended and predominant, acquiring great dimensions over the rest, while in all their movements they exhibit a certain clumsiness and helplessness, and in the *lobster* a great stupidity of the senses. The *Brachiura*, on the contrary, move rapidly both sideways as well as backwards and forwards, are dextrous and strong in all their limbs, and from their sharpness of sight, hearing and taste, are elevated above all the other Crustacea. Even the mode in which they seek their food places them before the *Macroura*. Thus I have observed in many parts of the Mediterranean Sea, how the *Cancer Mænas* provides itself with nourishment from some small *Balani* which often project by thousands their calcareous valves above the surface of the water. It gets slowly above them, sticks its sharp claws first into this, then into that shell, drags out with them the animal, and conveys it thus to the mouth. It seems very often to play with small round stones and empty snail-shells like a cat with a ball. I could never observe anything similar either in the large or smaller species of *Macroura*."

*The Botany of the Voyage of H.M.S. Sulphur*; edited by R. B. Hinds, Esq. The Botanical descriptions by G. Bentham, Esq.

This is the first number of a work published under the authority of the Lords of the Admiralty, and bids fair to be one for assisting in the publication of which they will deserve the thanks of all botanists. The voyage of the *Sulphur* extended through six years, during which Mr. Hinds had the opportunity of examining a very considerable portion of the west coast of America, more especially the northern part; several of the islands of the Indian seas; a portion of the coast of China, &c. He more especially turned his attention to the study of the geographical distribution of plants, to his valuable treatise

upon which subject, contained in Sir E. Belcher's Narrative of this Voyage, we have already directed the attention of botanists.

The present number is chiefly occupied with part of the flora of California, but contains also some highly valuable remarks upon the climate, &c. of that country and the north-west of N. America. The botanical descriptions being drawn up by Mr. Bentham, in whose hands the collections have been placed, is a sufficient guarantee for their accuracy and value. There are ten well-executed lithographic plates in this number; the succeeding parts, to appear quarterly, are not expected to exceed six.

*Supplement to English Botany.* Second Series. Nos. 1—3.  
London, 1843—44.

We have much pleasure in directing the attention of our botanical friends to the commencement of a new series of this valuable work. To praise the beauty and accuracy of the plates would be quite a "work of supererogation;" in those respects it is allowed to be unrivaled. As was the case in the former series of this Supplement, the descriptions which accompany the plates are written by some of our best-known botanists; the authors of those in the three numbers before us are Mr. W. Wilson, Rev. M. J. Berkeley, Mr. C. C. Babington and Mr. Borrer.

The death of Mr. C. E. Sowerby, its proprietor, having caused the premature conclusion of the third volume of this Supplement, the present new Series has been commenced by Mr. J. D. C. Sowerby, the distinguished artist, to whose pencil we are indebted for the plates contained in the preceding volumes.

As this work does not now produce any profit to its proprietor, we take the liberty of calling upon botanists to come forward with their support, for it seems to us to be disgraceful that so truly national a publication should be allowed to languish through the neglect of those from whom its proprietor has the justest right to look for encouragement. It is intended to publish a number each alternate month, to contain four coloured plates with the requisite descriptive letter-press. It may be as well to add, that abundant materials exist to make the future numbers quite as interesting as any of the preceding, and also, that the plates of this new Series will not be republished in the small edition of 'English Botany,' the two works now belonging to different persons.

*Histoire Naturelle des Zoophytes*:—*Acalèphes*, par René-Primevère Lesson, Membre correspondant de l'Institut de France, &c. Ouvrage enrichi de douze planches. Paris, 1843. 8vo. pp. 596.

In the compilation of this volume the scissors have been of as much service as the pen. The result has been a patch-work in which every borrowed piece has been put together after a pattern of the author's own, but not very skilfully. Hence the book is less adapted for continuous perusal than for occasional consultation and reference, but for the latter purpose it is a very useful magazine: for it contains

the views and opinions and knowledge of a very great number of authors on the history of the *Acalephes*; and these are given very fully either in the author's own words, or in accurate and entire translations of them; so far, at least, as translations were accessible to the compiler, who acknowledges that his ignorance of the German language prevented him from making the use of works written in that language which he would otherwise have done. Besides being a repertory of everything pertaining to the anatomy, physiology, habits and classification of these frail, fugitive and most singular animals, we have in it a notice of every species that had been described up to the period of publication, and this notice is as complete as existing materials allow it to be made. Upon the whole we can recommend the work as a cheap and convenient collection of many widely scattered facts and opinions, and as a complete epitome of our knowledge of the species.

#### PREPARING FOR PUBLICATION.

*The Illustrated Genera of Birds*, by Messrs. Geo. Gray and D. W. Mitchell, is in active preparation. Part I. will appear with the Magazines on the first of May.

It is proposed in this work to give complete characters of all the genera in Mr. Gray's list of 1842, with a catalogue of the species referable to each of them. As this will include a note of the original descriptions and figures, it will serve in some measure as a general index to ornithological literature. The size and number of the illustrations will prevent the necessity of an inconveniently reduced scale; and the juxtaposition of nearly allied generic forms on the same plate will afford sufficient proof, in the absence of actual comparison of specimens, of the real or imaginary value of the distinctions which previous authors have established, or sought to establish, between them.

#### *Johnsoni Itinera Botanica, Cantiana Hamstedianaque,* MDCXXIX & MDCXXXII.

This work, the original of which is excessively rare, will be so printed as that the English translation (with which it is intended to be accompanied) shall occupy the page opposite to the Latin text.

Much interest attaches to this curious production, which furnishes a detailed record or journal of, probably, the earliest botanical excursion undertaken by the Apothecaries' Company.

Among the places visited are the following:—Erith, Dartford, Gravesend, Rochester, Sheppey, Faversham, Canterbury, Margate, Sandwich and Deal; Kentish Town, Highgate and Hampstead. The portions referring to Hampstead include Caenwood, Hampstead Heath, and the adjoining fields.

There will be appended Mr. Irvine's list of Hampstead-Heath Plants, for the purpose of giving a comparative view of the present with the former state of the botany of this latter district.

Facsimiles of the exceedingly curious Illustrations will be given, and the text will be translated faithfully verbatim, by Mr. Irvine, author of the 'London Flora.'

## PROCEEDINGS OF LEARNED SOCIETIES.

## LINNÆAN SOCIETY.

June 6, 1843.—Edward Forster, Esq., V.P., in the Chair.

Read a "Description of *Peltophyllum*, a new genus of Plants allied to *Triuris* of Miers, with remarks on their Affinities." By George Gardner, Esq., F.L.S. &c.

The plant described in the present communication was discovered by Mr. Gardner in the province of Goyaz, in the interior of Brazil, and the few specimens which he possesses are unfortunately all female. The following are its characters:—

## PELTOPHYLLUM, Gardner.

*Flores* dioici. *Masc.* ignoti. *Fœm.* *Perigonium* 6-partitum, coloratum, patens, persistens; laciniis ovatis, longè acuminatis; acumine plano. *Ovaria* plurima, in tori apice sessilia, adpressa, libera. *Styli* ad apicem incrassati, obliquè truncati. *Fructus* ignotus.

*Herba parvula Brasiliensis.* *Folia a scapo distantia, longè petiolata, peltata, valdè reticulata.* *Radix tuberosa, fibrosa.* *Scapus subramosus, basi squamosus;* pedunculis basi bracteatis, unifloris; floribus luteis.

*Peltophyllum luteum*, Gardn. Herb. Bras. n. 3570.

Mr. Gardner compares the female flowers of his plant with those of *Triuris*, to which it is evidently nearly related; and discusses at some length the subject of their proper position in the natural system, which he believes to be along with *Smilacæ* and the other orders of the group to which Prof. Lindley gave first the name of *Retosæ* and subsequently that of *Dictyogens*. He proposes to form a distinct order for their reception under the name of

## TRIURACEÆ.

*Herbæ parvulæ, perennes, rhizomate repente?* *Folia* solitaria, a scapo distantia, longè petiolata, nervosa, integerrima. *Vaginæ* ad basin petiolorum membranacæ. *Scapus* subramosus, basi squamosus. *Flores* regulares, dioici; pedicellis unifloris, bracteatis. *Perigonium* corollinum, 3- vel 6-partitum, patens, persistens; laciniis longis, acuminatis, æstivatione basi valvatis; acumine interdum tubuloso, ante anthesin gyrate incluso. *Stamina* 3 vel 6? *Antheræ* extrorsæ, loculis disjunctis, imo androphoro magno carnosissimo centrali insertæ. *Ovaria* plurima, in tori apice sessilia, adpressa, libera. *Ovula* in loculis solitaria? *Styli* sublaterales, subulati, vel ad apicem incrassati et obliquè truncati. *Fructus* ignotus.

A figure of *Peltophyllum luteum*, with details, from the pencil of Mr. Miers, accompanied the paper.

June 20.—E. Forster, Esq., V.P., in the Chair.

Read "Notes on the Forest-trees of Australia." By George Suttor, Esq., F.L.S. &c.

Mr. Suttor states that the far greater number of these trees belong to the order *Myrtacæ*, and chiefly to the genus *Eucalyptus*. The species are very numerous, and many of them are still undescribed. They are generically known to the colonists as Gum-trees, and their distinctive names are chiefly derived from the colour of their barks;

as for example, blue, black-budded, red, white, yellow, green, and spotted Gum-trees. There is also a Flooded Gum-tree, a Manna Gum-tree, and a so-called Mountain-ash, all belonging to the genus *Eucalyptus*. Many of the species are of gigantic growth, and the Black-budded Gum-tree in particular (*Eucalyptus globulus*, Labill.?) attains a size equal perhaps to that of any tree in the world. It derives its name from the blackness of its butt, caused, it is said, by exposure to the fires which are so frequently kindled by the natives in order to burn the grass and secure the game.

The Manna Gum-tree (*Eucalyptus mannifera*) is also of large growth, with widely spreading branches. Its manna drops in a liquid state most plentifully in the summer from the flowers and buds of the young shoots into the leaves, where it quickly becomes hardened, and falls thence to the ground in irregular lumps. It has a sweet agreeable taste, and is said to have all the properties of the manna of the shops. The wood contains a large quantity of saccharine sap, which soon becomes acid, and it is to this cause that Mr. Suttor attributes the power of resisting fire, so remarkable in all the Gum-trees, and which renders them peculiarly valuable in building houses.

Another species of *Eucalyptus*, the so-called Mountain-ash, which grows in the Blue Mountains, is a very fine timber-tree, which splits freely into long pieces and is brought to Paramatta for chair-rafts, &c. Its wood is very strong and elastic, and said to be equal in those respects to any wood in the world.

The Forest-mahogany of the colonists (*Eucalyptus robusta*, Smith) has strong large spreading branches, forming a very large head, and sweet-scented flowers. Its wood is heavy and close-grained, resembles the mahogany of Jamaica, and is used in Sydney for making chairs and bedsteads.

The timber-trees not belonging to the order *Myrtaceæ* consist of a few species of *Coniferæ*, the *Casuarinæ*, and the so-called Cedar (*Cedrela Toona*, Roxb.), the wood of which very much resembles the Honduras mahogany, and is very valuable to the colonists in fitting up their houses, making furniture, &c. The tree is of large growth, and has not been found in the interior, but generally on the low grounds of the coast rivers.

December 5.—E. Forster, Esq., V.P., in the Chair.

Mr. Westwood, F.L.S., exhibited a box of *Æstrideous* insects recently received from Professors Zetterstedt and Dahlbom, with the view of determining the correctness of Mr. Bracy Clarke's conjecture as to certain characters, which, in his memoir published in the last Part of the 'Transactions' of this Society, he had regarded as sexual, and as proving that the *Æstrus Tarandi* and *Æ. Trompe* are sexes of the same species. Mr. Westwood stated that this collection contained both sexes of each of these species, and that it would consequently be necessary to reinstate these two species as well as several others, which, on the same account, Mr. B. Clarke had sunk in his memoir.

December 19.—E. Forster, Esq., V.P., in the Chair.

Read a paper "On *Carex saxatilis*, L., and an allied species." By Francis Boott, M.D., F.L.S. &c.

The allied species referred to was found in 1832 in Glen Phee, Clova, by the party accompanying Dr. Graham on his annual botanical excursion to the Highlands, and was considered as a form of *C. saxatilis*, L.; but Dr. Boott, whose attention has lately been called to the subject by a letter from Mr. W. Wilson of Warrington, pointing out certain differences between the two plants, is led to regard it as a distinct species, which he names and characterizes as follows:—

*Carex Grahami*, spicis 4—5 cylindricis ferrugineis; masculis 2 (rariùs 1) gracilibus acutis: fœmineis 2—3 subremotis crassis obtusis inferioribus pedunculatis evaginatiss subnutantibus, stigmatibus 2, perigyniis oblongo-ovatis rostratis bifurcatis inflatis nervosis suberectis ferrugineis (rariùs stramineis) basi pallidis squamâ ovatâ acutâ fuscâ apice albidâ nervo pallido duplò longioribus.

Of *Carex saxatilis*, L., Dr. Boott gives the following character:—

*C. saxatilis*, spicis 2—3 atropurpureis; masculâ 1 (rariùs 2) cylindricâ pedunculatâ: fœmineis 1—2 rotundatis ovatisve infimâ plus minusve pedunculatâ evaginatâ bracteata erectâ, stigmatibus 2—3, perigyniis subglobosis ovatisve rostratis emarginatis stipitatis patentibus enerviis atropurpureis basi pallidis squamâ ovatâ obtusiusculâ nigro-purpureâ apice albidâ nervo concolori longioribus.

*C. saxatilis*, L. *Fl. Lapp.* 259 (1737).

*C. pulla*, Good. in *Linn. Trans.* iii. t. 14 (1795).

*Hab.* in Alpihus Scotiæ, Norvegiæ, Lapponiæ, Sueciæ, Islandiæ, Insularum Færoensium.

The author enters at length into a critical examination of the original authorities which prove the *Carex pulla* of Goodenough to be the same with *Carex saxatilis*, L.; and points out the origin of the confusion of the latter with *C. rigida*, Good. He then examines more particularly the distinguishing characters of *C. Grahami* and *C. saxatilis*; and adds that he should have no doubt of the specific distinction between them but for the observations of Drejer, who in his 'Revisio critica Caricum Borealium' describes, under the name of *C. pulla*  $\beta$  *fusca*, specimens from Iceland and Greenland closely agreeing with *C. Grahami*, except that he makes no mention of the nerves of the perigynium, and observes that the Greenland specimens are so extremely variable that it could scarcely be believed that they belong to the same species. In the absence of precise information respecting the perigynium of the larger Greenland specimens, Dr. Boott is inclined to refer them, together with the specimens from the Rocky Mountains described by him in Sir W. J. Hooker's 'Flora Boreali-Americana' under the name of *C. saxatilis*, to *C. physocarpa*, Presl, a native of Nootka Sound. Of the latter his knowledge is derived from M. Kunth's "*Cyperographia*."

In conclusion Dr. Boott leaves it to future observation to determine the value of the specific character which he has given of *C. Grahami*; whether it is to be considered as a distinct species, referred back to *C. saxatilis*, L., or transferred to *C. physocarpa*, Presl, re-

peating that at present he considers it, with Mr. Wilson, entitled to rank as a species.

Read also an "Account of the Trees producing Myrrh and Frankincense, as found in those parts of the coast of the Red Sea and Indian Ocean whence those Gums were obtained in the first dawn of Commerce." By Major W. C. Harris, late on an Embassy to the Court of Shoa in Southern Abyssinia. Communicated by the Secretary.

Major Harris describes the Myrrh-tree (*Balsamodendron Myrrha*) as growing abundantly on the Abyssinian coast of the Red Sea to the Straits of Bab el Mandeb, over all the barren hill-sides of the low zone inhabited by the Danakil or Adaiel tribes. It is called *Kurbeta*, and there exist two varieties; one producing the better description of the gum being a dwarf shrub, with deeply serrated crisp leaves of a dull green; while the other, which yields a substance more like balm than myrrh, attains a height of ten feet, and has bright, shining, slightly dentated leaves. The myrrh, called *Hofali*, flows freely from any wound, in the form of a milky juice, possessing a perceptible acidity, which either evaporates or becomes chemically changed during the formation of the gum. The seasons for collecting it are in January, when the buds appear after the first rain; and in March, when the seeds are ripe. Every passer-by transfers such portions of it as he may find to the hollow boss of his shield, and exchanges it for a handful of tobacco with the next slave-dealer whom he meets on the caravan-route. The merchants also of the sea-coast, before returning from Abyssinia, send into the forests that gird the western bank of the river Hawash, and bring away considerable quantities of the *Hofali*, which is sold at a high price. The natives administer it to their horses in cases of fatigue and exhaustion.

The shrub which produces the balm of Mecca, *Balsamodendron Opobalsamum*, is found on the opposite Arabian coast at Cape Aden, where it is called *Beshán*, either the original of or a derivative from the word *Balsam*. It is the *Balissan* of Bruce, who did not meet with the true myrrh-tree. The balm flows copiously from any incision, and the æthereal oil speedily evaporating, a tasteless gum remains.

The Frankincense, Major Harris states, is found chiefly along the Somauli coast, in the neighbourhood of Cape Guardafui. At Bunder Maryah, twenty miles to the S.W. of Ras Feeluk, the mountains are three miles from the shore and attain a height of five thousand feet. Ascending a thousand feet a plain presents itself, bounded on every side by precipitous mountains, studded with the Frankincense and Gum-Acacia trees, although looking bare from the total absence of under-wood. The frankincense-trees invariably grow from the bare and smooth sides of the white marble rocks, or from isolated blocks of the same scattered over the plain, without any soil whatever. From the base of the trunk, and about treble its diameter, a round thick substance is thrown out, of a nature between bark and wood, adhering most firmly to the stone, and resembling at a distance a mixture of mortar and lime. The stem rises from the centre of this mass, and having first taken a bend outwards of several inches, rises



straight to a height of forty feet. It throws out from the top short branches covered with a very bright green foliage, the leaves being narrow and rounded at the end, five or six inches in length by one broad, and crimped like the frill of a shirt, or rather like the sea-weed called by children on the English coast "the old gentleman's ruffles." The usual girth of the stem is from a foot to eighteen inches. The bark is perfectly smooth and consists of four distinct layers, the outermost of which is very thin; the two next of a singularly fine texture, resembling oiled letter-paper, perfectly transparent, of a beautiful amber-colour, and used by the Somaulis to write upon; and the innermost about an inch thick, of a dull reddish hue, tough and not unlike leather, but yielding a strong aromatic perfume. The wood is white and soft. On making a deep incision into the inner rind, the gum exudes profusely, of the colour and consistence of milk, but hardening into a mass by exposure to the air. The young trees produce the best and most valuable gum, the older merely yielding a clear glutinous fluid resembling Copal varnish and exhaling a strong resinous odour. During the S.W. monsoon the pastoral tribes in the neighbourhood of Ras Feeluk collect large quantities of frankincense, which they barter with the Indian Banyans, of whom a few reside at the villages along the Abyssinian coast. Boats from Maculla and from other parts of the Arabian coast also come across during the fine season and carry away the gums that have been accumulated, in exchange for a coarse kind of cotton cloth which is worn by the shepherds.

#### ZOOLOGICAL SOCIETY.

April 11, 1843.—William Yarrell, Esq., Vice-President, in the Chair.

Descriptions of ten new species of *Cancellaria*, from the collection of Sir Edward Belcher, by Mr. Hinds, were read.

*CANCELLARIA VENTRICOSA.* *Canc. testá ovatá, acuminatá, albescente; anfractibus septenis, ventricosis, subturbinatis, cancellatis, interstitiis quadratis; aperturá oblongá, prope mediam dilatatá; labio interno expanso; columellá triplicatá; umbilico mediocri.*  
Axis 15 lin.

*Hab.* The west coast of America, between  $12^{\circ} 28'$  and  $24^{\circ} 38'$ , north latitude; viz. Realejo, in from sixty to seventy fathoms; San Blas; Gulf of Magdalena, California, in seven fathoms, sandy mud.

Very similar in its characters to *C. candida*, but distinguished from it in the absence of the secondary impressed lines which cross and interfere with the cancellation. *C. candida* is described with only two columellar folds, which might be regarded as another source of difference, our shell having three very distinct. But I think it will be found on close examination that the former has a third incipient fold, which, though very small, truly exists.

*CANCELLARIA URCEOLATA.* *Canc. testá ovatá, acuminatá, lævigatá, epidermide fuscá indutá; anfractibus septenis, costatis, supernè subangulatis, ultimo subquadrato; costis parviusculis, rotundatis, lineis elevatis decussatis; aperturá oblongá in canalem recurvum effusum desinente; labro subrecto, intus sulcato; labio interno*

*expanso*; *columellâ biplicatâ, sed plicâ tertiâ inferiore obsolete*; *plîcâ superiore in dente acuto desinente, sinu inferiore magno*; *umbilico parvo*. Axis 16 lin.

*Hab.* The west coast of America, between  $12^{\circ} 2'$  and  $21^{\circ} 32'$  north latitude; viz. Gulf of Papagayo, in from eight to fourteen fathoms; San Blas, in seven fathoms.

The elevations which cross this shell are remarkably disposed. If the finger-nail is driven over the shell, from the base towards the apex, it meets with no resistance, but if in the contrary direction it is obstructed at every elevation. The squareness of the last whorl and the straight outer lip have a mutual relation, since they are dependent on each other; and these characters, taken collectively, will be of value in making a diagnosis between nearly allied species.

*CANCELLARIA ALBIDA.* *Canc. testâ oblongâ, subattenuatâ, cancellatâ, albescente*; *anfractibus septenis, interstitiis transversis vel subquadratis*; *aperturâ oblongâ*; *labro acuto, intus sulcato*; *columellâ biplicatâ, plicâ tertiâ inferiore obsolete*; *umbilico minimo, suboculto*; *canali mediocri, contorto*. Axis 13 lin.

*Hab.* The west coast of America, between  $2^{\circ} 47'$  south, and  $9^{\circ} 55'$  north latitude; viz. Bay of Guayaquil, Panama, and Veragua, in from seven to twenty-three fathoms.

*CANCELLARIA CREMATA.* *Canc. testâ oblongâ, subattenuatâ, fuscâ, lucidâ*; *anfractibus quinîs, cancellatis, interstitiis magnis, transversis vel subquadratis*; *aperturâ oblongâ, supernè plicâ unicâ*; *labro intus sulcis subdistantibus, labio interno expanso*; *columellâ triplicatâ*; *umbilico mediocri*; *canali breviusculo*. Axis 10 lin.

*Hab.* Bay of Panama; from a muddy bed in from four to ten fathoms.

The figures in the 'Conchological Illustrations,' *Cancellaria* 9 and 10, appear to me to represent two distinct species, both of which were collected in the Sulphur. Fig. 10 corresponds more closely with the description of *C. indentata*, and to this I would limit the species. The opinion which I had formed from the specimens in my own possession, became fully confirmed in the examination of those in Mr. Cuming's collection, and a fine shell belonging to him enables me to enrich the description. It may be desirable to remark that M. Kiener has copied both figures, and assigns them to one species.

*CANCELLARIA CORRUGATA.* *Canc. testâ bucciniformi, fuscâ*; *anfractibus quaternis, subventricosis, rugis parvis longitudinalibus confertis indutis, lineis impressis decussatis*; *aperturâ oblongâ, fuscâ*; *labro intus sulcato*; *columellâ plicis duabus albidis instructâ*; *umbilico nullo*; *canali mediocri*. Axis 8 lin.

*Hab.* Bay of Guayaquil. From seven fathoms; mud.

*CANCELLARIA ELATA.* *Canc. testâ ovatâ, elongatâ, acuminatâ*; *anfractibus septenis costatis, supernè angulatis, lineis elevatis decussatis*; *suturâ profundâ*; *aperturâ ovali*; *peritremate supernè disjuncto*; *labro intus sulcato*; *columellâ triplicatâ, plicâ inferiore maximâ*; *umbilico parvo, suboculto*; *canali inflexo*. Axis 9 lin.

*Hab.* A single specimen was obtained at Panama, from thirty fathoms.

This shell will always be readily distinguished by its elongated form, shouldered ribs, and by the remarkable circumstance of the plaits on the columella being reversed in size, the inferior being the largest.

CANCELLARIA FUNICULATA. *Canc. testá ovatá, elongatá; anfractibus senis, costatis, supernè subangulatis; costis subdistantibus elevatis, rotundatis, nodulosis, lineis elevatis decussatis; suturá profundá; labro intùs sulcato; columellá plicis tribus parvis; umbilico marginato; canali subnullo.* Axis 8 lin.

*Hab.* A single specimen only was obtained by the dredge from seven fathoms, sandy mud, in the Gulf of Magdalena, California.

CANCELLARIA BICOLOR. *Canc. testá retusá, contabulatá, fusconigricante; anfractibus septenis, angulatis, procul costatis; costis acutis, lineis elevatis distantibus decussatis; aperturá trigoná, supernè callositate albá; labro reflexo, intùs sulcato; columellá triplicatá; umbilico magno.* Axis 11 lin.

*Hab.* Straits of Macassar; from ten fathoms, coarse sand. Mr. Cuming obtained specimens at the Island of Corregidor, Bay of Manila, from seven fathoms, also in coarse sand. A banded variety was obtained in the same locality.

A nearly allied species is the American shell, *C. rigida* of Sowerby; but the present is a larger shell, with sharper distant ribs, crossed at regular distances by slightly elevated lines, and the peritreme is not crenulate. The ribs of *C. rigida* are nodulous from the crossing lines, which are also disposed to rugosity throughout. In *C. bicolor* the lines are particularly regular and uniform in their characters. This is one of several species which were obtained both in the Sulphur and by Mr. Cuming in the Asiatic seas. It is worthy of remark, that the specimens from the seas about the Philippines are uncommonly fine, and the use of them permits me to complete my descriptions more fully, and to note with more accuracy their geographical diffusion.

CANCELLARIA LAMELLOSA. *Canc. testá ovatá, acuminatá, pallidá, contabulatá; anfractibus senis, ventricosis, lamellis numerosis confertis, crenatis, in loco costarum instructis; aperturá trigoná; labro incrassato, reflexo; columellá plicis tribus parvis; umbilico magno; canali subnullo.* Axis  $7\frac{1}{2}$  lin.

*Hab.* This species has an extensive habitat, being found in several places in the Indian Archipelago and at the Cape of Good Hope. At the latter a single specimen was obtained on the Lagulhas Bank in seventy fathoms; also at Ceylon and in the Straits of Macassar. Mr. Cuming also procured specimens in seven fathoms, coarse sand, at the Island of Corregidor, in the Bay of Manila.

Corresponding to the customary situation of the ribs, this species throws off series of lamellæ, two or more in number, which present a sharp, reflected, crenated margin. These are clustered together in very irregular numbers, sometimes there being only two, or perhaps even one; but as the shell advances in age they are usually crowded

together in some numbers, and this remarkable and elegant character will readily distinguish it from any other species.

*CANCELLARIA ANTIQUATA.* *Canc. testá ovald, acuminatá, contabulatá, albidá; anfractibus septenis, planulatis, costatis, transversè striatis; costis acutis, supernè spinis cavis desinentibus; aperturá trigoná; labro reflexo; columellá plicis tribus minimis; umbilico maximo.* Axis 7 lin.

*Hab.* New Guinea; in twenty-two fathoms, coarse sand. Also obtained by Mr. Cuming at the island of Corregidor, Bay of Manila, in seven fathoms, coarse sand.

A species nearly allied to the singular *C. trigonostoma*, having a similar relative situation of the whorls to each other, and a very large umbilicus. This is a smaller shell, with a shorter spire, and sutures less profound.

A letter from Mr. J. E. Gray, addressed to the Curator, was read. This letter refers to some species of Bats from Jamaica, which Dr. Richard Parnell had sent to Mr. Gray. Among these, Mr. Gray observes, are some specimens of the genus *Macrotis*, a genus which he had recently established upon a Bat from Hayti, showing that this form is likewise extended to Jamaica.

“The collection also contains a specimen of *Arctibeus Jamaicensis*, Leach, and some specimens of a new genus, which is very interesting, as being a Noctilionine Bat, with an apparent nose-leaf, bearing a much greater resemblance to the Leaf-nosed Bats (*Phyllostomina*) than even *Mormoops*, which, when he first described it, Dr. Leach referred to that group. Indeed at first sight I was inclined to regard the new bat as belonging to the Leaf-nosed Bats; but on examination I found that the nostrils, instead of being placed on the leaf-like process, which is the character of that group, were on the under side of the nose-keel, and quite separate from it.

“This genus may for this reason be called *Phyllodia*, and it is thus characterized:—

“Head moderate; nose rather produced, with a sharp-edged transverse keel, with the nostrils on the lower side of the keel, and an ovate, lanceolate, fleshy process on the middle of the upper surface; chin with a single, transverse, membranaceous fold, surrounding a triangular group of many small warts; ears lateral; tragus distinct; wings long, rather narrow; thumb moderate, lower joint rather shortest; wing from the upper part of the ankle; interfemoral membrane large, truncated; heel-bone long, strong; tail enclosed, half as long as the membrane, with the tip above it, and with a vessel from each side of its tip to the hinder margin of the membrane.

“These characters show that this genus has much resemblance with *Mormoops*, and especially *Chilonycteris*, but it differs from the former in having no transverse membranaceous fold on the face, and from the latter, with which it agrees in having a membranaceous fold across the chin, in having a fleshy, erect, leaf-like expansion on the upper surface of the nose, which is wanting in that genus.”

Mr. Gray proposes to name this species after Dr. R. Parnell, so well known for his works on the fishes and grasses of Scotland.

*PHYLLODIA PARNELLII*. *Phyll. auribus magnis, subacutis; vellere cinerascenti-fusco, pilis ad apicem obscurioribus.*

The following note on the Spermatozoa of the Camel (*Camelus Bactrianus*, Linn.), by Mr. Gulliver, was then read:—

“In my observations on the Semen and Seminal Tubes of Mammalia and Birds, published in the Proceedings of the Society, July 26, 1842, I have noticed the form of the spermatozoa of the Dromedary. As I am not aware that the seminal animalcules of the Camel and Dromedary have yet been described, I now exhibit drawings of them to the Society.

“Although the blood-corpuscles of the *Camelidæ* have the same form as the blood-corpuscles of oviparous vertebrate animals, it will be observed that the Camel, like the Dromedary, has spermatozoa of the same type as the spermatozoa of other Mammalia, several of which are figured in Professor Wagner’s excellent ‘Elements of Physiology,’ translated by Dr. Willis, part i. page 11.”

Various specimens presented to the Society since the previous Meeting were laid on the table; they consisted of a very valuable collection of insects from the interior of South Africa, presented by the President, the Earl of Derby; a specimen of a Manis from China, presented by the Honourable Sir Alexander Johnstone; and a series of Insects, Birds’ Eggs, &c., collected at Samsoon and Erzeroom by the Society’s Corresponding Members, E. D. Dickson, Esq., and H. J. Ross, Esq. This last-mentioned collection also contained a specimen of the European Green Woodpecker (*Picus viridis* of authors), and of the Common Pheasant (*Phasianus colchicus*, Linn.).

Mr. Fraser exhibited a specimen of a Pouched Rat (*Cricetomys Gambianus*) and various species of Birds which he had procured on the western coast of Africa during the Niger expedition, and read the following notes relating to them:—

*Cricetomys Gambianus*, Wat. Lives in holes in the ground, more abundantly under the storehouses, where of a night they may be heard squeaking and fighting, similar to our common Rat (*Mus decumanus*, Linn.); they climb the paw-paw trees and feed on the fruit as it hangs: the cheek-pouches contained paw-paw seeds. Caught in iron gins baited with boiled yam. The natives set great store on this animal, its flesh being considered the greatest delicacy that can be offered at a wedding-feast.

*Hab.* Clarence, Fernando Po. Common.

*Neophron niger*, Less., *Cathartes monachus*, Temm. Pl. Col. 222.

Common in the neighbourhood of Cape Coast Castle, living in the smaller trees near the houses.

*Hirundo leucosoma*, Swains. Jard. Nat. Lib. vol. (Orn.) viii.; B. of W. Africa, page 74, 1837.

*Hab.* Accra. Very common.

*Ispida bicincta*, Swains. Jard. Nat. Lib. vol. (Orn.) viii.; B. of W. Ann. & Mag. N. Hist. Vol. xiii.

Africa. Common : seen in flocks of six or eight, making a continual chattering noise as they fly ; this species dives into the salt as well as fresh water, sometimes from the height perhaps of twenty feet ; I have seen them hover over their scaly prey like a kestrel.

*Hab.* Fernando Po and river Niger, as far up as Iddah.

*Macronyx flavigaster*, Swains. Jard. Nat. Lib. vol. (Orn.) vii. ; B. of W. Africa, p. 215, 1837.

*Hab.* Accra.

*Ploceus textor*, Cuv.

*Hab.* Cape Palmas, Cape Coast and Fernando Po.

At each of the above places I found this bird extremely common ; they commit much mischief in the rice and Indian-corn plantations. As many as fifty pairs may be seen building their domed nests in one tree, and in the neighbourhood of houses : they lay from four to five mottled eggs, varying as much in size, colour and markings as do our common Sparrow (*Pyrgita domestica*, Cuv.) ; they are extremely active and noisy, continuing fighting and chattering from daybreak to sundown : the nest is composed of coarse grass interwoven, sometimes fixed in a forked branch of a tree and at other times suspended.

*Ploceus brachypterus*, Swains. Jard. Nat. Lib. vol. (Orn.) vii. ; B. of W. Africa, p. 168. pl. 10, 1837.

*Hab.* Fernando Po.

Found in company with *P. textor*, living in the gardens round Clarence. Irides white.

*Ploceus personatus*, Vieill. Gal. des Ois. pl. 84.

*Hab.* Cape Coast.

*Euplectes oryx*, Swains., *Loxia oryx*, Vieill.

*Hab.* Cape Coast. Common : frequents the Indian-corn plantations.

*Vidua chrysonota*, Swains. Jard. Nat. Lib. vol. (Orn.) vii. ; B. of W. Africa, p. 178, 1837.

*Hab.* Cape Palmas.

*Vidua erythrorhynchus*, Swains. Jard. Nat. Lib. vol. (Orn.) vii. ; B. of W. Africa, p. 176. pl. 12, 1837.

*Hab.* Cape Palmas. Common.

*Passer simplex*, *Pyrgita simplex*, Swains. Jard. Nat. Lib. vol. (Orn.) vii. ; B. of W. Africa, p. 208, 1837.

*Hab.* Cape Coast and Accra.

*Passer Jagoensis*, Gould. Voy. of Beag. (Birds) p. 95. pl. 31.

*Pyrgita Jagoensis*, Gould, Proc. Zool. Soc. 1837, p. 77.

*Hab.* St. Vincent's and St. Antonio, Cape Verde Islands (June).

*Lamprotornis chrysonotis*, Swains. Jard. Nat. Lib. vol. (Orn.) vii. ; p. 143. pl. 6, 1837.

*Hab.* Fernando Po.

Very shy : irides white, bill and legs black, nostrils large and open. Caws somewhat like a crow ; makes a burring noise like a parrot when beginning to fly ; lives in the loftiest trees. The gizzard contained small seeds and red berries. The sexes do not differ.

*Cuculus rubiculus*, Swains. Jard. Nat. Lib. vol. (Orn.) viii. ; B. of W. Africa, p. 181, 1837.

*Hab.* Fernando Po.

Very shy: irides red hazel, cere and legs bright yellow, base of both mandibles yellow, mouth red.

*Zanclotomus flavirostris*, Swains. Jard. Nat. Lib. vol. (Orn.) viii. ; B. of W. Africa, p. 183. pl. 19, 1837.

*Hab.* Fernando Po (June).

Somewhat like a magpie, jerking and bobbing its tail and making a carr-r-r-ring noise as it hops from branch to branch; also a fast runner. A *mantis* found in the gizzard. Irides red, bill yellow, legs nearly black, cere turquoise colour. The sexes do not differ.

*Centropus Senegalensis*, Ill., Swains. Jard. Nat. Lib. vol. (Orn.) viii. ; B. of W. Africa, p. 185. pl. 20, 1837.

*Hab.* Cape Palmas and Accra.

Found on or near the ground.

*Peristera tympanistera*, Temm.

*Hab.* Fernando Po (June).

A female was killed on the nest, which was composed of small roots, and contained two white eggs; the nest was placed on the broken part of a small tree, about three feet from the ground. Irides hazel, bill and feet reddish plum-colour.

*Chatopus Adansonii*, Swains. Jard. Nat. Lib. vol. (Orn.) viii. ; B. of W. Africa, p. 217, 1837.

*Hab.* Central Africa.

This specimen was shot nearly opposite Iddah, about two hundred miles up the river Niger (August).

*Glareola torquata*, Temm.

*Hab.* Accra.

*Rhynchops Orientalis*, Rüppell, Atl. Zool. pl. 24.

*Hab.* Mouth of the river Nùn (August).

Mr. Fraser also called attention to two specimens of a species of *Manis*, which he laid before the Meeting. These, he observed, agreed in their characters with the species described by Mr. Gray in a communication read at the Meeting for February 28th of the present year, under the name *Manis multiscutata*. They were procured by Mr. Fraser at Fernando Po, and upon his return to England he had, upon comparing the specimens on the table with others of the *Manis tetradactyla*, perceived those differences upon which Mr. Gray founds the *M. multiscutata*. The animals, judging from their bones, were evidently not adult; the largest measured thirty inches in length, of which the head and body were twelve inches, and the tail eighteen inches. He had kept them alive for about a week at Fernando Po, and allowed them the range of a room, where they fed upon a small black ant, which is very abundant and troublesome in the houses and elsewhere. Even when first procured they displayed little or no fear, but continued to climb about the room without noticing his occasional entrance. They would climb up the somewhat roughly-

hewn square posts which supported the building with great facility, and upon reaching the ceiling would return head-foremost; sometimes they would roll themselves up into a ball and throw themselves down, and apparently without experiencing any inconvenience from the fall, which was in a measure broken upon reaching the ground by the semi-yielding scales, which were thrown into an erect position by the curve of the body of the animal. In climbing, the tail, with its strongly pointed scales beneath, was used to assist the feet; and the grasp of the hind feet, assisted by the tail, was so powerful, that the animal would throw the body back (when on the post) in a horizontal position and sway itself to and fro, apparently taking pleasure in this kind of exercise. It always slept with the body rolled up; and when in this position in a corner of the building, owing to the position and strength of the scales and the power of the limbs combined, Mr. Fraser found it impossible to remove the animal against its will, the points of the scales being inserted into every little notch and hollow of the surrounding objects. The eyes are black and very prominent. The colonial name for this species of *Manis* is Attadillo, and it is called by the Booby, 'Gahlah.'

May 9.—William Yarrell, Esq., Vice-President, in the Chair.

Mr. Hinds proceeded with his descriptions of new species of Shells collected during the voyage of Sir Edward Belcher, C.B., and by H. Cuming, Esq., in his late visit to the Philippine Islands: those characterized in the paper read were laid on the table.

#### Genus CORBULA, Bruguière.

**CORBULA CRASSA.** *Corb. testâ solidâ, incrassatâ, elevatâ, albidâ, inæquilaterali, latere antico paululùm superante, longitudinaliter sulcatâ, anticè rotundatâ, posticè ad extremitatem truncatâ, ab umbone ad marginem posticam biangulatâ; valvarum margine ventrali inclausâ, gibbosissimâ, sinistra posticè denticulatâ; umbonibus obliquis, posticis; intùs fuscâ.* Long. 11; lat. 7; alt. 7 lin.

*Hab.* Straits of Macassar; Straits of Malacca; Sabonga, island of Zebu; Bais, island of Negros, Philippines. Obtained in from seven to thirty fathoms, on a floor of coarse sand or gravel.

*Cab.* Belcher et Cuming.

Remarkable for the preponderance of the bulk of the anterior half over the posterior, a circumstance which also occurs in *C. bicarinata*. This, however, depends in some measure on the age, and is thus most conspicuous in those specimens which may be considered as beyond adult age.

**CORBULA TUNICATA.** *Corb. testâ ovato-trigonâ, obliquâ, anticè rotundatâ, posticè nasutâ, excavatâ, ab umbonibus angulatâ; valvis inæqualibus, dextrâ præcipuè maximâ, valdè sulcatâ, epidermide tenui corned indutâ, sinistra prope umbonem sulcatâ, aliter epidermide densâ indutâ; umbonibus obliquis posticis; intùs fuscâ.* Long. 12; lat. 7; alt. 9 lin.

*Hab.* Island of Corregidor, Bay of Manila; in seven fathoms, coarse



sand. Straits of Macassar; Lagulhas Bank, Cape of Good Hope: from seventy fathoms, on a gravelly bottom.

Cab. Belcher et Cuming.

**CORBULA CUNEATA.** *Corb. testá ovato-trigoná, æquilaterali, solidá, complanatá, sulcatá, anticè rotundatá, posticè angulatá; valvis subæqualibus, marginibus ventralibus gibbosis inclausis; umbonibus rectis; intùs purpurascete.* Long. 7; lat. 3; alt. 5 lin.

*Hab.* Catbalonga, Philippine Islands; from ten fathoms, soft mud. Lagulhas Bank, Cape of Good Hope; from seventy fathoms.

Cab. Belcher et Cuming.

**CORBULA PALLIDA.** *Corb. testá ovatá, tenui, elevatiusculá, sulcatá, anticè rotundatá, posticè ab umbonibus ad marginem posticam angulatá, valvæ dextræ margine ventrali acutá, inflexá; umbonibus lævigatis, rectis; intùs prope cardinem rosed.* Long.  $7\frac{1}{2}$ ; lat. 3; alt. 5 lin.

*Hab.* — ?

Cab. Cuming.

**CORBULA SIMILIS.** *Corb. testá ovatá, solidá, sulcatá, anticè elevatiusculá, rotundatá, posticè ad marginem posticam obliquè truncatá, ab umbonibus angulatá; valvis inæqualibus, dextrá margine ventrali subacutá, productá; umbonibus subobliquis; intùs rosed, dente valvæ sinistræ bifido.* Long. 6; lat. 8; alt. 4 lin.

*Hab.* Island of Corregidor, Bay of Manila; in seven fathoms, coarse sand.

Cab. Cuming.

**CORBULA SCAPHOIDES.** *Corb. testá oblongá, ordinatè sulcatá, interstitiis lævissimè striatis, anticè rotundatá, posticè elongatá, ad extremitatem obliquè truncatá, ab umbonibus subcarinatá; valvæ dextræ margine ventrali acutá, productá; umbonibus rectis.* Long. 6; lat.  $2\frac{1}{2}$ ; alt.  $3\frac{1}{2}$  lin.

*Hab.* Singapore; from seven fathoms, sandy mud. Bais, island of Negros, Philippines.

Cab. Cuming.

**CORBULA FRAGILIS.** *Corb. testá ovatá, tenui, albidá, striatá, striis transversis minutissimè reticulatá, anticè subproductá, rotundatá, posticè elongatá, ab umbonibus subrotundatá; valvæ dextræ margine ventrali acutá, productá; umbonibus rectis, lævigatis, æqualibus.* Long. 7; lat. 3; alt. 4 lin.

*Hab.* West coast of Veragua; from eighteen fathoms, mud.

Cab. Belcher.

**CORBULA ALBUGINOSA.** *Corb. testá retuso-ovatá, tenui, anticè rotundatá, posticè subelongatá, rotundatá; valvis valdè disparibus, dextrá longitrorsum striatá, pallidá, margine ventrali productá, acutá, sinistrá lævigatá, lineis elevatis radiantibus, epidermide fuscá indutá; umbonibus albidis, nitidis, inæqualibus.* Long.  $4\frac{1}{2}$ ; lat. 2; alt.  $3\frac{1}{2}$  lin.

*Hab.* New Guinea; Straits of Macassar: from seven to twenty-two fathoms, mud and coarse sand.

Cab. Belcher.

**CORBULA ROTALIS.** *Corb. testá oblongá, cornéá, anticè rotundatá, posticè subnasutá; valvis valdè disparibus, dextrá præcipuè maximá, rotundatá, sulcatá, margine ventrali productá, acutá, sinistrá parvâ, lineis decenis elevatis radiantibus; umbonibus valdè inæqualibus, subobliquis, anticis.* Long.  $2\frac{1}{2}$ ; lat.  $1\frac{1}{2}$ ; alt.  $1\frac{1}{2}$  lin.

*Hab.* Calapan, Mindora, Philippine Islands; from fifteen fathoms, coarse sand.

*Cab.* Cuming.

Several species of *Corbula* are provided with elevated lines radiating from the umbo of the left valve towards the ventral margin, but none have them in such numbers, or so distinctly marked, as in the present small species. Here they are about ten in number, and with the great disparity of the valves, will readily distinguish the species.

**CORBULA POLITA.** *Corb. testá oblongá, ventricosá, tenui, albidá, obsoletè sulcatá, anticè rotundatá, posticè ab umbonibus subangulatá; valvis ferè æqualibus, dextræ margine ventrali acutá, subproductá; umbonibus æqualibus, lævigatis, rectis.* Long.  $3\frac{1}{2}$ ; lat. 2; alt.  $2\frac{1}{2}$  lin.

*Hab.* Sorsogon, province of Albay, Luzon, Philippine Islands.

*Cab.* Cuming.

**CORBULA QUADRATA.** *Corb. testá quadratá, albidá, tenui, lævigatá, anticè rotundato-truncatá, posticè rotundato-angulatá, abbreviatá; valvarum marginibus ventralibus tenuibus; umbonibus obliquis, anticis; dentibus parvis, gracilibus.* Long. 6; lat. ; alt. 5 lin.

*Hab.* — ?

*Cab.* Metcalfe.

**CORBULA OBESA.** *Corb. testá ovatá, tenui, ventricosá, pallidá, striatá, anticè rotundatá, posticè ad extremitatem truncatá, ab umbonibus acutè angulatá; valvarum marginibus ventralibus inclausis, gibbosis; umbonibus rectis, lævigatis.* Long. 3; lat. 2; alt. 2 lin.

*Hab.* The west coast of America, between  $8^{\circ} 57'$  and  $21^{\circ} 32'$  north latitude, in from twenty-two to thirty-three fathoms, mud; namely, Panama, coast of Veragua, and San Blas.

*Cab.* Belcher.

**CORBULA SPECIOSA.** *Corb. testá ovato-trigond, anticè rotundatá, posticè excavatè angulatá, albidá, sanguineá, densè multiradiatá; valvis valdè inæqualibus, marginibus ventralibus inclausis, dextrá rotundatá, sulcatá, sinistrá subplanulatá, striatá; umbonibus rectis, subplanulatis; intùs albidá.* Long. 9; lat. 5; alt. 7 lin.

*C. radiata*, Sowerby, Proc. Zool. Society, p. 36, 1833.

*Hab.* Panama; from six fathoms, mud. Gulf of Nicoya, Central America.

*Cab.* Belcher et Cuming.

This shell has been described as *C. radiata*, Sow., a name previously assigned by M. Deshayes to a fossil species. The description also was drawn up from such an indifferent shell, that it was almost by accident I discovered it was to apply to my specimens. I have therefore been under the necessity of recording a new description.

**CORBULA MODESTA.** *Corb. testá ovato-trigond, complanatá, pal-*

*lidá, radiatá, profundè sulcatá, anticè rotundatá, posticè ad extremitatem truncatá, ab umbonibus angulatá; valvarum marginibus ventralibus inclausis; umbonibus parvis, subæqualibus, roseis; intùs roséa.* Long. 7; lat.  $3\frac{1}{2}$ ; alt. 5 lin.

*Hab.* Straits of Macassar; from seven fathoms, coarse sand. Ticao, Philippine Islands; from eight fathoms, sandy mud. The Macassar specimens are of a dwarf size.

Cab. Belcher et Cuming.

*CORBULA SOLIDULA.* *Corb. testá parvá, ovatá, subtrigond, solidulá, elevatiusculá, æquilaterali, sulcatá; anticè rotundatá, posticè unguulatá; valvarum marginibus ventralibus inclausis, gibbosis; umbonibus rectis, lævigatis.* Long. 2; lat. 1; alt.  $1\frac{1}{3}$  lin.

*Hab.* Straits of Macassar; from seven fathoms, coarse sand. Bais, island of Negros, Philippines.

Cab. Belcher et Cuming.

*CORBULA MARMORATA.* *Corb. testá parvá, oblongá, solidulá, lævigatá, marmoratá, anticè rotundatá, posticè subangulatá; valvarum marginibus ventralibus inclausis; umbonibus obliquis, anticis; ante umbones sanguineo maculatá.* Long. 2; lat. 1; alt.  $1\frac{1}{3}$  lin.

*Hab.* West coast of Veragua; from twenty-six fathoms, mud.

Cab. Belcher.

*CORBULA EBURNEA.* *Corb. testá parvá, ovatá, subtrigond, eburneá, solidulá, complanatá, lævigatá, obsolete sulcatá; margine ventrali gibbosá; umbonibus parvis, subrectis, nitidis; intùs corned.* Long. 2; lat. 1; alt.  $1\frac{1}{3}$  lin.

*Hab.* North coast of New Guinea; Camaguing and Bohul, Philippine Islands: from seven to sixty fathoms, coarse sand and mud.

Cab. Belcher et Cuming.

This shell closely approaches *C. solidula*, but is distinguished by its somewhat more triangular shape, polished, ivory-like, flattened valves, and the slightly sulcate sculpture.

*CORBULA MONILIS.* *Corb. testá minutá, globosá, pallidá, striulatá; valvis valdè inæqualibus, dextrá multò maximá, posticè elongatá, margine ventrali acutá, productá; umbonibus rectis, lævigatis.* Long. 1; lat.  $\frac{2}{3}$ ; alt.  $\frac{2}{3}$  lin.

*Hab.* Sual, Luzon, Philippine Islands; from five to seven fathoms, sandy mud.

Cab. Cuming.

A small globose species remarkable for the inequality of the valves, the left being sunk into the right. The latter valve is also distinguished by the posterior nasute elongation.

*CORBULA FASCIATA.* *Corb. testá ovatá, subtrigond, lævigatá, pallidá, atro-fusco trifasciatá, anticè productá, rotundatá, posticè elongatá, ab umbonibus arcuatè angulatá; valvarum marginibus ventralibus acutis, convexis, dextrá productá; umbonibus rectis, suberosis.* Long.  $6\frac{1}{2}$ ; lat.  $2\frac{1}{2}$ ; alt. 4 lin.

Var. *Testá pallidá, posticè subproductiori.*

*Hab.* St. Juan, province of Illocos, and Agoos, province of Pangasinan, Luzon, Philippine Islands.

Cab. Cuming.

**CORBULA TRIGONA.** *Corb. testá trigoná, lævigatá, pallidá, fuscá, vel obsolete unifasciatá, anticè rotundatá, posticè abbreviatá, ab umbonibus angulatá; valvæ dextræ margine ventrali acutá, productá; umbonibus rectis.* Long.  $4\frac{1}{2}$ ; lat. 2; alt. 4 lin.

*Hab.* Senegal. Cab. Cuming et Metcalfe.

**CORBULA LÆVIS.** *Corb. testá ovali, æquilaterali, pallidá, tenui, lævigatá, complanatá; valvæ dextræ margine ventrali acutá, productá; umbonibus rectis, suberosis.* Long. 6; lat.  $2\frac{1}{2}$ ; alt. 4 lin.

*Hab.* Hong-Kong, China. Cab. Belcher et Cuming.

Both valves are flattened towards their ventral margins in a very characteristic manner.

**CORBULA FABÆ.** *Corb. testá ovali, subæquilaterali, elevatiusculá, tenui, lævigatá, pallidè fusco trifasciatá, posticè ab umbonibus angulatá; valvæ dextræ margine ventrali acutá, productá; umbonibus rectis, fragmentis epidermide tenui indutá.* Long. 5; lat.  $1\frac{2}{3}$ ; alt.  $2\frac{2}{3}$  lin.

*Hab.* St. Miguel, east coast of Luzon, Philippine Islands. Obtained in the mud at low water.

Cab. Cuming.

It is very probable that the four species last described affect situations where the water is brackish rather than salt; and though they retain the hinge of *Corbula*, in general character they materially differ from the more typical forms of the genus.

#### POTAMOMYA, J. Sowerby.

**POTAMOMYA NIMBOSA.** *Pot. testá ovato-trigoná, lævigatá, anticè rotundatá, posticè productá, angulatá; valvis inæqualibus, margine ventrali acutá; umbonibus subæqualibus; epidermide tenui, tenebrosá, indutá, lineis capillaribus radiantibus; intùs albidá.* Long. 17; lat. 8; alt. 11 lin.

Sowerby's Conch. Manual, f. 498, 499.

*Hab.* The tributary streams of the Rio de la Plata, in the mud.

Cab. Cuming.

**POTAMOMYA OCREATA.** *Pot. testá valdè inæquilaterali, anticè abbreviatá, rotundatá, posticè productá, subnasutá, ab umbone ad marginem posticam angulatá; valvá dextrá rotundatá, margine ventrali anticè productá, acutá; epidermide fuscá indutá; intùs albidá vel cærulescente.* Long. 13; lat. 6; alt. 8 lin.

*Hab.* Brazil. From freshwater streams.

Cab. Cuming et Metcalfe.

The younger specimens are much less inequilateral than the old.

#### ENTOMOLOGICAL SOCIETY.

At the Anniversary Meeting held on the 22nd of January, Mr. G. Newport, the President, delivered an Address on the state and progress of Entomology, from which the following interesting observations are extracted:—

There is little need that I should dwell on the importance of a

knowledge of the habits of insects to the agriculturist, the horticulturist, and all who are directly engaged in the cultivation of the soil, in reference to the first great requisite of life, the production of food. The value of Entomology, in this respect, is already generally acknowledged; but there are other departments of science in which its value is yet unknown, or only just beginning to be appreciated; and yet even in these it may hereafter prove highly important.

The great object of all scientific research is the welfare and improvement of mankind. All inquiries that tend to this object, however remotely connected with it, deserve the attention of the philosopher and the philanthropist. Observations on the habits and economy of insects, independently of their immediate connexion with the cultivation of the soil, are of high importance with reference to our arts and manufactures; and are valuable, not merely to individual enterprise, but to the commerce of the whole world. The dye, the wax, the silk contribute to the riches and comfort of thousands, and even supply means of existence to tens of thousands; yet the value and most successful cultivation of these can only be improved by attention to the habits of the diminutive creatures by which they are produced. In like manner, attention to the habits, and experiments on the functions of these "miniatures of creation," become of immense importance when the knowledge of the entomologist is combined, on the one hand, with the skill of the analytic chemist, in watching the processes, or in testing the products of their little vital laboratories; or, on the other hand, is employed in assisting to guide the diminutive scalpel, or the eye of the comparative anatomist and physiologist, in his microscopic investigations of structure or function. Entomological knowledge, unapplied and alone, like many other pursuits, may perhaps be of little absolute value; but when combined with that of the chemist, the physiologist or the anatomist, it leads to a result of the highest possible importance to mankind,—the right understanding of the great laws of life in health and disease, which alone enables the physician to apply his experience with success in restoring to us that which is more valuable than all the comfort that riches or luxury can contribute.

MM. Edwards and Dumas' paper on the production of wax is in striking accordance with these views.

A theory has been promulgated by the justly celebrated Professor of Chemistry at Giessen, Dr. Liebig, that the constituents of the food of animals, when taken into the system, during the processes of digestion and nutrition, undergo a peculiar modification, the result of which is the production of substances, through the agency of special organs, totally different in the proportions of their chemical constituents from those of the materials from which they have been derived. A proof of this change was pointed out by Liebig as afforded in the production of wax by the honey-bee, as in the experiments of Huber, recently confirmed by Gundlach, in which the bees were fed only on sugar. But it was objected by many distinguished chemists that there was no direct *proof* in these experiments;

as the constituents of wax might have been collected by the bees before they were confined for experiment, and stored up in their own bodies, or that the wax might be derived from the fat of their bodies, which, in the proportions of its ultimate constituents, is very similar to wax. To put these objections to the test, MM. Milne Edwards and Dumas jointly undertook to repeat the experiments. They first ascertained by analysis the quantity of fatty matter in the bodies of a given number of bees, and the quantity of waxy matter accidentally contained in the honey with which they were fed, during confinement. The result of the experiments proved that the quantity of wax produced in a given period by each bee exceeded very nearly three times the combined amount of waxy matter contained in the food, and of fat in the body of each bee at the commencement of the experiment, besides a large amount of fat still contained in its body at the close. These experiments most incontrovertibly prove that the constituents of the wax could not have pre-existed in the bodies of the bees; but that wax is a true formation, the result of changes which the constituents of the food undergo, through the agency of special organs, during the process of nutrition.

So again experiments on the functions of insects, when combined with anatomical examination of their particular structures, and compared with the vital phænomena and structure of analogous parts in our own bodies, and the higher animals in general, lead us to equally important results.

## MISCELLANEOUS.

### NOTE UPON THE HABITS OF THE COMMON TOAD.

THAT the food of the Toad consists of insects as well as worms, is a fact with which every naturalist is familiar, though all are perhaps not aware of the extent to which in certain instances it preys upon the larger Coleoptera, chiefly of the Carabideous kind. I once found during the summer, concealed beneath a very large stone, one of these reptiles, the stomach of which was filled with the detached heads, thoraces, abdominal segments, elytra, &c. of *Steropus madidus*, *Oma-seus melanarius*, *Calathus*. These hard parts, more or less broken, and with the flesh dissolved out and digested, had undergone no further change, so that the species they belonged to could be perfectly well determined. I have since met with toads, in chalky districts where these beetles abound, which were literally *crammed* with them, and among others have found in the egesta the remains of *Carabus violaceus*, and of some also of the large Curculionidæ, such as *Otiorhynchus niger*. I have myself forced an ordinary-sized toad to swallow alive successively two of the first-named insect, which it effected without much difficulty, and have known it in confinement to devour two *C. moniles* inclosed along with it. These observations tend to throw some light upon the explanation of toads being found in holes of rocks and hollows of trees, whither they had probably resorted in search of the abundant store of insect-food which these situations afford, and where they might remain until the cavity became closed

up. It would be curious to witness in what manner the toad manages to seize and secure such a powerful prey as the *Carabus*, as something more than the viscid and adhesive secretion of the tongue must be required for this purpose.—ALFRED TULK.

PROPAGATION OF THE GENUS SYLLIS.

Among other results obtained by M. de Quatrefages in studying the Annelida, the most singular is that which relates to the propagation of *Syllis*. He met upon the coast of Brittany with a great number of this genus aggregated together in a manner similar to that described and figured by O. F. Müller in the double Annelide, named by him *Nereis prolifera*. M. de Quatrefages has proved that the two individuals are formed in *Syllis* also, at the expense of a single one, by the body of the latter becoming strangulated in the middle, and dividing, after the first rings of the posterior segment are modified, so as to constitute a head. But the two individuals, though thus similar in their exterior, are endowed, according to him, with very different functions. The first continues to be nourished in the ordinary way and to perform all the necessary vital functions, and in all probability becomes complete by reproducing a tail similar to the one which it has lost. But the second, formed at the expense of this tail, is destined only to multiply the species; its alimentary canal exhibits a tendency to become atrophied, and it appears to be nourished as it were upon matters pre-existing in its body; but it incloses the whole of the generative organs possessed by the parent stock, and after its separation continues to live sufficiently long for these organs, by fulfilling all their functions, and producing either ova or spermatozoa to insure the perpetuity of the species.—*Abstracted from the Comptes Rendus*, Jan. 15, 1844.

VESSELS PIERCED BY THE WEAPON OF THE SWORD-FISH.

Although notices have at various times been published respecting vessels at sea being pierced by the weapon of the Sword-fish, it seems to me that the positive information conveyed in the following letter from Robert M'Calmont, Esq. of Eaton Square, London, is worthy of a place in the 'Annals.' The portion of the weapon alluded to and preserved in the Belfast Museum is about nine inches in length, and two inches in diameter. It belonged, not to a sword-fish or *Xiphias*, but to a fish of the allied genus *Histiophorus*.

"London, 22nd October, 1834.

"MY DEAR SIR,—I send you along with this a small parcel containing part of the horn of a sword-fish, which may perhaps be considered deserving a place in your museum, from the manner in which it came into my possession. A vessel of ours, called the *Euphemia*, when on her passage to Brazil a few months ago became rather leaky, and upon examination at the end of her voyage was found to have been pierced by this horn through the copper-plank, and about nine inches through the solid timbers. It was broken off close to the copper, probably by the struggles of the fish, and the other end was

broken off by the carpenter in his endeavours to extract it from the position in which it was tightly wedged, and the point, with some inches of the horn, still remains in the ship. It was splintered by the same cause, and is glued together in the state in which you will receive it.

"It is remarkable that it entered the vessel, not, as one would suppose, in a horizontal direction, but nearly vertically, passing rather obliquely through two of the floor timbers within a few feet of the keel.

"Believe me to be yours sincerely,

"ROBERT M'CALMONT."

"To William Thompson, Esq., Belfast."

The following paragraph which appeared in the *Caledonian Mercury* in October 1843 may be added:—

"*Extraordinary Circumstance.*—The brig *Lord Byron*, of Limekilns, when on her voyage, at the end of last month, from the West Indies to Liverpool, suddenly sprung a leak, without any apparent cause. It was considered advisable to return to Jamaica, and, on the cargo being taken out and the vessel examined, it was found that the damage was occasioned by a sword-fish. The sword or bill of the fish had passed through the copper sheathing, then through the planking, in a slanting direction, to the extent of five inches, and also about eight or ten inches into the dead wood of the keel; leaving an opening in the planking in each side sufficient to admit the hand of a boy. A piece of the sword retained by the Captain is six inches long and one and a half inch thick, of solid bone; but a longer piece remains in the keel. The strength of the sword-fish must be very great, and it may have been the cause of the loss of several vessels. The vessel referred to was carried into port with very great difficulty."

Donegal Square, Belfast, Jan. 31, 1844.

WM. THOMPSON.

#### UPON THE SECRETION OF SILK.

The question has lately arisen, contrary to the old opinion of the silk (especially that of the silkworm) being contained in a fluid state within the reservoirs, whether it does not exist there already formed into a thread, and the caterpillar have merely to unwind a skein of it in constructing its cocoon. Straus-Durckheim expresses at some length (p. 88. vol. ii. of his recent work upon *Comp. Anat.*) his conviction that such is the case, both from anatomical observation and experiment, but the researches of M. Robinet have led him to the following different conclusions:—

1. The silk escapes by a simple membranous orifice, situated in a conical and fleshy appendage adhering to the labium of the silkworm.

2. The silk reaches this orifice by a single very short canal resulting from the union of the two serigenous cæcal tubes.

3. The anterior part of these tubes is capillary; the middle is very much swollen, and constitutes the *reservoir* properly so called; the posterior part consists of a very long slender cylinder, which is probably the secreting organ.



4. The silk is in the state of a thick gelatinous liquid in the two posterior parts of these organs. It *solidifies* in the capillary part of the tubes and reaches the external meatus in the concrete state.

5. The caterpillar compresses its thread by the contractions of an angle (*coude*) formed by the two capillary tubes at their point of union. It is thus that it can stop the secretion of silk and suspend itself by its thread.

6. The material of the silk is always colourless, and derives the colour which it presents in certain cases from a varnish existing in the reservoirs and issuing along with it.

7. The conical form of the thread is due to the gradual narrowing of the capillary tubes, which may be regarded as a kind of *wire drawer* to the silk.

8. All the other appearances which have led to the supposition that the silk existed in the state of a skein within the reservoirs are easily explained by the fact of its solidification in the capillary tubes *before their union*. How this takes place, and under what circumstances, remains to be determined.

When I have torn the capillary tube of a silk-reservoir as near as possible to its junction with its fellow, I have succeeded in drawing out simple silken threads, some of which are several inches long. This result has been obtained *under water*, and I do not think by any one previously.—*Comptes Rendus*, Jan. 15, 1844.

#### FUCUS LABILLARDIERII, TURN.

It is stated in the observations on this Alga (p. 57), that *Calocladia*, Grev., is identical with *Delisea*, Lamx., and that the Alga which Dr. Greville considered identical with *Fucus Labillardierii* is the same with *Delisea fimbriata*, Lamx. The latter part of the statement is not correct. Since the memoir was printed, Dr. Montagne has received specimens from Lehmann and Lenormand, which have convinced him that some correction here is necessary. The plant of Dr. Greville is the same with *Spharococcus flaccidus*, Suhr, and is specifically different from, though closely allied to *Delisea fimbriata*, Lamx. He proposes, therefore, to call it *Delisea pulchra*, adopting the specific name of Dr. Greville, which is anterior to that of Suhr. *Delisea fimbriata* will then remain the type of the genus.—M. J. B.

#### KENTISH BIRDS.

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

Margate, January 1844.

GENTLEMEN,—In my last communication I omitted to mention that in the latter part of September we were visited by an immense number of chaffinches that continued their course in a north-eastern direction. Fresh arrivals continued for several days, coming in a direct line from the continent; as soon as they reached our coast near Kingsgate, some of them, from hunger, staid merely for a few seconds to recruit their strength by picking up a few seeds, and then joined the following flight. I shot several of them, all females. In one of Mr. White's letters, he says he saw vast flights of chaffinches, and

when he came to observe them narrowly he was surprised to find them all hens, and he expresses a wish to know whether these birds do come over from the continent. For my part I am quite satisfied; and after such an opportunity of observing their coming from that direction have no doubt on the subject. After the females had arrived, and a greater portion had left our coast, an immense number of male chaffinches made their appearance, with an equal number of redbreasts; but the chaffinches did not follow the hens as I should have thought, but betook themselves to the farm-yards, doing great mischief to the granaries; and the redbreasts also filled our hedges and shrubs, so that they were swarming alive with them; and in many small hedge-rows of only a few yards' long about Northdown, several hundreds would start out within a yard or so of your gun.

About the 10th of October the wind got out to north-east again, and perhaps you may be surprised when I inform you, that almost every bush, shrub and garden in the vicinity of Margate was for several days swarming with the Golden-crested Regulus\* (*Regulus aurocapillus*), and a few of the Fire-crested Regulus (*R. ignicapillus*); of the former I obtained as many as three in a shot for several times, but of the latter I only got seven at different times; but strange to say, the cliffs and houses and walls were completely lined with them; and a friend of mine watched his cat in less than half an hour killing no less than nine; and, to use his own expression, he does not know how many it had killed, but it had been at the work of slaughter all the morning.

The inhabitants, who saw so many birds of so curious a character, put it down at once for a severe winter; in which surmise I did not concur, concluding that some spot must be the place of landing of the migrators. And when, about five years since, I saw a great number of Ring Ouzels (*Turdus torquatus*) about the neighbourhood of Dover, the same opinion was then entertained by myself as well as others; but at any rate the severe weather has been a long time in coming, which for my part I am rather sorry for, as this mild weather is not good for collectors.

Since my letter of last month I have only obtained the following specimens:—

Snow Buntings (*Emberiza nivalis*).

One specimen of the Great-spotted Woodpecker (*Picus major*).

One Slavonian Grebe (*Podiceps cornutus*).

Feb. 15.—I send you the list of a few birds that have been obtained on our coast last month.

Several specimens of Sanderlings, *Calidris arenaria*; some of them nearly or wholly white.

Several specimens of the Bar-tailed Godwit, *Limosa rufa*. They are very plentiful along the coast.

Feb. 16.—For several years we have been visited by vast numbers of the Snow Bunting, *Emberiza nivalis*, but in no season do I remember seeing so many as at the present. Their favourite locality

\* From Mr. Richard Taylor, jun. we learn that during the first week of the present February, he observed unusual numbers of Gold-crests in Cornwall.

used to be at a place called Newgate, about one mile from Margate ; but now they visit not only Newgate, but all along the range of fields from Newgate to Updown and to Chapel Bottom. They are very wild ; I have tried from year to year to catch them with a lark-net at night, but never could succeed, except only in taking a few. As they visit the clover-lay all the day, I thought that they roosted at night ; but I now find this not to be the case, for on returning from a shooting tour at dusk in the evening along the cliffs near the Infirmary, my attention was attracted by a number of small birds sitting on the fissures of the cliff. On examination they proved to be snow buntings in thousands. This, then, accounts for my not finding them in the fields. On questioning the coast-guardsmen, they told me that about half an hour before dusk they arrive in immense numbers, getting into the small holes and crevices of the cliff ; but as soon as daylight appears they depart in small flights, making a very musical noise.

STEPHEN MUMMERY.

144 High Street, Margate.

METEOROLOGICAL OBSERVATIONS FOR JANUARY 1844.

*Chiswick*.—January 1. Snow and sleet ; clear and frosty at night. 2. Clear : sharp frost at night. 3. Severe frost : overcast : thawing rapidly. 4. Hazy : overcast. 5. Overcast : rain. 6. Mild and fine. 7. Exceedingly clear and fine : frosty. 8. Frosty : fine. 9. Thick haze : cold and dry : overcast. 10. Hazy : drizzly. 11. Overcast. 12. Foggy : heavy rain. 13. Slight drizzle : heavy clouds : squally, with rain. 14. Hazy and drizzly : clouds in strata : densely overcast. 15. Clear and frosty. 16. Sharp frost : very fine. 17, 18. Overcast. 19. Fine : densely clouded. 20. Cloudy, cold and dry. 21. Overcast. 22. Hazy : very fine. 23. Foggy : very fine. 24. Slight fog. 25. Frosty : very fine. 26. Very fine. 27. Slight rain. 28. Rain : fine. 29. Clear : overcast : squally. 30. Fine : showery. 31. Brisk wind, with small hail : stormy showers, snow, sleet, rain : densely overcast.—Mean temperature of the month  $2\frac{1}{2}^{\circ}$  above the average.

*Boston*.—Jan. 1. Cloudy : rain early A.M. 2, 3. Fine. 4, 5. Cloudy : rain early A.M. 6. Fine : rain early A.M. : rain P.M. 7. Cloudy. 8. Fine. 9. Cloudy : snow P.M. 10. Fine : rain P.M. 11. Cloudy. 12. Fine : rain P.M. 13. Cloudy : rain P.M. 14—16. Fine. 17. Cloudy. 18—20. Fine. 21. Cloudy : rain early A.M. 22. Cloudy. 23. Cloudy : rain early A.M. 24, 25. Foggy. 26. Fine. 27. Cloudy. 28. Cloudy : rain early A.M. : rain P.M. 29. Fine. 30. Stormy. 31. Fine : stormy P.M.

*Sandwich Manse, Orkney*.—Jan. 1. Snow-showers. 2. Snow : bright : cloudy. 3. Snow-showers : clear. 4. Bright : frost : clear. 5. Rain. 6. Bright : rain. 7. Damp : clear. 8. Bright : clear. 9. Cloudy : rain. 10. Showers. 11. Bright : cloudy. 12. Rain : showers. 13. Bright : cloudy. 14. Frost : snow : clear. 15. Cloudy. 16. Cloudy : drizzle. 17. Drizzle. 18. Showers. 19. Hail-showers. 20. Snow-showers : cloudy. 21. Showers. 22. Bright : cloudy. 23. Drizzle. 24. Bright : fine. 25, 26. Showers. 27. Bright : drizzle. 28. Sleet-showers. 29. Rain : showers. 30. Sleet : showers. 31. Snow-drift : clear.

*Applegarth Manse, Dumfries-shire*.—Jan. 1. Frost : snow-shower. 2. Frost, severe. 3. Thaw : rain P.M. 4. Small rain. 5, 6. Heavy rain. 7. Showers. 8. Frost. 9. Snow : rain P.M. 10. Frost. 11. Fog. 12. Small rain. 13. Frost : fair and fine. 14, 15. Frost : fine. 16. Slight frost. 17. Frost : fine. 18. Frost. 19. Showery. 20. Frost, slight. 21. Fair and clear. 22. Frost : fine. 23. Frost : mild. 24. Fair and mild. 25. Rain at noon. 26. Fair and fine. 27. Fair, but cloudy. 28. Shower, heavy. 29. Wet. 30. Rain : snow-shower. 31. Frost and snow.

Mean temperature of the month .....	38° 4
Mean temperature of January 1843 .....	37 ° 8
Mean temperature for twenty years .....	34 ° 2

*Meteorological Observations made by Mr. Thompson at the Garden of the Horticultural Society at CHISWICK, near London; by Mr. Veall, at Boston; by the Rev. W. Dunbar, at Applegarth Manse, DUMFRIES-SHIRE; and by the Rev. C. Clouston, at Sandwick Manse, ORKNEY.*

Days of Month.	Barometer.				Thermometer.				Wind.				Rain.								
	Chiswick.		Dumfries-shire.		Orkney, Sandwick.		Chiswick.		Boston.		Dumfries-shire.		Orkney, Sandwick.		Chiswick.	Boston.	Dumfries-shire.	Orkney, Sandwick.			
	Max.	Min.	9 a.m.	9 p.m.	9 a.m.	4 p.m.	8 a.m.	Min.	Max.	8 a.m.	4 p.m.	8 a.m.	9 a.m.	9 a.m.	4 p.m.	8 p.m.					
1844. Jan.																					
1.	29.606	29.562	29.14	29.36	29.36	29.15	29.32	27	40	46	31½	33	31½	w.	calm	sw.	n.	.45	.08	.22	
2.	29.898	29.485	29.20	29.53	29.56	29.45	30	14	30	45	25	30	32	n.w.	calm	n.	n.	.24			
3.	29.860	29.626	29.63	29.59	29.47	29.50	42	32	28	39	13½	38	30	w.	calm	sw.	w.	.05	.13		
4.	29.726	29.510	29.20	29.44	29.50	29.29	51	34	40	40½	33	28	38	sw.	calm	e.	se.	.40	.19	.87	
5.	29.569	29.214	29.19	29.19	29.02	29.15	28.92	44	48	50	38½	40	43	sw.	w.	sw.	calm	.06		.05	
6.	29.407	29.109	28.77	28.90	29.12	28.92	29.14	26	47	49	40½	42	43	n.w.	calm	sw.	ese.	.03	1.00	.58	
7.	29.656	29.538	29.12	29.34	29.55	29.25	29.14	44	35	35.5	40	30	40	n.	n.w.	ene.	sse.				
8.	30.125	29.834	29.46	29.81	30.08	29.91	30.05	44	37	39	34	40	40	se.	calm	ne.	s.	.08			
9.	30.320	30.303	30.03	30.09	29.92	29.94	29.80	33	37	39	34	40	40	n.	calm	ne.	s.				
10.	30.291	30.199	29.88	30.03	30.15	29.80	29.99	48	30	35	44	33	44½	se.	calm	ne.	n.w.	.01	.19	.19	
11.	30.338	30.304	29.94	30.21	30.18	30.12	30.01	46	30	41	44	37	46	sw.	calm	s.	s.	.76	.07	.05	
12.	30.237	29.992	29.88	29.95	29.98	29.80	29.85	35	37	45	39	45½	44	sw.	calm	n.w.	ssw.	.03	.40	.44	
13.	30.013	29.988	29.60	30.03	30.13	30.08	30.27	44	35	37	42	33	40	n.	calm	sse.	n.	.03	.40	.07	
14.	30.312	30.116	29.80	30.29	30.36	30.40	30.25	40	26	37	39	52	35½	ne.	calm	ne.	calm	.01	.08	.95	
15.	30.346	30.317	30.05	30.30	30.27	30.10	30.16	40	20	28.5	36	22½	45	ne.	calm	n.w.	w.			.07	
16.	30.292	30.133	29.98	30.18	30.19	30.11	30.06	39	32	26.5	41½	32	44½	ne.	calm	wsw.	w.				
17.	30.197	30.180	29.85	30.13	30.12	30.10	30.02	45	39	36	40	29½	45½	n.	calm	wsw.	w.			.13	
18.	30.190	30.150	29.82	30.05	29.88	29.81	29.54	44	38	34	48	30	42	n.w.	calm	w.	w.			.07	
19.	30.007	29.932	29.56	29.76	29.81	29.63	29.78	48	37	45	48½	40	32	w.	calm	w.	n.w.			.17	
20.	30.017	30.003	29.59	29.90	29.89	29.88	29.80	48	28	34.5	40	32½	34	n.	w.	n.w.	n.			.05	
21.	29.995	29.919	29.48	29.75	29.83	29.73	29.78	47	34	41	47	35	41½	sw.	w.	w.	n.			.04	
22.	29.919	29.865	29.45	29.80	29.89	29.78	29.92	49	26	37	41	27½	42½	sw.	w.	n.w.	n.			.16	
23.	30.100	30.026	29.66	29.95	30.00	29.90	29.97	45	35	38	41	28½	45	ne.	calm	w&sw	w.			.12	
24.	30.242	30.184	29.79	30.02	30.06	30.00	29.90	43	23	37.5	45	35½	45½	sw.	calm	sw.	w.			.04	
25.	30.262	30.188	29.79	29.98	30.04	29.71	29.86	46	36	39	48½	40	46	sw.	calm	w.	w.	.01		.13	
26.	30.282	30.225	29.79	30.11	30.16	29.96	30.06	48	27	36	48½	36	41½	n.w.	calm	n.w.	n.w.	.02		.17	
27.	30.249	30.134	29.77	30.03	29.95	29.88	29.68	50	39	44	50	43	47	sw.	calm	w.	w.	.02		.04	
28.	29.900	29.833	29.58	29.62	29.70	29.30	29.50	54	32	46.5	50	43½	41	sw.	calm	w.	w.	.02		.33	
29.	29.977	29.745	29.34	29.71	29.40	29.29	28.90	54	44	37.5	51	34	38	sw.	calm	w.	s.	.04		.25	
30.	29.843	29.634	29.30	29.51	29.49	29.12	29.22	51	32	45	48	36½	39½	w.	w.	w.	w.	.03		.60	
31.	29.811	29.799	29.33	29.58	29.78	29.42	29.70	41	26	35.5	48½	30½	30	n.w.	w.	w.	n.w.	.15	.24		
Mean.	30.031	29.908	29.57	29.810	29.840	29.698	29.720	45.87	31.74	37.9	44.5	33.4	40.20					2.24	1.68	2.60	4.42

# THE ANNALS AND MAGAZINE OF NATURAL HISTORY.

No. 84. APRIL 1844.

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XXX.—*On the Zoological condition of Chalk Flints, and the probable causes of the Deposit of Flinty Strata alternating with the Upper Beds of the Cretaceous Formation.* By D. T. ANSTED, M.A., F.R.S., Professor of Geology in King's College, London, and Fellow of Jesus College, Cambridge.

THE occurrence of siliceous bands—the silex being exhibited in detached fragments called flints—regularly bedded with the upper portion of the Chalk formation in many parts of Europe has always been considered a geological phenomenon very difficult to account for, and the explanations hitherto offered have been extremely unsatisfactory, because they have assumed a mineral condition for the silica which we are not warranted by experience in supposing to be possible, and which no one who fairly examines all the circumstances of the deposit can at all conclude to be probable.

Dr. Buckland has supposed, for instance\*, that each new mass of calcareous and siliceous matter as it was discharged formed a bed of pulpy fluid at the bottom of the then existing ocean, and that the separation of the siliceous from the calcareous ingredients was modified by attractions drawing the particles to certain centres. Dr. Mantell again in 1833 remarks†, speaking of a specimen of *Ventriculite*, “the appearance of this specimen seems to warrant the conclusion, that at the period of its mineralization the silex was in the state of a thick viscid fluid.” And in 1838 Mr. Lyell, referring to Dr. Buckland's account already quoted, adds, “Nevertheless the separation of the flint into layers so distinct from the chalk is a singular phenomenon, and not yet accounted for. Perhaps, as the specific gravity of the siliceous exceeds that of the calcareous particles, the heavier flint may have sunk to the bottom of each stratum of soft mud.”

I need hardly say more in illustration of my remark, that the origin of flints in chalk is a phenomenon not yet satisfactorily explained: nor, indeed, do I venture to assert that the view I

\* *Geol. Trans.* 1st series, vol. iv. p. 422. The date of this paper is 1816.

† *Geol. of South-east of England*, p. 102.

am myself inclined to take, and which I am now about to advocate, is borne out entirely by positive observation. I think, however, I shall be able to offer a reasonable and probable account, and one more consonant with the results of minute investigation than any of those I have quoted.

Of the lithological and geological character of the chalk and the layers of flint imbedded in it I need say very little. Chalk itself is a nearly pure carbonate of lime, having a small quantity of iron as well as silica distributed through it, the particles of the former mineral being collected into nodules irregularly placed, and usually crystallized with sulphur in the form of pyrites\*. Careful microscopical investigation has distinctly proved that a large proportion of the solid chalk is of animal origin, and the substance most nearly resembling it in a recent state is a white calcareous mud formed in coral lagoons by the decomposition of recent soft corallines. The flint in chalk consists of about 98 per cent. of pure silica, and is usually of dark colour internally, but each nodule or separate portion of a layer is surrounded with a thin coat of a white colour and a coarser or more saccharoid texture, evidently owing to the presence of a certain proportion of chalk. The flints occur either in detached nodules or tabular masses; the latter forming layers of various thickness alternating with a much greater though also variable thickness of chalk, and the former more rare and still having a tendency to stratified arrangement. Flints are also sometimes found filling up veins and traversing the chalk at various angles. Almost the whole however of the siliceous matter of the upper chalk is distributed in tabular masses, and it is chiefly therefore to those that I shall refer, although I may mention here, that there is no apparent difference in structure between the tabular flints and those which occur detached or filling up veins.

In order to discover the conditions under which siliceous matter may have formed in the chalk, and the cause of its appearing in layers regularly stratified and distinctly separate, it is clear that we must investigate minutely not only the chemical condition of the mineral, which is a very insufficient guide, but also its mechanical condition; and this must be done in two ways, examining first its structure by the aid of a powerful microscope, and then observing its external relations both with the chalk itself and also with the organic bodies imbedded in it. We must also pay some attention to the nature of those silicified fossils of whose organic origin there can be no doubt.

\* A small proportion of argillaceous matter occurs in the lower chalk, but this proportion is smaller as we examine specimens higher up in the formation, until at length in the white chalk with flints it can no longer be traced.

It is to Professor Ehrenberg that naturalists are indebted, first for the discovery of the infusorial and other animalcules of the chalk, and next for the determination of various organic remains in the solid substance of flint. These observations induced Mr. Bowerbank in 1840 to examine with care numerous specimens of chalk flint, and in doing so he was struck by the frequent recurrence of small patches of brown reticulated tissue constantly presenting nearly the same appearance. "The occurrence of this tissue," he observes in a paper published in the Transactions of the Geol. Soc. (2nd ser. vol. vi. p. 181), "combined with the circumstance of finding spicula exhibiting nearly the same form and size, and always occurring in about the same proportion along with numerous foraminated shells and other extraneous bodies, strongly induced me to believe that the brown reticulated tissue was a portion of the remains of the organized body, the shape of which was represented by the flint nodules; and the indications thus observed equally inclined me to believe, that if these flints were fossil organized bodies, they would almost inevitably prove to be sponges." On the careful examination of a considerable number of flints obtained from various localities, he found in all a perfect accordance in the structure and proportion of this tissue and of the spicula. I proceed to give a short account of the result of these experiments.

When thin slices of flint are examined under a good microscope as transparent objects with a power of 120 linear, they present the appearance of a turbid solution of decomposed organic matter, containing fragments of extraneous bodies and portions of a dense opaque matter of a brown colour and sometimes of considerable size. Treating these latter as opaque objects, they are readily distinguished to be made up of numerous cylindrical contorted canals with occasional orifices of larger diameter, the walls of the canals presenting an appearance of having been formed of thin network like that observable in sponge, while spicula and minute foraminated shells are sparingly distributed over the whole. The smaller of the canals correspond with those by which the animal of a sponge introduces the sea-water into its substance, the larger ones being those for the excretion of the water.

But this is not all. Even when the reticulated tissue is not to be traced, its presence is still often indicated either by the form in which the siliceous matter is moulded upon the tissue once there, or by the spicula and minute shells which are suspended equally in all parts: not being precipitated to one particular portion, as if they had been deposited in a fluid, but entangled in the organized matter, which had retained its form and texture during the process of silicification. An examination of the chalky band forming the exterior of the flint also exhibits a peculiar appearance under

the microscope, deep circular excavations being traceable, and small fragments of shells and other extraneous matters being partly imbedded in and partly adhering to the surface.

Mr. Bowerbank having thus examined and described the nature of the flint which forms tabular masses interstratified with the chalk, extended his observations to the internal casts of sea-urchins and other shells of Radiata common in the chalk, some of which are wholly and others only partially siliceous. In these cases, on clearing away the chalk with care, it appeared that the flint did not in any case present an even surface, such as would have resulted from a fluid depositing the siliceous matter, but, on the contrary, that the surface was undulated, projecting above the surrounding parts, and offering the same characters as those observed in flint nodules. It therefore appeared that these remains must be referred to the same origin as the tabular flint.

Mr. Bowerbank, from such observations as these, has arrived at the conclusion, that all flint, in the common acceptation of the term, has been formed upon spongy bodies as nuclei. Anxious to verify so far as I could these conclusions and convince myself of their correctness, I have now to record an observation of my own of a similar kind.

In this experiment, which I look upon as to a certain extent an *experimentum crucis*, I selected from the collection in the Woodwardian Museum\* a small specimen of the purest black flint, in which a common *Cidaris* of the chalk was imbedded, part of the shell projecting beyond the surface of the flint and that part still consisting of carbonate of lime. The general appearance of the specimen is strongly in favour of the idea of a pulpy tenacious fluid having received on its surface the sinking shell, whose weight was not sufficient to cause it to sink entirely beneath the surface.

Examining first of all fragments of the flint not contained within the shell, they presented the appearance described by Mr. Bowerbank and figured in the Geol. Trans.; they did not indeed exhibit distinct marks of reticulated tissue, but there could be no doubt whatever of their organic origin. I then selected several small portions chipped off from within the fossil, and one of these, although exceedingly minute, was fortunately sufficiently uniform in its texture to admit of employing a very high power. I was thus enabled clearly to distinguish the peculiar reticulated tissue, the existence of which puts beyond question the nature of the organized being upon which this portion of the silica had formed. The distinct texture was not made out without a power of 1200 linear, and the appearance was still more striking with a power of 2500. In this case then, the substance which has partially filled a shell not broken and resting on the surface of a flint, is itself of the

\* The Geological Museum in the University of Cambridge.



same spongy origin as the flint on which it reposes. The surfaces however within and without this shell are not on the same level, but the flinty matter has reached considerably higher on one side than on the other, and has entered the shell on the side opposite to that on which it has the highest surface. This latter fact is clear from the perfect condition of the shell. But we cannot suppose a thick pulpy fluid to have entered the shell at its lower part and have risen in it on the opposite side above its general level, although there is no difficulty in conceiving that a sponge so entering an inclosed space should work its way upwards in the endeavour to reach the open water.

With regard also to the surface of the flint and its partially calcareous appearance, it is readily explained, if we suppose the flint to have been originally a sponge; in that case a deposit of calcareous mud taking place upon it would penetrate only to a very small depth, while the interior space would remain filled with pure water. By far the greater portion of the sponge would thus be preserved from the operation of other agents while the process of silicification was going on, provided it is the case (as we have every reason to suppose) that the siliceous forms readily on such horny organic matter as is found in all sponges.

The conclusions thus arrived at as to the origin of tabular flint are greatly strengthened when we consider the nature of the commonest chalk fossils that occur silicified, and the peculiar appearances often presented by chalk flints.

By far the most abundant of those fossils in the chalk which attain to any size are the remains of spongy Zoophytes, known under the generic names of *Ventriculites*, *Choanites*, *Paramoudra* and *Polypothecia*.

The *Ventriculite* is found of various shapes and sizes, and its original texture was evidently soft, and yielding readily to pressure. It appears to have possessed externally a reticulated surface, the inside being porous and bearing considerable resemblance to dried sponge. Specimens occur in every intermediate form between that of a simple elongated cone and a flat circular disc, the thickness of the sides being considerable when the cone is short, thinner when more extended, and thinnest when completely expanded.

The *Choanites* differ from *Ventriculites* by the possession of a circular opening in the upper part, which continues gradually diminishing to near the base. The general proportions are also somewhat different and the dimensions smaller.

The *Paramoudra*, or Potstones, are only common in particular localities; but there attain a considerable size, measuring from one to three feet in height, and about half that in diameter. They are chiefly found in the North of Ireland and in chalk-quarries

near Norwich, and are generally insulated in the chalk, sometimes lying horizontal and sometimes inclined or erect, but although silicified, not apparently connected with the layers of flint. These singular fossils are cylindrical, fusiform or cup-shaped, and they are occasionally found planted as it were one above another, the upper one being closed at the top and attached to the open lip of that immediately below. They all have a hollow open axis filled with chalk, and a central tube about the thickness of a finger, and consisting of siliceous particles, is traceable through the chalk from the base to the vertex\*. All these three genera were doubtless affixed by radicles to solid rock and possessed no powers of locomotion.

Lastly, the *Polypothecia* represented the branching sponges as the former genera did the large cup-shaped sponges of the existing seas. They are frequently found inclosed in flint, the *Polypothecia* having in this case been partly surrounded by another sponge and silicification taking place in the whole mass together. The branching sponge however not decomposing at the same rate as the other, we often find its remains represented by a loose cast in the substance of a common flint.

It appears then, that in the zoological condition of those flints which offer external proof of their organic origin as well as in the microscopic structure of the others, which are regularly stratified in tabular masses, the principal, if not the only, accumulations of siliceous matter in the chalk are upon sponges; that singular class of organic beings, the very fact of whose possessing life has sometimes been doubted. It only now remains to consider how far the external relations of such fossils with the chalk itself renders it probable or otherwise that all chalk flints are of spongy origin.

In those cases in which the flint is perfectly tabular, these relations can of course have no further interest than that which arises from the condition of the surface of the flint which we have already considered; but it is not an uncommon accident that portions of some organic bodies should adhere to or be imbedded in the flint, sometimes projecting from it to a considerable distance and offering strange and grotesque forms. Such appearances are easily explicable on the hypothesis of sponges growing at the bottom of an ocean, in which from time to time various fragments of shells, &c. were deposited and partly inclosed by the sponges; and it is not at all necessary to assume that these fragments were

\* The organic nature of the siliceous matter in the *Paramoudra* is sufficiently clear from the evidence of Prof. Ehrenberg on this subject. He states, that although he failed to discover in them the structure of well-preserved sponges, he could perceive the contorted remains of decomposed sponges along with the remains of Infusoria.—Annals of Nat. Hist. vol. ii. p. 162.

received upon a mass of semifluid siliceous matter, without the existence of which it has hitherto been thought impossible to account for the phænomena. The microscopic structure is in all these cases precisely the same, and the evidence is therefore conclusive.

And finally, the composition of the chalk itself and the nature of its organic remains, requiring as these do the lapse of a long period of time, may be considered to strengthen the probability of the organic origin of the siliceous part of the formation. There is, we know by experience, a tendency in different substances, when distributed irregularly, to accumulate round certain points of attraction, and by the process of segregation separate themselves even from others with which they are in contact, and this is still more the case when any particles of the same substance as that about to be grouped are present in any part of the whole mass. Sponges are known to contain siliceous spicula which also are constantly seen in chalk flints, and thus we have additional grounds for supposing that the layers of flint were formed upon spongy bodies as their centre.

It is only necessary now in conclusion to put into general language the view which results from the considerations I have offered with reference to the internal structure and external appearance of chalk flints, and their relations with the fossils of the chalk and with the chalk itself.

I suppose that for a long period the gradual deposit of chalk may have gone on undisturbed, the material being derived partly from animals living in the water at the time, and partly, perhaps chiefly, from the degradation of calcareous and coralline rocks at a distance, the silt being conveyed by marine currents and evenly deposited. In this way I presume that the formation of the lower and middle chalk may be fairly explained. At the termination of these deposits I imagine that there succeeded a period of tranquillity, the cretaceous mud ceasing to be deposited, and the bottom of the sea becoming hard and fit for the habitation of innumerable sponges, which lived and flourished there. In these we see, as I believe, the elements of the first layer of flint in the chalk, and I suppose that after they had continued to exist for a certain time, there occurred the commencement of a series of subterraneous disturbances in some part of the bed of the ocean of the nature of undulations, elevating the bed of the sea in some parts and depressing it in others. These disturbances I also suppose to have been accompanied by the eruption of a considerable quantity of hot water holding silica in solution\*. The elevation

\* The boiling springs of the Geyser in Iceland contain 31·38 grs. of silex per gallon of water, and even the mineral waters of Bath contain 20 grs. in ten pints and a half.

of calcareous beds, the previous denudation of whose exposed surface had formed the lower and middle chalk, would now again be the source of similar deposits, and the sponges would begin to be covered by a calcareous mud, and at the same time the siliceous matter would begin to deposit itself upon the organized substance of the sponges. After an interval corresponding to the deposit of the first layer of chalk above the flints I suppose another pause to have occurred, and a similar growth of sponge to have taken place and been succeeded by other disturbances, and so that such alternations of tranquillity and volcanic eruption continued till the close of the cretaceous period.

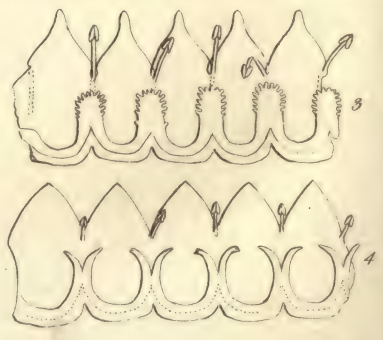
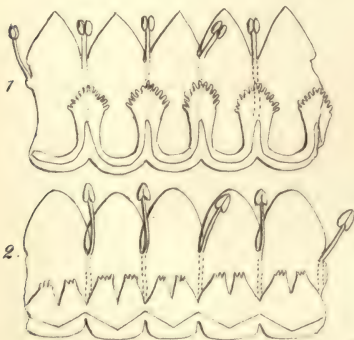
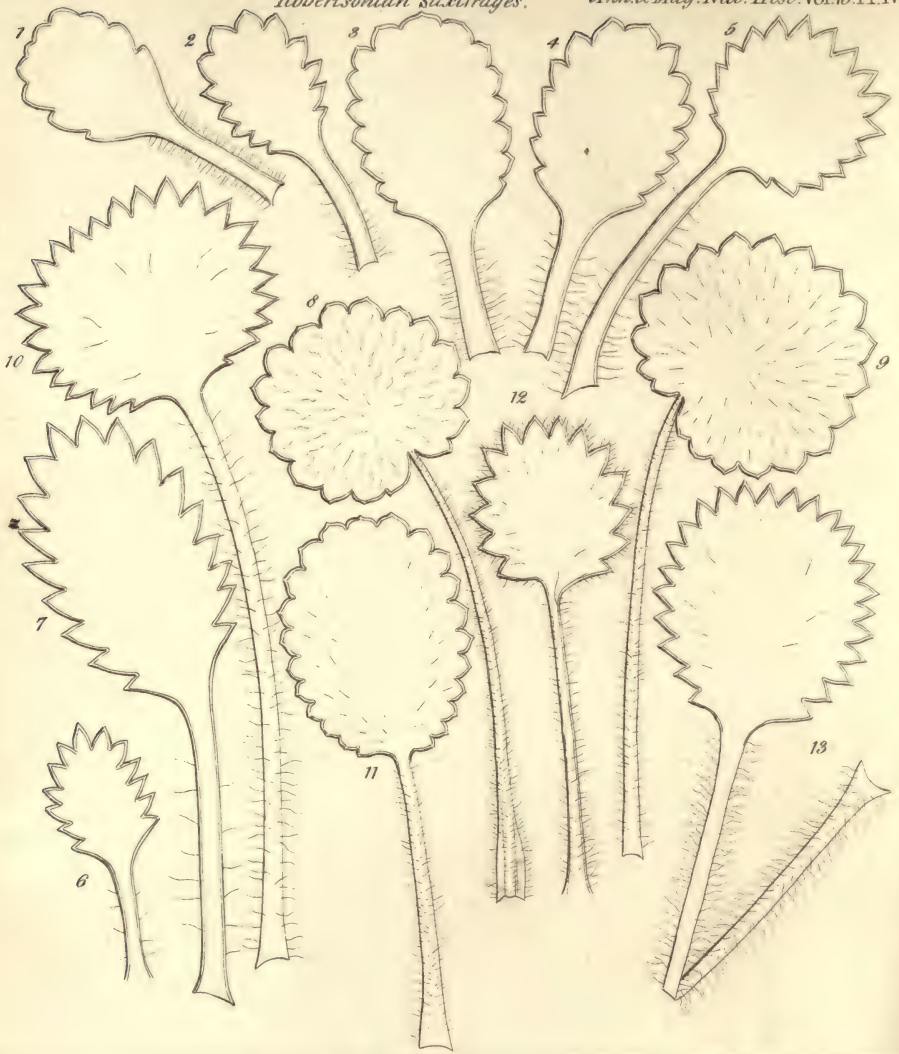
Without some such cause, I cannot see any reasonable explanation of the fact, that while flints and siliceous matter are found abundantly in other beds and under various circumstances, it scarcely ever occurs in layers, except in a certain part of the cretaceous system, that part not presenting any other difference whatever, either mineral, geological or zoological, with the immediately preceding strata: neither can I in any other way account for the fact, that single layers of flint and chert occur in other formations\*, but not such alternations of flint and calcareous matter as we find in the chalk, although the origin of the flint appears to have been the same in all cases.

And finally, I am not assuming in these alternations and periodical eruptions any extraordinary or improbable agent. Immediately subsequent to the cretaceous period, and even during its continuance, we have the most decided proof of the action of disturbing forces on the grandest scale—forces to which we owe the disruption of the chalk in the Wealden district, and the positive and complete denudation of strata several hundred feet thick and many thousand square miles in extent, and disturbances, which in the North of Ireland and elsewhere were accompanied by the eruption of igneous matter to an extent rarely if ever since equalled.

I am also entitled to assume not only the possibility but the probability of the eruption of hot water containing silica in solution, and it is not impossible that this may have gone on constantly and without interruption during the whole period; while with regard to the existence of other calcareous rocks to whose denudation the chalk is owing, I have only to point to the absence of calcareous rocks overlying the beds in the West of England, and the fact that many oolitic outliers of limestone occur distant from the main formations, but bearing marks of

\* In the freestone of Portland, in the mountain limestone of the Mendip Hills, in the oolitic limestone of Pickering in Yorkshire, near Poligny (on the north-west of the Jura mountains), and in the greensand of Black Down, &c.—See Geol. Trans. 1st ser. vol. iv. p. 420.





having been formerly part of them. We know also from the observations of Mr. Darwin, that many large tracts in the Southern hemisphere are undergoing undulations of surface similar to those required by my hypothesis, so that on the whole I think I have left no point exposed, in which the assumption of a cause that is insufficient or improbable under the circumstances will invalidate my argument. After all it must be understood that I only offer an hypothesis that appears to me probable to explain a phenomenon of great and acknowledged difficulty, and no one can be more thoroughly aware than myself that there must always be a wide and strongly marked distinction between such hypothetical explanations and the numerous well-founded deductions with which geology abounds, and which are unchangeable and unanswerable, because founded solely on the consideration of undoubted facts. I need not however add any remarks to illustrate the benefit resulting from the fair and unprejudiced discussion of the class of explanations which I now offer.

Jesus College, Cambridge, March, 1844.

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XXXI.—*On some species of Cuscuta*. By CHARLES C. BABINGTON, M.A., F.L.S., F.G.S. &c.\*

[With a Plate.]

It is now some years since my attention was first drawn to the structure of the corona, the prominent parts of which form what are usually denominated scales, in the interior of the tube of the corolla of the genus *Cuscuta*; but of which the existence in some species, *C. europæa* for example, is denied by several eminent botanists; and having soon become convinced of its presence in that plant, and also that the general shape and direction of its processes would furnish valuable characters for the discrimination of species in this genus, in which so few tangible points are afforded for that purpose, I presented to the Linnæan Society of London the results of an examination of those species which were within my reach in the form of two short papers which it did me the honour to publish in its Transactions, vol. xviii. p. 213 and 563.

Having since that time become more practised in the examination of such minute and inconspicuous objects, I have ascertained that the figures then published do not represent the characters of those curious organs with sufficient accuracy, and have therefore carefully prepared other drawings of the interior of the flowers of the species gathered in Britain, with the exception of *C. Epilinum*, which is well represented by Mr. Sowerby in the 'Suppl. to Eng. Bot.' (vol. iii. tab. 2850), and in which the cha-

\* Read before the Botanical Society of Edinburgh, Feb. 8, 1844.

racters derived from other more apparent parts of the flower are so satisfactory as to render it unnecessary to lay much stress upon these obscure organs. It will be seen that a careful attention to the general form of the scales and their connecting membrane, neglecting the minute and variable subdivisions, furnishes us with valuable distinctions for the separation of plants whose outward appearance is extremely similar, but which are constantly found to be parasitical upon plants of different structure or which inhabit distant countries.

Since attention has been drawn to these organs, many botanists have endeavoured to form some theory by which to account for their peculiar position in the flower. Their being placed opposite to the stamens and alternating with the segments of the corolla has presented so much difficulty, that no botanist, as far as I am informed, has ventured to express a positive opinion concerning them, although many have supposed that they represent an inner whorl of stamens in an altered condition. If that is the case, we ought to find the scales alternating with the stamens and not opposite to them. It thus became necessary to suppose either that an intermediate whorl was totally lost, giving three whorls of stamens to the normal state of the flower; or, that the scales represented some other organs, concerning which no conjecture has been published.

It will be seen from the sketches which accompany this paper that I have had the good fortune to meet with an undescribed Indian species, *C. approximata* (Bab. MSS.), in which the scales differ so much from their usual appearance as to lead me to form a theory concerning their origin, which, if allowed to be probable, will tend greatly to confirm the views of those botanists who suppose them to represent a whorl of stamens. In all the species, which have been carefully figured, the scales are represented as being separated from each other by a considerable space, and each of them is placed exactly under the insertion of the neighbouring stamen; and although in some cases (*C. europæa* for example) they are rather deeply bifid, still this bifurcation takes place in such a manner as not in the least to lead to the idea that the two parts are not portions of one and the same organ. In *C. approximata* (Pl. IV. fig. 3) each scale (continuing the usual nomenclature for convenience) is more deeply divided than in any species that has fallen under my notice, or of which I have seen a figure, and the lobes diverge from each other in a very remarkable manner, meeting below at a considerable angle. Again, the space between each scale, which in most, if not all the other species, is broad, deep and rounded, in *C. approximata* is very narrow, and terminates below in an extremely acute angle. Thus the appearance of the corona would inevitably lead a person previously unac-



quainted with the usual structure of the flowers of *Cuscuta* to the opinion, that five broad, blunt, deeply bifid processes were placed alternately with the stamens and opposite to the segments of the corolla; or in other words, that a whorl of organs existed exactly in the position which would be occupied by an internal whorl of stamens; and, if given to theorizing, he would at once decide that these organs were abortive and transformed stamens, and that in its normal condition *Cuscuta* was provided with two whorls of stamens, of which the outer one alone attained its perfect development.

It ought however to be stated, that even in *C. approximata* the line of separation between the corona and the corolla rises higher up the latter just under each stamen, as is the case in the other species. In each of my sketches I have endeavoured to represent the place of this separation by a line intervening between the upper edge of the corona and the base of the corolla; but it is necessary to add, that the exact point at which the free corona begins is often determinable with considerable difficulty, owing to its extreme thinness and transparency. It is possible therefore that the course of this line may not be found to be precisely as I have represented it; indeed in *C. europæa* it is little more than conjectural.

From this it will be justly deduced, that I have come to the conclusion that the scales are indeed abortive stamens; and I would endeavour to explain their peculiar position by supposing that each scale (as seen in *C. Epithymum* for example, fig. 1) is formed of two totally distinct parts, which, from some unknown cause, have become closely connected together by their edges, so as apparently to form but one organ situated beneath the stamen, whilst in reality the abortive stamen is represented by a deeply bifid membrane, each lobe of which is more or less closely soldered to the neighbouring lobe of the next abortive stamen; thus forming a whorl of scales, placed opposite to the perfect stamens, which appear to be simple, but are in reality composed of two parts. That this theory is not so wild as it might at first appear to be, is shown by the existence of a similar structure in the stigmatic rays of the *Papaveraceæ*, as has been proved by Mr. Robert Brown, and also, from independent observations, by Mr. Warren Howell. Let it however be remembered that I only put this theoretical explanation forward for the consideration of botanists, being well aware that much more extended observation is requisite before it can be considered as an established fact.

I now proceed to characterize the species to which the drawings refer, and as they all have filiform leafless stems and germinate in the ground, but afterwards become wholly parasitical, I

have not considered it necessary to describe any parts except the flowers.

1. *C. Epithymum* (Murr.); florum glomerulis bracteatis sessilibus, tubo corollæ cylindrico, squamis convergentibus fimbriatis subacutis spathulatis basi distantibus, calyce tubo corollæ multo breviori, germine spherico, stigmatibus filiformibus. (Pl. IV. fig. 1.)

*C. Epithymum*, Linn. *Syst. Nat. ed. Murray*, p. 140.

Flowers small. Calyx reddish; sepals rhomboidal-ovate, apiculate. Corolla white, with spreading acute segments. Anthers roundish-oblong, blunt or slightly notched at the end. Scales nearly as long as the tube of the corolla, widening from below up to the commencement of the fringed part, then narrowing in a triangular manner so as to be rather acute at the end, separated by rounded spaces, but at the same time connected (as is the case in all the species) by a free membrane forming a continuous deeply lobed corona, situated at the base of the corolla, to which it closely adheres. Stigmas filiform.

This plant is not uncommon in England, where it is found to grow upon shrubby plants, such as *Erica*, *Ulex*, *Sarothamnus*, &c.

2. *C. Trifolii* (Bab.); florum glomerulis bracteatis sessilibus, tubo corollæ cylindrico, squamis fimbriatis apice rotundatis lateribus parallelis basi distantibus, calyce tubo corollæ breviori, germine obovato, stigmatibus filiformibus. (Pl. IV. fig. 2.)

*C. Trifolii*, Bab. in *Phytol.* (Feb. 1843), vol. i. p. 467.

*C. Epithymum*,  $\beta$  *Trifolii*, Bab. *Man. Br. Bot.* p. 302.

Flowers rather larger than those of *C. Epithymum*, white. Calyx occasionally tinged with red; sepals ovate-lanceolate, acute, often nearly or quite as long as the tube of the corolla. Limb of the corolla spreading, with very acute attenuated segments. Anthers oblong, apiculate, the lobes rather deeply separated below. Scales nearly as long as the tube of the corolla, of equal width throughout, blunt and rounded at the end, separated by rounded spaces. Germen narrowed below. Stigmas filiform.

In general appearance this plant closely resembles *C. Epithymum*, but is parasitical upon herbaceous *Leguminosæ*. Of late years it has occurred so frequently upon clover (*Trifolium pratense*) in the counties of Norfolk, Suffolk and Essex, as to have destroyed a considerable part of the crop. In Loudon's 'Gardener's Magazine' (vol. iii. p. 208) it is stated that the seeds of *C. europæa* are not unfrequent amongst Dutch clover-seed, and that "the plant is a great nuisance in Holland and Flanders." As a considerable quantity of the clover-seed sown in England is imported from those countries, and as I have never heard of *C. europæa* occurring upon clover, I am led to suspect that the plant

which is so frequent in that position in Holland is the *C. Trifolii*, but not having been able to obtain either specimens or good descriptions of the Dutch plant, I am unable to determine with certainty. My friend Mr. G. S. Gibson of Saffron Walden informs me, that one of the crops of clover in which the Dodder was found was also infested with large quantities of *Barkhausia setosa*, which is a native of the European continent, and was undoubtedly introduced with the clover-seed. *Centaurea solstitialis* occurred in a similar manner in another field. Bertoloni states (Fl. Ital. vol. iii. p. 69) that his *C. europæa* "pestis pratorum est, in quibus serunt *Trifolia*, aut *Medicaginem sativam*;" but as he describes the plant as not possessing any scales beneath the stamens, I am in doubt to what species his description refers. Dr. Lindley considers our plant to be the *C. sulcata* (Roxb.), of which specimens are preserved in the great Indian herbarium formed by Dr. Wallich, and presented to the Linnæan Society by the Hon. East India Company (no. 1320); they have capitate stigmas, and are therefore a different species, neither do they grow upon Leguminous plants. After a careful examination of the published characters of the species of *Cuscuta*, I have been led to the conclusion that this plant, and also the following, are still undescribed, and have therefore ventured to publish them as new.

3. *C. approximata* (nova species); florum glomerulis bracteatis sessilibus, tubo corollæ ventricoso vix calyce longiore, *squamis approximatis bifidis: lobis divergentibus latis apice fimbriatis truncatis*, germine ovali, stigmatibus filiformibus. (Pl. IV. fig. β.)

Flowers small, whitish, slightly stalked. Sepals rhomboidal-ovate, acute, about as long as the tube of the corolla. Segments of the corolla spreading (?), blunt. Anthers cordate. Scales shorter than the tube of the corolla, widest at the base, deeply bifid; the lobes truncate, fringed at the end, widely separated at the top, but closely approximating to those of the adjoining scales, from which they are divided by a narrow space which terminates below in a very acute angle. It would perhaps be more correct to describe these parts, not as five scales, but as a continuous corona, deeply divided into ten truncate lobes, which are disposed in pairs alternating with the stamens. Germen oval, narrowed above and below, as far as I can judge from the examination of soaked specimens, not having seen it when fresh. Stigmas filiform.

This plant was found upon *Melilotus sativa*, which had been raised from seed distributed by Col. Sykes, Director of the Hon. East India Company, under the name of Bokhara Clover. I am indebted to my friend the Rev. W. S. Hore of Devonport for the specimens examined.

Having been unable to find a trace of this plant in books, it

is now named and described as new, the name being derived from the peculiar form of its corona, concerning which I have already spoken at some length. In general appearance it closely resembles *C. Trifolii* and *C. Epithymum*.

4. *C. europæa* (Linn.); florum glomerulis bracteatis sessilibus, tubo corollæ per anthesin cylindrico, fructiferæ ventricoso, *squamis adpressis erectis bifidis basi distantibus*: lobis divergentibus attenuatis, *calyce corolla multo breviori*, stigmatibus filiformibus. Pl. IV. fig. 4.  
*C. europæa*, Linn. *Sp. Pl.* p. 180. *excl.* var.  $\beta$ .

Scales closely adpressed to the tube of the corolla, always present, narrow, bifid; their lobes slender, very acute, entire, or with two or three obscure teeth at the end; each scale separated from its neighbour by a broad rounded space. Stigmas filiform.

Parasitical upon herbaceous plants, such as *Urtica*, *Humulus*, *Carduus*, &c.

St. John's College, Cambridge, Feb. 1, 1844.

XXXII.—*Catalogue of Irish Entozoa, with observations.* By O'BRYEN BELLINGHAM, M.D., Fellow of and Professor of Botany to the Royal College of Surgeons in Ireland, Member of the Royal Zoological, Geological and Natural History Societies of Dublin, &c.

[Continued from p. 174.]

## Order 2. ACANTHOCEPHALA.

(Derived from ἀκανθα, *spina*, and κεφαλή, *caput*.)

THE order *Acanthocephala* contains only a single genus, *Echinorhynchus*.

The characters of the order are as follows:—

The body is cylindrical or bladder-like, subelastick, obtuse at both extremities, provided with a retractile proboscis, which is armed with minute recurved spines arranged in a regular series. The intestinal canal is complete; the sexes are distinct; females oviparous.

The species are numerous, and occur in all the classes of vertebral animals; they are frequently found attached to the mucous membrane of the alimentary canal by means of their proboscis, consequently their powers of locomotion must be very limited.

## Genus 9. ECHINORHYNCHUS.

(Derived from ἐχῖνος, *echinus*, and ῥόγχος, *proboscis*.)

This is the only genus in the order; it was named by Müller,

and the term has been adopted by all zoologists since. The species inhabit principally the alimentary canal; they are most numerous in birds and fish, less common in mammalia, and still more rare in reptiles.

Two divisions have been made of the genus: in one the neck and body are unarmed; in the other this part is provided with spines; the species are further subdivided according to the shape of the proboscis, and to the absence or presence of a neck.

*Collo corporeque inermibus; proboscide cylindrica vel lineari.*

- |                                       |   |  |
|---------------------------------------|---|--|
| 1. <i>Echinorhynchus angustatus</i> * | } | Stomach and intestine of perch ( <i>Perca fluviatilis</i> ).             |
|                                       |   | Intestine of eel ( <i>Anguilla acutiros-tris</i> ).                      |
|                                       |   | Intestine of trout ( <i>Salmo Fario</i> ).                               |
|                                       |   | Intestine of rudd ( <i>Cyprinus Ery-throphthalmus</i> ).                 |
|                                       |   | Intestine of gudgeon ( <i>Cyprinus Gobi</i> ).                           |
|                                       |   | Intestine of three-spined stickleback ( <i>Gasterosteus aculeatus</i> ). |
|                                       |   | Intestines of pike ( <i>Esox Lucius</i> ).                               |

\* The *Echinorhynchus angustatus* is common in the perch; the colour of this species is reddish yellow or white; the longest specimen I possess measures  $4\frac{1}{2}$  lines, including the proboscis; the body is nearly cylindrical, a little wider anteriorly however than posteriorly; the proboscis is cylindrical, about two-thirds of a line in length; the neck is short, seldom protruded fully, and nearly of the same diameter as the proboscis; the caudal pouch in the male is large: little difference in size exists between the male and the female; the male however is much rarer than the female.

This species may be preserved in fresh water for a sufficient length of time to observe the manner in which the proboscis is protruded and retracted; as far as I have seen, the only mode in which this organ is retracted is by inversion upon itself, that surface which had been exterior when it was protruded becoming internal when it was retracted; the proboscis was always retracted slowly, and generally protruded with great rapidity.

The figure given by Müller of this species in his 'Zoologia Danica' under the name *Echinorhynchus Lucii*, and that which Rudolphi has given in his 'Entozoor. Hist. Nat.' under the name *Echin. affinis*, are not good; the proboscis is not at all so thick in proportion to the body as they have represented it to be.

The specimens of *Echinorhynchus angustatus* which I have found in the eel and trout are perfectly white; the longest measures nearly six lines exclusive of the proboscis; the body has a greater diameter

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|--|---|---|
| 2. <i>Echinorhynchus transversus</i> * | } | Small intestine of redbreast ( <i>Sylvia Rubecula</i> ).      |
|  |   | Intestine of cod ( <i>Gadus Morrhu</i> ).                     |
|  |   | Intestine of pouting ( <i>Gadus Luscus</i> ).                 |
|  |   | Intestine of whiting ( <i>Merlangus vulgaris</i> ).           |
| 3. ————— <i>Acus</i> † . . . .         | } | Intestine of whiting-pollach ( <i>Merlangus Pollachius</i> ). |
|  |   | Intestine of coal-fish ( <i>Merlangus Carbonarius</i> ).      |
|  |   | Intestine of conger-eel ( <i>Anguilla Conger</i> ).           |

anteriorly than posteriorly; in some (from the intestine of the eel) this is so much the case that they might be mistaken for the *Echin. globulosus*, if the size and shape of the proboscis did not distinguish them.

The specimens of this species which occurred in the rudd and stickleback are more equally attenuated at each extremity than those which I found in the perch and eel; and the *Echin. angustatus*, which inhabits the intestine of the gudgeon, resembles in every particular that which occurred in the perch.

\* The colour of the *Echinorhynchus transversus* is a dirty white; the body is nearly cylindrical, three lines in length, a little thicker anteriorly than posteriorly; the proboscis is linear, cylindrical, three-fourths of a line in length, armed with numerous rows of recurved hooks, and is placed obliquely or transversely on the body; the posterior extremity of the body of the female is obtuse; in the male it terminates in a large globular pouch, which has a whiter colour than the other parts of the body.

† I have little to add to the excellent description of the *Echinorhynchus Acus* which has been given by my friend Dr. Drummond (so long the distinguished President of the Belfast Natural History Society) in the 'Magazine of Nat. History.' I have met with this species more frequently in the whiting-pollach than in any other fish, and they are more common in young cod than in the full-grown animal. When first removed from the intestine they are thick, rugose, and of a yellowish colour; after remaining for a short time in fresh water they become white, straight and turgid; the body is thicker anteriorly than posteriorly; at the posterior extremity is a minute yellowish spot; the proboscis is cylindrical and comes off obliquely; there is no neck. After remaining in fresh water for a time, some specimens ruptured near the head and an immense number of ova were discharged; these have an elliptical shape, the parietes transparent; within each is the outline of another body nearly of the same shape, but prolonged more at the extremities, and with some dark spots in the centre.

## LONGICOLLES.

- |                                       |   |   |
|---------------------------------------|---|---|
| 4. <i>Echinorhynchus filicollis</i> * | { | Small intestine of wild duck ( <i>Anas Boschas</i> ).                         |
|                                       | { | Small intestine of tufted duck ( <i>Fuligula cristata</i> ).                  |
|                                       | { | Intestine of golden eye ( <i>Clangula chrysophthalmos</i> ), by Dr. Drummond. |
| 5. ————— <i>tereticollis</i> †        | { | Intestine of trout ( <i>Salmo Fario</i> ).                                    |
| 6. ————— <i>nodulosus</i> ? ‡         | { | Intestine of gillaroo trout ( <i>Salmo Fario</i> , var.).                     |
|                                       | { | Intestines of pike ( <i>Esox Lucius</i> ).                                    |

\* The *Echinorhynchus filicollis* has been so accurately figured and described in the 'Magazine of Nat. History' for 1839 by my friend Dr. Drummond, that I have been anticipated in almost everything respecting it. Dr. Drummond has detected this species in the intestine of the golden eye and tufted duck; I have met with it in the wild duck and tufted duck.

The body of this remarkable species lies in the mucous surface of the intestine; the head projects upon the peritonæal surface but covered by peritonæum, and the neck, which is fine and strong, is contained in the substance of the walls of the intestinal canal; in the centre of the anterior surface of the head is a small conical papillary body destitute of spines; the ova (of which they contained a great number) have an oval shape and are visible to the naked eye.

† I found a single specimen of the *Echin. tereticollis* in the intestine of a common river trout (*Salmo Fario*) in the month of October 1838; the body lay in the mucous surface of the intestine; the neck was contained in its walls (as is the case with the *Echin. filicollis*), and the proboscis and receptacle projected upon the peritonæal surface, but covered by a layer of peritonæum; the body is three-quarters of an inch long, about the same diameter anteriorly as posteriorly; colour white; the proboscis is linear and cylindrical, densely armed with minute spines; the neck is conical, widest next the body, transversely striated, and terminates in a globose receptacle, which is flattened anteriorly and posteriorly.

‡ In the intestine of a gillaroo trout and of a pike I found several specimens of an *Echinorhynchus* which resemble the *Echin. nodulosus* and *Echin. ovatus* of Rudolphi, but differ in some respects from both. They belong to the same division, 'Longicolles;' the longest measures five lines, the smallest somewhat less; the neck and part of the body near it were of a light orange colour when removed from the intestine; the body is cylindrical, but wider anteriorly than posteriorly, and resembles in shape the body of the *Echin. nodulosus*; the proboscis is cylindrical, in some specimens very slightly thicker in the centre than at either extremity; the neck is cylindrical, double the thickness of the proboscis, longer than it, and marked with transverse rugæ; between the proboscis and neck is the receptacle

*Collo vel corpore armato.*

- |                                      |   |  |
|--------------------------------------|---|--|
| 7. <i>Echinorhynchus strumosus</i> . | } | Small intestine of seal ( <i>Phoca variegata</i> ).                |
| 8. ————— <i>striatus</i> ? .         |   | Rectum of sea-swallow ( <i>Sterna Hirundo</i> ).                   |
|                                      | } | Small intestine of wild swan ( <i>Cygnus ferus</i> ).              |
|                                      |   | Small intestines of tame swan ( <i>Cygnus Olor</i> ).              |
|                                      |   | Small intestine of wild duck ( <i>Anas Boschas</i> ).              |
| 9. ————— <i>versicolor</i> *         |   | Small intestine of shoveller ( <i>Anas Chlypeata</i> ).            |
|                                      |   | Small intestine of teal ( <i>Anas Crecca</i> ).                    |
|                                      |   | Small intestine of tufted duck ( <i>Fuligula cristata</i> ).       |
|                                      |   | Small intestine of golden eye ( <i>Clangula chrysophthalmos</i> ). |

or head, which is subglobose, but not at all so large as it is in the *Echin. nodulosus*; the head, proboscis and neck together measure a line and a half in length. All the specimens I have met with were free in the intestine; none of them attached to its coats.

\* The *Echinorhynchus versicolor* I have found in very large numbers in the small intestine of the tame swan; the majority were firmly attached to the mucous membrane; some had a reddish colour, others were white, but all became white after lying in spirits of wine for a certain time: the longest females measured  $5\frac{1}{2}$  lines, the males little more than 3 lines; in the largest specimens the body is constricted in two places, this is not so remarkable in the smaller specimens; the proboscis is short; the neck long, conical and unarmed; the body is somewhat thicker in front, and is armed over its whole surface, but particularly anteriorly, with numerous short spines. The body in the female terminates obtusely, in the male in a distinct pouch. The young differ in shape from the larger; in some the body has a greater diameter posteriorly than anteriorly, and is constricted in only one place.

I have met with the *Echinorhynchus versicolor* in the small intestine of the common wild duck, along with the *Echinorhynchus filicollis*; some had a reddish colour, others were white. The anterior part of the body in all is armed with innumerable very minute spines. The neck is longer than the proboscis, a little wider at the base; the vagina, from which it projects, is very distinct.

I have found this species also, but sparingly, in the small intestine near the large, and in the large intestine of the teal; they are from a line to two lines in length; the neck is long, conical and naked; the body narrower posteriorly, constricted in some about the centre, and armed anteriorly with very minute spines; the caudal extremity obtuse in the female, terminating in a small pouch in the male.



10. *Echinorhynchus Hystrix* \* {
- Rectum of cormorant (*Phalacrocorax Carbo*).
  - Small and large intestine of crested cormorant (*Phalacrocorax cristatus*).
  - Small intestine of red-breasted merganser (*Mergus Serrator*).
  - Rectum of red-necked grebe (*Podiceps rubricollis*).
  - Rectum of goosander (*Mergus Merganser*), by Dr. Drummond.

In the month of March 1839, I met with this species in immense numbers in the small intestine of the golden eye, the majority firmly attached to the mucous membrane; the longest were about three lines in length, independent of the neck and proboscis; the greater number however measured little more than a line. All were constricted in one part of the body, and in some the anterior, in others the posterior division was the larger; the posterior portion in the great majority had a beautiful red colour, which faded after lying in water or spirits of wine; the anterior white, pellucid, and armed over nearly its whole surface, but particularly anteriorly, with very minute recurved spines: the anterior division of the body has the greater diameter when the proboscis and neck are retracted; when fully protruded however, this part is more slender than the posterior. The proboscis is short and armed with prominent spines; in many the neck is hardly visible: the caudal pouch in the male is separated from the body by a narrower portion.

\* In the month of May 1838 I found a considerable number of the *Echinorhynchus Hystrix* in the large and small intestine of the crested cormorant, the majority firmly attached to the mucous membrane; the greater number and the largest existed in the rectum and close to its short cæca; in the small intestine they were fewer in number and less in size. Their colour white; the longest three lines in length, and a line in diameter at the thickest part of the body; the males not so large as the females; the proboscis conical, armed with very numerous recurved spines; the neck retracted in some; when fully protruded it is about the length of the head, smaller where it joins the head, and increasing in diameter posteriorly; it is unarmed. The body is somewhat globular anteriorly, gradually diminishing in diameter as it approaches the posterior extremity; it is armed, especially anteriorly, with innumerable minute recurved spines: some specimens are armed from one extremity of the body to the other, others are unarmed near the posterior extremity: the body of the female is rounded posteriorly, and a very small yellowish spot is visible at its extremity.

Two vessels or canals are seen through the parietes of the neck running into the body, where they are lost. This species has been very accurately described by my friend Dr. Drummond in the 'Ma-

*Species dubiæ.*

11. *Echinorhynchus*. Rectum of plover (*Charadrius Hiaticula*).
12. —————. Small intestine of water-ouzel (*Cinclus aquaticus*).
13. —————. Small intestine of smew (*Mergus albellus*).
14. —————. Small intestine of king-eider (*Somateria spectabilis*).
15. —————. Small intestines of rabbit (*Lepus Cuniculus*).

gazine of Natural History;’ it does not appear to have been ever found by Rudolphi, who has given a description of the species from some specimens communicated to him by Bremser. Bremser found it in but one species, the common cormorant; I have met with it, in addition to the common cormorant, in the crested cormorant, the red-breasted merganser, and in the red-necked grebe, and Dr. Drummond has found it in the goosander.

[To be continued.]

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XXXIII.—*A List of Lichens gathered in different parts of Wales, principally in the neighbourhood of Barmouth, with a few casual observations upon some of the species.* By the Rev. T. SALWEY.

*To Richard Taylor, Esq.*

DEAR SIR,

Oswestry, Feb. 10, 1844.

MAY I request that you will have the kindness to allow me a page or two of your valuable Magazine to supply a few omissions in my list of Welsh Lichens inserted in your January Number?

I am, dear Sir, yours faithfully,

T. SALWEY.

1. *Variolaria multipunctata*. On trees in the woods about Tyn-y-Gooes, &c.
2. *Endocarpon Hedwigii*,  $\beta$  *lachneum*\*. In patches about the rocks; at the angle of the turnpike-road turning down to the harbour between Borthwen and Barmouth, sparingly.
3. ————— *rufo-virescens*, Taylor. On the high wall of the turnpike-road on the right-hand side leading from Barmouth to Harlech, just by the first mile-stone.

This grows not uncommonly upon the walls near Barmouth. It

\* Acharius well observes in his ‘Syn.’ on this species, that both the colour and the figure of the thallus greatly vary, so that it is not to be wondered at that several species have been made out of one. My specimens are of a reddish brown colour and without apothecia. Those which I have received from other quarters, as “*lachneum*,” are of a paler colour, and with numerous apothecia. I think the “*lachneum*” of Fl. Hib. “growing upon rocks in mountain streams” must be a distinct species, as Taylor has made it.

may be distinguished from *smaragdulum*, 1st, by its mode of growth; 2ndly, by the particular habitat which each of these species affects. The *rufo-virescens*, from the scales of the thallus being usually collected together into a close-set areolate crust, forms a well-defined conspicuous object which arrests the eye at some distance. It is also of a darker colour than the *smaragdulum*, being usually of a brown reddish green, whereas the *smaragdulum* is of a pale fawn-colour. 3rdly, the *rufo-virescens* usually grows upon the smooth perpendicular face of the stone; but the *smaragdulum* upon the broken edges of the fracture of the stones in the walls, and can only be chipped off in small bits in the direction of the strata.

4. *Parmelia rugosa*. This grows not uncommonly about Barmouth, but is scarce in fruit. I have gathered however fine specimens in that state on the wall of a field under a wood to the west of the old mill at Ty Gwyn, and also between Crafnant and Cwm Bychan, on a low wall on the right-hand side of the road.
5. *Cornicularia bicolor*. Amongst the stones under the rocks at Llyn Bodlyn.
6. ——— *lanata*. Sent to me by Mr. Ralfs from Cader Idris.
7. *Urceolaria cinerea*. Common, particularly about the borders of lakes. *U. calcarea* is found only where the rocks are of a calcareous nature.
8. *Nephroma resupinata*,  $\beta$  *papyracea*, Ach. and Wahl. On stones and mosses, and upon the mossy trunks of trees: not uncommon. I have hitherto regarded this plant as the *parilis* of Acharius, and I still believe it to be the same as the plant described and figured in the 'Eng. Bot.' under that name. After much examination, however, and in the absence of authentic specimens from Acharius of the Swedish plant, I must confess my belief, that whether the true *parilis* or not, our plant is that which Acharius has described as the "*resupinata*,  $\beta$  *papyracea*;" Wahlenberg as the "*Peltidea resupinata*,  $\beta$  *papyracea*;" and Dillenius, xxviii. 105. p. 206, Edinb. ed. 1811, as the "*Lichenoides fuscum*, var. *farinosa* et *crispa*." My friend Dr. Taylor has always contended that what I have sent him as the *parilis* is only "a mountain state of the *resupinata*." Acharius, who in his 'Lich. Univ.' in 1810 described the *parilis* as a native of Sweden and England, in his 'Syn.' in 1814 speaks of it only as a Swedish plant, as if he had given up the claim of our English plant to be the *parilis*; yet he does not refer to it under the  $\beta$  *papyracea* of that work, so that he leaves us in doubt what at that time he considered the *parilis* of the 'Eng. Bot.' to be. Dillenius, Acharius and Wahlenberg all describe a variety of *resupinata* which pretty accurately agrees with the plant I have hitherto regarded as *parilis*, and which I have indeed no doubt is the *parilis* of 'Eng. Bot.' Dillenius says in the place above cited, "Sunt mihi hujus speciei exemplaria absque peltis cum marginibus crispis et farinosis B: et habeo alia ubi non tantum margines, sed et ipsa folia verrucis farinosis obsita, C, in quibus foliorum superficiem nonnihil lacunosam observo; eadem tamen planta est, tota facie, colore et substantia utrinque congruente." I would here

observe that Dillenius mentions two varieties of the  $\beta$  *papyracea*, both of them having the margins of the lobes of the thallus crisped and mealy, and one of them, in addition to this, having the thallus itself sprinkled with mealy warts. Now my own observation coincides entirely with this, except that the variety *without* the mealy warts is a great deal thinner in the substance of the thallus than the other; often indeed so much so, that it is impossible to detach it from the inequalities of the surface of the stone which it follows, without tearing it. *This* is the var. which I have hitherto regarded as the  $\beta$  *papyracea* of Ach., and the name is very applicable. The substance of the thallus in the other variety, the one sprinkled with mealy warts, is thinner than in the *resupinata*, but thicker than in the last-described variety; and it is this with the mealy warts which I have regarded hitherto as the *parilis* of 'Eng. Bot.' and still believe it to be so, but whether the *parilis* of Sweden I cannot say, having no specimen to refer to. Acharius describes this latter as "granulis nigris obsessus," which looks like our *parilis*, for I have a specimen covered with dark mealy warts, and which on both sides is almost black: usually the colour of this var. beneath is of a dark olive-brown inclining to black, smooth, but wrinkled, and only sparingly beset with the black fibrous roots which attach it to the stones or mosses on which it grows. Wahlenberg does not appear to have met with our variety with mealy warts, for he says of his  $\beta$  *papyracea*, "omnino lævis est, et L. herbaceum apprimè refert," which corresponds well enough with the variety without warts, but not with that variety which has been figured in 'Eng. Bot.' as *parilis*: I have a single specimen of the plant without warts in fruit. Dillenius speaks of it as barren, "absque peltis." Upon the whole, I am inclined to think it still doubtful whether our var. with powdery warts, the *parilis* of 'Eng. Bot.,' may not also be the *parilis* of Acharius, as he considered it when he published his 'Lich. Univ. '; but in the absence of authentic specimens it is perhaps safer for the present to refer both our varieties to *Neph. resupinata*,  $\beta$  *papyracea*.

Since the above was put in type I have received the following additional habitats of Welsh Lichens from my friend Mr. Ralfs.

*Verrucaria viridula*. Common upon the walls on the road-sides about Dolgelley.

*Endocarpon Hedwigii*,  $\gamma$ . Cader Idris, as you ascend to Gen Graig; and by a small stream as you ascend from Llanberis by the side of Glyder towards Twll-du.

*Lecidea cornea*. Dolgelley and Bangor.

—— *aurantiaca*. Bangor. Not uncommon.—T. S.

*Lecanora sophodes*. Bangor.

—— *squamulosa*. Abundant in several places about Dolgelley.

*Parmelia isidioides*. Not uncommon on the trees by the waterfall at Dol-me-lyn-llyn, but in fruit only upon one tree.

*Placodium microphyllum*. In fruit near the stations of the *Parm. isidioides*.

- Parmelia Fahlunensis*. Not unfrequent on Glyder, but in fruit only on Cader Idris.
- *encausta*. Glyder.
- *sinuosa*. Rather plentiful on a wall behind a small inn at the foot of Snowdon, between Carnarvon and Beddgelert.
- *incurva*. Not uncommon upon the walls about the foot of Snowdon.
- Collema fasciculare*. Below Aber waterfall near Bangor.
- *muscolola*. In fruit at Cwm Idwal (in company with Mr. Borrer) and at Machynlleth.
- Peltidea apthosa*. In fruit on the Brecon Beacon in South Wales.
- Nephroma parilis* (*resupinata*,  $\beta$  *papyracea*). More abundant than *resupinata* on a wall by the road one mile from Dolgelley to Bala.
- Cetraria sepincola*. On the largest of the stones called the Giant's Pebbles by a small pool on the road from Dolgelley to Tal-y-llyn.
- Cornicularia bicolor*. Ditto.

XXXIV.—*A List of the species of Myriapoda, Order Chilognatha, contained in the Cabinets of the British Museum, with descriptions of a new Genus and thirty-two new Species.* By GEORGE NEWPORT, F.R.C.S., Pres. Ent. Soc. &c.

THIS list of *Myriapoda* completes the enumeration and description of species in the cabinets of the British Museum, and includes the whole of the vegetable feeders, as my former list did the carnivorous and mixed feeders.

The *Chilognatha* have usually been regarded by naturalists as the first order of *Myriapoda*, partly in consequence of the more compact form of the head, and its similarity to that of the larva state of hexapod insects, and partly from the general form of their bodies being similar to that of those larvæ. This was the view taken of these animals by Latreille, Leach, Gervais, and some others, and very recently even by Lucas. But a different, and, as I believe, more correct view and arrangement have been followed by Professor Brandt, who regards the *Chilopoda* as the first, and the *Chilognatha* as the second division of the class. Although I cannot entirely agree with Brandt in his division of the *Chilognatha* into masticating and sucking species, because, as Lucas has recently remarked, there are species, even among the *Chilopoda*, which have the external organs of nutrition fitted only for taking liquid food, as in the little *Scolopendrella*, I fully agree with him in the superiority of the *Chilopoda*, as an order, over the *Chilognatha*, notwithstanding the less compact structure of the head in the former. The general characters of the *Chilopoda* certainly point them out as the most perfect animals of this osculant class of Articulata. The more compact form of body, the reduced number of the organs of locomotion, the greater activity,

and the predaceous habits of the higher species, approximate the *Chilopoda* to the predaceous insects on the one hand, and to the *Arachnida* on the other. The form of the head, in the two divisions of *Myriapoda*, seems to have reference chiefly to the particular habits of the species. Thus, in those which seize their prey, and subsist, like the Arachnidans, on living objects, those segments which in reality compose the whole head are not all anchylosed together, but are in part freely moveable on each other, and thus allow of a more prehensile function to the large forcipated foot-jaws, the true mandibles of the Articulata. Some naturalists have believed that these foot-jaws in the *Chilopoda* are not the true analogues of the mandibles of insects and of *Chilognatha*; but I am satisfied by recent examinations that this is really the case. In the *Chilognatha* the foot-jaws have the form of true mandibles, because the habits of the species require that compact form of the organ which alone can be subservient, not to the seizing and piercing of living prey, but to the grinding or comminuting of more or less solid vegetable matter, on which most of the genera of *Chilognatha* entirely subsist. In all other respects, both in their internal as well as their external anatomy, and in their physiology and mode of growth, the *Chilognatha* are decidedly inferior to the *Chilopoda*. They seem to conduct us down to the Annelida from the vegetable-feeding Crustacea, as the *Chilopoda* do from the Arachnidans to the same class.

### Class MYRIAPODA.

#### Order II. CHILOGNATHA.

##### Genus GLOMERIS, Latr.

1. *G. limbata*, Latr.; *G. marginata*, Leach. England.
2. — *annulata*, Brandt; *G. marginata*, Gervais. Spain.
3. — *transalpina*, Koch. Sicily.
4. — *pustulata*, Fabr. (sp.); var. *b. G. microstemma*, Brandt. Spain.

This is a very distinct species, but is subject to great variety. There are several specimens from Portugal in Mr. Hope's collection, which most decidedly mark the varieties pointed out by Brandt in his recent revision of this genus.

##### Genus ZEPHRONIA, Gray; SPHÆROPÆUS, Brandt.

Antennæ six-jointed, clavate, truncated.

1. *Z. ovalis*, Gray. Java. *Sphæropæus insignis*, Brandt.
2. — *glabrata*, mihi. Whitish ash-colour, polished, with the front of the head deeply and thickly punctured; the anterior margin of the first dorsal ring with a free elevated border. Length 4 lines. Philippine Islands.

3. *Z. castanea*, mihi. Dark chestnut-coloured, roughened. Length 1 inch. Philippine Islands.
4. — *innominata*, mihi.
5. — *heterostictica*, mihi. Dull fuscous, with the rings mottled irregularly with small and large blackish confluent spots; head and collar polished, brown; labial margin blackish, deeply punctured; antennæ black. Length  $1\frac{1}{2}$  inch. India.

I have adopted the name *Zephronia* for this genus on the authority of the figure of *Z. ovalis* by Mr. Gray in Griffith's 'Animal Kingdom' (1832), where the characters of the genus, the form of the eyes, and the form and number of joints to the antennæ are delineated, although no letter-press description of the genus or species was then given. Professor Brandt claims to have first described this genus by the name of *Sphæropæus*, in a paper read to the Academy at St. Petersburg in August 1831; but no abstract of this paper was published till 1833. While, therefore, I would not pretend to decide on the priority of these two naturalists, I have restricted the genus *Zephronia* to those species which have but six joints to the antennæ, and regard those with seven joints to the antennæ as constituting Brandt's genus *Sphærotherium*.

GENUS POLLYXENUS, Latr., Leach.

1. *P. lagurus*, Linn., Fabr. (sp.)

GENUS FONTARIA, Gray.

1. *F. virginiensis*, Drury, (sp.)
2. — \_\_\_\_\_?
3. — *dilatata*, Brandt. (sp.)

GENUS POLYDESMUS, Latr., Leach.

1. *P. complanatus*, Linn (sp.)
2. — *canadensis*, mihi. Light chestnut-coloured, polished; with two rows of broad, scutiform, very slightly raised tubercles on the posterior half of each dorsal plate, four in the anterior and six in the posterior row; posterior border of each plate slightly waved. Albany river, Canada.

This species very closely approaches the common *P. complanatus* of this country, but differs from it in colour, and in the anterior half of each dorsal plate being smooth and entirely destitute of tubercles; and also in the number of tubercles on the posterior half.

3. *P. acutangulus*, mihi. The posterior angles of all the dorsal plates elongated and very acute; antennæ pubescent, with the head and

body jet-black, polished; lateral plates bright yellow; legs brown. Length  $1\frac{1}{2}$  inch. Philippine Islands.

4. *P. elegans*, Gray.
5. — *bifasciatus*, mihi. Dark olive, with the antennæ, margins of the lateral plates, and two longitudinal dorsal lines, yellow; antennæ short, lateral plates declined. Length 2 inches. Philippine Islands.
6. — *Afer*, Gray. Body depressed, reddish brown, legs yellowish; dorsal plates with three transverse rows of minute tubercles; lateral plates elongated, tetragonal, with an elevated curved marginal line. Length  $2\frac{1}{2}$  inches. Africa.
7. — *Leachii*, Gray. North America.
8. — *Grayii*, mihi. Body smooth, depressed, brown, with the lateral plates subtetragonal, rounded, with an elevated marginal line, which on each alternate plate is waved and thickened. Length  $2\frac{3}{4}$  inches. Sierra Leone.
9. — *Drurii*, Gray. Brownish ash-coloured; dorsal surface of the body convex, thickly covered with minute rough granulations; lateral plates subtetragonal, with the posterior angles acute; antennæ short, joints roughened, obconic. Length  $2\frac{3}{4}$  inches. Demerara.
10. — *margaritiferus*, Gervais. Philippine Islands.

#### GENUS STRONGYLOSOMA, Brandt.

1. *S. monilis*, (sp.) Bonelli.
2. — *trilineata*, mihi. Body convex, polished, yellowish gray, with the legs, antennæ, and two broad lateral longitudinal fasciæ and one narrow median fascia, brown; legs elongated. Length  $1\frac{1}{2}$  inch. New Holland.

#### GENUS CAMBALA, Gray.

Eyes disposed in a single, semilunar, transverse row on each side of the head; antennæ short, subclavate, joints equal; lateral plates very short, spheroidal, reaching only half way along each segment, and terminating posteriorly in a simple raised line.

1. *C. lactaria*, Say, (sp.) North America.

I have derived the characters of this genus from the specimens originally sent by Say to Dr. Leach. The only characters given by Mr. Gray, in Griffith's 'Animal Kingdom,' are in the description of the plates, vol. ii. Insecta, page 784: "135. 2. *Cambala lactaria*, 142. Brown, with the front edge of the rings dotted. Allied to *Tulis* (*Iulus*?), but the head is furnished with a row of minute ocelli (ocelli) on each side." There is also an indistinct representation of these ocelli on the plate.

#### GENUS PLATOPS? mihi.

Head short, very small, and truncated on the frontal surface; flattened or slightly excavated; eyes subtriangular; antennæ elon-



gated, slender, with the sixth joint clavated; body both anteriorly and posteriorly very much attenuated, the second, third and fourth segments narrower than the head; legs slender.

1. *P. rugulosa*, Gray (sp.). Body dark brown, with a single median light-coloured line; head, eyes, and distal portion of each joint of the antennæ, black; segments with numerous elevated longitudinal striæ terminating in acute points; segments sixty-one. Length  $1\frac{1}{2}$  inch.
2. — *lineata*, Gray (sp.). Dark brown, with a single median red line, and one lateral one on each side; posterior half of each segment short, with longitudinal elevated striæ; prothorax small, with the anterior half smooth and the posterior marked with elevated striæ; segments sixty-one. Length  $1\frac{3}{10}$  inch. North America.
3. — *Richii*, Gray (sp.). Yellowish brown; antennæ pubescent, with the third joint elongated; the posterior half of each segment with numerous elevated longitudinal lines; those on the side united into an arch, including the *foramina repugnatoria*; segments forty-eight. Length 2 inches. Malta.
4. — *Xanthina*, mihi. Body polished, ochraceous, slightly compressed, with the posterior half of each segment with numerous slightly raised lines; antennæ very long, with the third basilar joint longer than the second; occipital portion of the head excavated, front flattened; legs elongated; segments forty-eight. Length 5 inches. Valley of the Xanthus, Asia Minor.
5. — *Hardwickei*, Gray (sp.). Ash-coloured, polished; segments sixty-one, smooth, with the posterior half bordered with little triangular-shaped plates; head with the occipital surface excavated, and the front with a broad cup-shaped surface; eyes subtetragonal, elongated, with the internal angle acute and formed of five rows of ocelli; legs elongated; segments sixty-one. Length  $1\frac{3}{4}$  inch.

This genus reminds us strongly of the characters given by Risso of his genus *Callipus*, with which indeed it agrees in the form and length of the antennæ and legs. But the characters given by Risso apply equally well to many species of the true *Iuli*, while no notice is taken by him of the very marked structure on which I propose to found this new genus, *Platops*, the short and flattened frontal surface of the head, and the narrowness of the anterior segments. I am not acquainted with Risso's species, and until then I shall propose to consider the two genera as distinct.

#### Genus IULUS, Linn.

1. *I. terrestris*, Linn.
2. — *pilosus*; segments fifty-six, hairy, Newp. Hampstead.
3. — *niger*, Leach.
4. — *sabulosus*, Linn.
5. — *canadensis*, mihi. Reddish flesh-coloured, with black lateral spots beneath a longitudinal series of whitish patches; segments fifty-three, smooth, polished, without striæ on the dorsal surface;

- penultimate segment with a strong, curved, acute mucro. Length  $1\frac{1}{2}$  inch. Canada.
6. *I. parvipes*, mihi. Bluish black, polished; segments sixty-six?, with the posterior half of each with very faint longitudinal striæ; legs very short and slightly hairy; penultimate segment with a straight, elongated, acute point; lateral anal plates with deep hairy punctures. Length 2 to  $2\frac{1}{4}$  inches. Valley of the Xanthus, Asia Minor.
  7. — *londinensis*, Leach.
  8. — *pilipes*, mihi. Colour of dried specimen white; segments sixty-three, longitudinally striated, with the posterior margin black, or reddish; legs rather short, fuscous, densely ciliated, penultimate segment with a very short, acute apex; the *foramina repugnatoria* minute, black. Length  $3\frac{1}{2}$  inches. Country — ?
  9. — *punctatus*, Leach.
  10. — *pusillus*, Leach.
  11. — *Sayii*, mihi; *I. pusillus*, Say. Flesh-coloured, with a black patch at the side of each segment; eyes black, arranged in a transverse arched line, with the concavity forwards; antennæ short, clavate; segments smooth, without striæ, the penultimate one with the apex rounded. Length 6 lines. North America.

This description is taken from Say's original specimen, which, however, is not an adult. It has but forty-five segments, the three antepenultimate of which are apodal.

#### GENUS BLANIULUS? *Gervais*.

1. *B. pulchellus*, Leach, (sp.)

Although I have placed this species in a separate genus, according to Gervais, it yet seems doubtful whether it ought not rather to form only a section of the *Iuli*, with which it agrees in every respect except in the absence of eyes.

#### GENUS SPIROBOLUS, *Brandt*.

1. *S. olivaceus*, mihi. (Div. 1. Subdiv. 1, *a*, Brandt) Body short, thick, dark olive, with the prothorax subferruginous; legs dark chocolate; front convex, smooth, with a median labial sulcus; segments forty-four, smooth, with the posterior half of each very short and distinct, with obsolete striæ; preanal scale triangular, with the apex acute, with a deep transverse depression at its base. Length 8 inches. Oajaca, Mexico.

This species ought perhaps to form the type of a distinct subgenus, since the second, third, fourth, fifth, six and penultimate segments each bear only one pair of legs.

2. *S. pulvillatus* ♂, mihi. Front of the head flattened, with the labial margin dilated and acute at its angles, with a median sulcus; segments fifty-seven, smooth, the posterior half of each without striæ; legs strong, with the distal or third joint of the tarsi more

- than three times as long as the second, with a soft pulvus on its under surface. Length  $6\frac{3}{4}$  inches. Cape Coast Castle, Africa.
3. *S. simillimus* ♀, mihi. Segments fifty-eight; front subconvex, smooth, without punctures on the labial margin, subquadrate, with the external angles rounded; sides of the prothorax triangular, very acute; legs very short, slender, with the joints of the tarsi equal, without pulvilli. Length  $6\frac{1}{2}$  inches. Fantee, Africa.
  4. — *nigerrimus*, mihi. (Div. 1, *b*, Br.) Jet-black, shining, front convex, labial margin deeply notched; prothorax smooth, with the sides triangular, rounded; segments smooth. Length 2 inches.
  5. — *ruficollis*, mihi. (Div. 1, *b*, Br.) Black, with the head, prothorax, penultimate and anal segments and a broad median dorsal line bright red; legs castaneous; segments fifty-two, smooth, with the posterior half of each short and elevated. Length  $1\frac{3}{4}$  inch. New Holland.
  6. — *caudatus*, mihi. (Div. 1, *b*, Br.) Dark olive, with the antennæ and legs chestnut-coloured; front mottled, with a median sulcus; segments forty-two, polished, without striæ, the penultimate segment with a long, acute, recurved mucro; body short and thick. Length 3 inches. Demerara.
  7. — *marginatus*, Say, sp. (Div. 2, *b*, Br.) North America.
  8. — *annulatus*, Say, sp. (Div. 2, *a*, Br.) North America.

GENUS SPIROSTREPTUS, Brandt.

1. *S. gracilipes*, mihi. (Div. 1. Subdiv. 2, *c*, Br.) Chestnut-coloured; legs naked, slender; front convex, with the labial border deeply emarginated, with a triangular elevated line; prothorax smooth, with the sides narrowed and rounded anteriorly, with a single elevated marginal line; segments sixty-four, with the posterior half of each substriated; anal mucro short. Length  $4\frac{1}{2}$  inches. Philippine Islands.
2. — *curvicaudatus*, mihi. (Div. 1. Subdiv. 2, *b*, Br.) Colour of dried specimen fuscous; segments sixty-one, with the posterior half of each smooth, with the margin reddish; penultimate segment with a recurved, acute mucro; labial margin of the front nearly straight; prothorax with the sides tetragonal, with the anterior angle subacute, and the posterior surface with faint striæ. Length  $4\frac{1}{2}$  inches.
3. — *nigrolabiatus*, mihi. (Div. 1. Subdiv. 2, *d*, Br.) Fuscous brown; front of the head ferruginous, convex, with the labial border blackened, emarginated, and armed with three distinct teeth; legs yellowish; sides of the prothorax very much narrowed, with an elevated border, but not striated or plicated; segments fifty-nine, smooth, polished, penultimate segment with a short, acute, recurved mucro. Length 4 inches. East Indies.
4. — *vittatus*, mihi. (Div. 1. Subdiv. 2, *a*, Br.) Dark brown, with the head, first seven segments of the body, and a ring around the posterior half of each segment, red; legs annulated, with the three tarsal joints pulvillated; the superior and posterior part of the head with a partially concealed elevated transverse band of closely arranged longitudinal striæ; prothorax with a broad, flattened,

falcated margin; segments eighty-one; mucro of the penultimate segment short. Length 9 inches. China?

5. *S. maculatus*, mihi. (Div. 1. Subdiv. 2, a, Br.) Reddish orange; head, prothorax and antennæ chestnut; segments sixty-nine, with a black spot on each side; prothorax with its anterior margin falcated, and its posterior angle produced and acute. Length 8 inches. Calcutta.
6. — *fasciatus*, mihi. (Div. 1. Subdiv. 2, a, Br.) Dark chocolate, with the front of the head mottled with black, and a black transverse fascia around the posterior half of each segment; anal mucro short, black; legs orange. Length 10 inches. China?
7. — *cinctatus*, mihi. (Div. 1. Subdiv. 2, b, Br.) Ferruginous, with a narrow black ring around the middle of each segment; legs fuscous, with a broad black annulus around the middle of each joint; segments seventy-five. Length 9 inches. India.
8. — *rubripes*, mihi. (Div. 1. Subdiv. 2, b, Br.) Colour of dried specimen whitish, with the posterior border of each segment black; head and legs red; segments fifty-nine, smooth, polished. Length  $3\frac{1}{2}$  inches. Country —?
9. — *quadricollis*, mihi. (Div. 1. Subdiv. 1, b, Br.) Chestnut-coloured; front very convex, with the labial border red; segments sixty-three to sixty-five, smooth, with the posterior half of each very short, with the margin elevated; sides of the prothorax broad, quadrate, with a deep fossa on the anterior portion, and the posterior angle acute and elongated. Length 8 inches. ? Fantee, Africa.
10. — *punctilabium*, mihi. (Div. 1. Subdiv. 2, c, Br.) Colour of dried specimen grayish, the posterior border of each ring chestnut; front convex, smooth, with the labial portion deeply emarginated with a series of deep and closely arranged punctures; segments fifty-nine, with very faint obsolete striæ; anal mucro short. Length —? Philippine Islands.
11. — *microsticticus*, mihi. (Div. 1. Subdiv. 2, c, Br.) Orange-yellow; segments sixty-six, the posterior margin of each irregularly marked with numerous minute black points; front convex, smooth, with the labial margin dark chestnut; legs with the basilar joints compressed at their upper surface, and the inferior surface of the tarsal joints armed with stiff hairs. Length  $6\frac{1}{2}$  inches. Cape Coast Castle.
12. — *annulatipes*, mihi. (Div. 1. Subdiv. 2, c, Br.) Fuscous, with the posterior margin of the rings dark chestnut; segments sixty-eight, the anterior portion of each segment with numerous delicate transverse plicæ, the posterior half smooth; legs with broad flesh-coloured annuli. Length  $7\frac{1}{2}$  inches. Fantee, Africa.
13. — *obtusus*, mihi. (Div. 1. Subdiv. 2, c, Br.) Chestnut-coloured; body short, very thick and obtuse, becoming suddenly enlarged posterior to the tenth segment; legs very short and slender, compressed and hairy; segments sixty. Length 6 inches. Congo, W. Africa.
14. — *flavotaniatus*, Brandt.
15. — *antipodarum*, Newp.

XXXV.—*The Musci and Hepaticæ of Teesdale.* By RICHARD SPRUCE, Esq., F.B.S.

[Concluded from p. 203.]

41. *Ceratodon purpureus*, Brid. (Didymodon, *H. and T.*) Frequent.

42. *Cinclidotus fontinaloides*, Beauv. In the Tees.

43. *Climacium dendroides*, W. and M. (*Hypnum dendroides*, Dillen.; *Linn.*; *H. and T.* Leskea, *Hedw.*) Common.

44. *Dicranum Dillenii*, Tayl. MSS. (*D. scoparium*  $\alpha$ . *vulgaris*, *Musc. Brit.*) Heaths and rocks; fruiting abundantly in Holwick Wood.

45. — *flavescens*, Sm. Sides of streams, frequent.

46. — *flexuosum*, Hedw. Heaths and moist rocks.

47. — *fulvellum*, Sm. On stones near springs, between the base of Cronkley Scarr and the river: fruit very scarce.

48. — *fuscescens*, Turn. *Musc. Hibern.* p. 60; *Engl. Bot.* t. 1490. *D. Sphagni*, *Wahl.* (*D. scoparium*  $\gamma$ . *Hook. in Engl. Flora.*)

On basaltic rocks below the High Force, Holwick Scarr and other places, but existing in the greatest abundance and perfection on Cronkley Scarr.

Dr. Taylor has well distinguished between *D. scoparium*, Hedw., and *D. Dillenii*, and I do not hesitate to assert that the *D. fuscescens* of Turner is equally distinct from both. In Teesdale, where *D. Dillenii* and *fuscescens* grow together on the same rocks, the difference in habit is so striking, that I am surprised any one should ever have thought of uniting them. The latter I would separate from the former by the following characters:—

*Tufts* more dense, darker-coloured, deep green above, fuscous below. *Leaves* secund or subsecund, slightly twisted in drying, lanceolate, tapering into a very long and slender acumination; *nerve* much thicker, in the upper half usually exceeding the breadth of the pagina on each side, which is not the case at all in *D. Dillenii*\*; *reticulation* far smaller, *punctate* in the upper portion of the leaf (the cellules being nearly equal in length and breadth), which is never the case in *D. Dillenii* (where the length of the cellules always much exceeds their breadth). The *perichætal leaves* have broad sheathing bases (usually extending a very little above the *vaginula*), but are widely spreading upwards; whereas in *D. Dillenii* the inner perichætal leaves are remarkably convolute, broadly elliptical, with linear squarrose apiculi †, and the sheath which they form is *above twice the length of the vagi-*

\* In *D. Dillenii* the *nerve* has 3—5 dorsal ribs, the middle one of which is serrated near the summit and sometimes expanded into a lamina; but in *D. fuscescens* the *nerve* has only one rib at the back, which is serrated and extends a very little way below the summit of the leaf.

† The stem-leaves of *Hypnum piliferum* are very similar in form.

*mula*. Capsule ovato-cylindrical, subcernuous; lid curved, subulate from a conical base. In *D. Dillenii* the capsule is cylindrical, nearly erect, with a subulate straight lid. Seeds deep olive, slightly larger than the brownish seeds of *D. Dillenii*. Teeth of the peristome shorter, deep red (almost black), opaque, cloven less than half way: in *D. Dillenii* tapering to a longer point, red at the base and tips but orange-yellow in the middle, cloven more than half way, often trifid.

I did not once observe the true *D. scoparium* in Teesdale. Its differences from *D. Dillenii* may be thus briefly stated:—Stems of far larger size and growing in looser tufts, mostly ascending from a decumbent base. Leaves more distant, of extraordinary length, uniformly falcato-secund, in the slender nerve and elongated cellules agreeing with *D. Dillenii*. The perichætium is still more remarkable than that of *D. Dillenii*, and frequently encloses several pedicels, which I have never seen to be the case in *D. fuscescens*. Capsules arcuate, substrumose.

49. *Dicranum glaucum*, Hedw. Heaths and rocks.

50. — *heteromallum*, Hedw. Heaths and banks.

51. — *squarrosum*, Hedw. Sides of streams; always barren.

52. — *strumiferum*, Ehrh. On fallen rocks (basaltic) at the base of Holwick Scarr. The capsules appeared to have ripened prematurely (owing, probably, to the dryness of the season) and were for the most part imperfectly formed.

53. — *varium*, Hedw. Common.

54. *Didymodon Bruntoni*, Arn. On basaltic rocks near the High Force, Cronkley Scarr, &c. The habit of this moss is very similar to that of *Weissia cirrhata*, along with which it grows; but the capsules of the latter were quite empty and dead, while those of the former were only beginning to shed their opercula.

55. — *capillaceus*, Schrad. Frequent, and in fine state, especially on moist basaltic rocks near Winch Bridge.

56. *Encalypta ciliata*, Hedw. On limestone rocks at the White Force, below High Force and in Ettersgill beck.

57. — *streptocarpa*, Hedw. Limestone rocks and walls, but barren.

58. *Fissidens adiantoides*, Hedw. (*Dicranum, Musc. Brit.*) Hagg Syke.

59. — *bryoides*, Hedw. Banks, chiefly in the lower grounds.

60. — *taxifolius*, Hedw. Clayey and sandy banks.

61. *Fontinalis antipyretica*, L. In the Tees and its tributary streams.

62. *Funaria hygrometrica*, Hedw. Frequent.

63. *Grimmia apocarpa*, Hedw. Rocks and walls. In sandy spots overflowed by the Tees, the var. *rivularis* grows with closely tufted erect stems and leaves of extraordinary breadth.

64. — *pulvinata*, Sm. On walls, &c.

65. — *spiralis*, H. and T. Basaltic rocks at Caldron Snout and Falcon Clints, where it fructifies very sparingly.

66. *Grimmia torta*, Hornsch. Not unfrequent, either on the limestone or basalt, but occurring chiefly on loose stones in the more elevated situations, as at the base of White Force and Falcon Clints. Always barren.

67. — *trichophylla*, Grev. Abundant on walls between Barnard Castle and Middleton, and on rocks in Upper Teesdale.

68. *Gymnostomum curvirostrum*, Hedw. On rocks near streams; chiefly on the limestone, but not confined to it.

69. — *Donianum*, Smith. On limestone rocks (below the basalt) on the Yorkshire side of the High Force, where it was discovered by Mr. R. B. Bowman. This minute moss grows in very small quantity, and its locality is exceedingly difficult of access, except when the river is low. Since observing it in this station I have gathered it in considerable quantity in Mowthorpe Dale near Castle Howard, where it grows in the crevices and on the under side of calcareous rocks, in company with *Hypnum tenellum* and *crassinervium*.

70. — *nimbosum*, Tayl. MSS. (*Zygodon Mougeotii*, B. and S.?) Rocks at the High Force, White Force and Cronkley Scarr.

71. — *rupestre*, Schwægr. Frequent on moist rocks; often growing in company with *G. curvirostrum*.

72. *Hedwigia æstiva*, Hook. On moist basaltic rocks below the High Force, as well as in other similar situations. When the immense tufts which this moss usually forms are separated vertically, they often appear beautifully zoned, which I suppose is caused by the annual elongation of the stems.

73. *Hookeria lucens*, Sm. On the west side of Mickle Fell.

74. *Hymenostomum microstomum*, R. Br. (*Gymnostomum microstomum*, Hedw.; *H. and T.*) Upon a wall, topped with earth, below the High Force plantation.

75. *Hypnum aduncum*, L. Bogs. In fruit on Cronkley Fell.

76. — *alopecurum*, L. Moist rocky situations.

77. — *catenulatum*, Schwægr. On stones in Holwick Wood.

78. — *commutatum*, Hedw. Abundant and in a fertile state on wet rocks.

79. — *confervoides*, Bridel? "Repens, ramis teretibus capillaceis, foliis erectis lato-lanceolatis enervibus, integerrimis; capsula suberecta, operculo obtuso."—*Schw. Suppl.* t. 142; *Drummond's Musci Americani*, No. 190.

Growing intermixed with *Jung. trichophylla* on basaltic rocks in a shaded situation by the Tees' side below Winch Bridge. I observed only a single patch, destitute of *capsules*, but possessing *perichætia*.

*Stems* sparingly branched, not subpinnate as in *H. catenulatum* (its nearest congener). *Branches* nearly erect, of a beautiful pale green above, in their lower part with a slight tinge of pink. *Leaves* nerveless, slightly denticulate, more widely areolated (though far smaller in size), narrower, and tapering more upwards than those of *H. catenulatum*, yet not extending to so long a point as in *H. serpens*; they are equally patent, too, in

the dry as in the moist state. *Perichætil* leaves deeply but unequally serrated.

This interesting moss bears so strong a resemblance to *H. serpens*, that, had I not been struck by its peculiar colour and remarkably neat appearance, I might have passed it over for that species. The characters above stated will suffice to show those who have studied *H. serpens* that *H. confervoides* is widely different from it in several essential particulars.

80. *Hypnum crassinervium*, Tayl., Wils. On limestone rocks by the Tees, near the foot of the High Force.

81. — *cupressiforme*, L. Everywhere.

82. — *curvatum*, Sw. Trees and rocks.

83. — *cuspidatum*, L. Common.

84. — *denticulatum*, L. Frequent in moist shady situations.

85. — *filicinum*, L. Common, but rarely fructifying.

86. — *fluitans*, L. In Hell Cleft.

87. — *incurvatum*, Schrad. On stones at the base of the High Force, on the Durham side of the Tees; growing with *Orthotrichum rupestre*. I had nearly passed this over for *H. serpens*, which it certainly much resembles, especially in the form of its capsules. It is also not unlike *H. populeum*, with which species it grew intermixed.

88. — *loreum*, L. Frequent.

89. — *lutescens*, Huds. Limestone rocks in Ettersgill beck and Hell Cleft.

90. — *molluscum*, Hedw. Frequent.

91. — *multiflorum*, Tayl. On trees in Egglestone Wood and Balderdale. A *Hypnum*, which for the present I must consider a var. of this, grows in the fissures of limestone rocks in Hell Cleft, at the High Force, and other places; it is remarkable for the reddish hue of its foliage, in consequence of which I at first mistook it for *Leskea rufescens*. The leaves are longer and narrower than in the usual state of *H. multiflorum*, and when dry are striated.

92. — *myosuroides*, Hedw. Common in rocky situations.

93. — *palustre*, L. Wet rocks and on stones in streams, fructifying copiously.

94. — *plumosum*, L. On rocks in and near streams.

95. — *polymorphum*, Hedw. By the Tees below Winch Bridge; barren.

96. — *populeum*, Hedw. Walls and rocks.

97. — *prælongum*, Linn. }

98. — *proliferum*, L. }

99. — *purum*, L. }

} Everywhere common.

100. — *rugulosum*, Web. This has been found by Mr. Ibbotson on the limestone above Falcon Clints; but as I only searched the base of those rocks, I did not observe it.

101. — *ruscifolium*, Neck. Streams, frequent.

102. — *rutabulum*, L. Everywhere.

103. — *Schreberi*, Willd. Heaths.

104. — *scorpioides*, L. Bogs.



105. *Hypnum sericeum*, L. Walls, trees and banks.  
 106. — *serpens*, L. Everywhere.  
 107. — *splendens*, Hedw. Heaths and rocks.  
 108. — *squarrosum*, L. Common.  
 109. — *stellatum*, Schreb. Bogs, frequent. Var.  $\beta$ . *minus*, on a wall near Lonton, in fruit.  
 110. — *striatum*, Schreb. Banks.  
 111. — *triquetrum*, L. Frequent.  
 112. — *uncinatum*, Hedw. Abundant on stones and about the roots of trees, with fruit in excellent condition.  
 113. — *undulatum*, L. Shady places, not common.  
 114. — *velutinum*, L. Common.  
 115. *Leskea complanata*, Hedw. (*Hypnum complanatum*, *Musc. Brit.*) Frequent.  
 116. — *pulchella*, Hedw. Frequent among rocks in shaded situations. In Teesdale this elegant moss is almost constantly associated with *Bryum crudum*.  
 117. — *trichomanoides*, Hedw. About the roots of trees; not common.  
 118. *Leucodon sciuroides*, Schwægr. Trees between Barnard Castle and the High Force inn.  
 119. *Meesia uliginosa*, Hedw. (*Bryum trichodes*, L.; *H. and T.*) Very sparingly on moist basaltic rocks at Winch Bridge.  
 120. *Mnium hornum*, Hedw. (*Bryum*, *Musc. Brit.*) Frequent.  
 121. — *marginatum* (*Mn. serratum*, *Brid.*; *Bryum marginatum*, *Dicks.*; *H. and T.*). In rocky situations.  
 122. — *punctatum*, Hedw. Near streams.  
 123. — *rostratum*, Schwægr. Rocks in Ettersgill beck, in fruit. Below Winch Bridge.  
 124. — *undulatum*, Hedw. (*Bryum ligulatum*, *Schreb.*; *H. and T.*) Frequent.  
 125. *Neckera crispa*, Hedw. Common on rocks.  
 126. — *pumila*, Hedw. On trees in Holwick Wood.  
 127. *Orthotrichum affine*, Schrad. Trees and walls.  
 128. — *anomalum*, Hedw. Frequent on limestone rocks and walls. The capsules had passed the season of maturity, and were therefore in an unfit state for observing the *cilia*; but by attentively watching this moss on a wall near Castle-Howard during the last three summers, I have satisfied myself that *well-developed capsules* usually possess an inner peristome. I have arrived at the same conclusion respecting *O. cupulatum*; but in the latter the *cilia* are 16, in the former only 8.  
 129. — *crispum*, Hedw. On trees, with *O. Drummondii*.  
 130. — *cupulatum*, Hoffm. In the same localities as *O. anomalum*.  
 131. — *diaphanum*, Schrad. Trees and walls, between Barnard Castle and Middleton.  
 132. — *Drummondii*, Hook. This beautiful species is more abundant in Upper Teesdale than any other of the genus, and may be met with everywhere on shrubs and young trees. I observed it in the

greatest plenty and luxuriance on junipers near the High Force, and on birches by the side of Blea beck and on Cronkley Fell.

The existence of an *annulus* at the mouth of the capsule in the genus *Orthotrichum* appears to have escaped the notice of every writer on the subject of bryology: even Bruch and Schimper, whose investigations have been so minute and elaborate, have failed to detect it. To Mr. Wilson is due the credit of first observing this organ in the capsules of *O. cupulatum*, sent to him by myself from the neighbourhood of York, in May 1842. At that time we thought it might be peculiar to the species, but I have since ascertained its presence in nearly every British species of the genus; and I may mention *O. Drummondii* and *crispum* as mosses in which it may be easily detected. In all cases it is best seen by bending the teeth of the peristome inwards and cutting them away, or by carefully taking out the inner membrane of the capsule, of which the peristome forms the continuation.

The *annulus* of *O. Drummondii* is very narrow, closely appressed to the teeth of the peristome, of which it partakes the hue, so that unless they be first removed, it is almost certain to be overlooked. It is divided into processes, of which *two* subtend each tooth, so that the whole number of processes is thirty-two: they are obtuse, sometimes perforated, and of very fragile texture.

133. *Orthotrichum leiocarpum*, B. and S. (*O. striatum*, Hedw.; *H. and T.*) Frequent on trees.

Bruch and Schimper assign the following very adequate reason for changing the name of this species: "Comme c'est la seule espèce du genre *Orthotric* qui ait *une capsule dépourvue de raies*, nous l'appelons *O. leiocarpum* (à fruit lisse) en rejetant la dénomination '*striatum*,' qu'on avait conservé jusqu'ici."

134. *O. Lyellii*, H. and T. On trees in many places, but barren.

135. — *pulchellum*, Sm. On trees near streams; frequent. In Hell Cleft I found a large var. growing on a stone, with a longer capsule and paler outer peristome than ordinary.

136. — *rivulare*, Turn. On stones in the Balder; rare. The leaves of specimens gathered in this locality are remarkably denticulated at the apex; but this peculiarity exists also, though in a less degree, in specimens from Dr. Greville, gathered in Glen Dochart.

137. — *rupestre*, Schleich. (*O. rupicola*, Funk.; *H. and T.*) On fallen rocks and stones at the base of the High Force.

138. — *stramineum*, Hornsch. "Monoicum, subpulvinatum; caule ramoso; foliis patulis, siccitate laxè imbricatis, lanceolatis, costato-carinatis, margine reflexis; capsula pyriformi-oblonga, late striata, e lutescente fusca; calyptra campanulata, subpilosa; dentibus 8 bigeminatis, ciliis 8 æqualibus vel 16 alternis brevioribus." — *Bryol. Eur.*

*O. stramineum*, Hornsch. *ined. Brid. Bryol. Univ.* i. p. 789.

On an ash-tree near the bridge across the Lune, between Mickleton and Lonton; very scarce.

From *O. affine*, growing on the same tree, this differs as follows. *Leaves* usually of a deeper green. *Vaginula* clothed with remarkably long hairs, which often reach half-way up the capsule; but naked in *O. affine*. *Capsule* much shorter and wider, with a shorter neck, thick-skinned, the areolation wider, especially near the mouth, the 8 striæ with which it is marked far broader. *Calyptra* straw-coloured, more convex, concealing two-thirds of the capsule (in *O. affine* only half). *Operculum* shorter. *Cilia* consisting of fewer cellules. *Seeds* green; in *O. affine* pale brown.

My specimens uniformly show 16 cilia, but Bruch and Schimper remark: "Le nombre des cils du péristome intérieur varie de 8 à 16, et on trouve souvent des échantillons où cette variation a lieu sur le même individu."

*O. pallens*, Bruch, which I have found near York, agrees with *O. stramineum* in the number of cilia, but differs in its obtuse upper leaves and their wider areolation, smooth vaginula, smaller calyptra and elongated capsule.

139. *Phascum alternifolium*, Schwægr. On a turf-capped wall below the High Force plantation.

I cannot satisfy myself that this is specifically distinct from *Ph. subulatum*, Hedw. The character which appears to be chiefly relied on for their separation in the 'Bryol. Europ.' is founded on the male inflorescence; the *antheridia* in the former being enclosed in *gemmæ* dispersed along the stem, and in the latter free in the axils of the perichætil leaves. I must trust to future observation to decide whether or not this difference is to be accounted specific.

140. *Physcomitrium ericetorum*, De Notaris. (Gymnost. fasciculare, H. and T.) Caldron Snout.

141. *Polytrichum aloides*, Hedw. Frequent.

142. — *alpinum*, L. Abundant in heathy situations.

143. — *commune*, L. Heaths.

144. — *gracile*, Menzies. Near Lower Cronkley.

145. — *juniperinum*, Willd. Heaths.

146. — *nanum*, Hedw. In several places.

147. — *piliferum*, Schreb. On the moor between the High Force inn and Cronkley Bridge.

148. — *undulatum*, Hedw. Common.

149. — *urnigerum*, L. Near the High Force inn.

150. *Pottia truncata*, B. and S. (Gymnostomum truncatum, *Musc. Brit.*) In cultivated ground.

151. *Pterogonium gracile*, Sw. Falcon Clints; barren.

152. *Splachnum mnioides*, L. fil. On fallen rocks at the base of Holwick Scarr; between Cronkley Scarr and the Tees; Meldon Hill, on the Westmoreland side of Maize beck.

153. *Tetraphis pellucida*, Hedw. Hagg Syke; Hell Cleft, &c.

154. *Tetradontium Brownianum*, Schwægr. (*Tetraphis Browniana*, Grev.; *H. and T.*) On the underside of stones near Caldron Snout.

155. *Trichostomum flexicaule*, B. and S. (*Didymodon*, *Brid.*) Abundant, both on the limestone and basalt. This is a moss which I had concluded from previous observation to be confined exclusively to limestone and chalk formations; but it certainly does not refuse to grow on the basalt, in Teesdale.

156. — *rigidulum*, Smith. (*Didymodon rigidulum*, *Hedw.*; *H. and T.*) Near streams.

The five following species are not included in *Trichostomum*, as limited by Bruch and Schimper.

157. *Tr. aciculare*, Beauv. Abundant.

158. — *fasciculare*, Schrad. Frequent on rocks and stones.

159. — *heterostichum*, Hedw. Rocks and walls.

160. — *lanuginosum*, Hedw. Abundant. Among the mountains the rocks and stones are frequently quite hoary with this moss.

161. — *microcarpum*, Hedw. Falcon Clints; scarce.

162. *Weissia acuta*, Hedw. Plentiful on basaltic rocks by the Tees at Winch Bridge and other places.

163. — *cirrhatta*, Hedw. On Holwick and Cronkley Scarrs.

164. — *controversa*, Hedw. Banks.

165. — *curvirostra*, H. and T. On walls and rocks, as well as in moist sandy situations.

166. *Zygodon lapponicus*, B. and S. (*Gymnostomum lapponicum*, *Hedw.*; *H. and T.*) Fissures of basaltic rocks at Caldron Snout; in fruit.

167. — *viridissimus*, *Brid.* (*Gymnostomum viridissimum*, *H. and T.*) On trees between Barnard Castle and Middleton; on rocks in Balderdale.

#### *Hepaticæ.*

1. *Fegatella conica*, Tayl. Near streams.

2. *Jungermannia albicans*, L. Everywhere.

3. — *asplenioides*, L. Frequent in the low grounds; scarcely ascending to the subalpine regions.

4. — *Bantriensis*, Hook. MSS. Caule erecto vel adscendente, subramoso; foliis ovato-rotundatis, obtuse emarginatis, perichætalibus conformibus; stipulis parvulis, lanceolato-subulatis, integerrimis, basi 1-2 dentatis, bifidis, vel laciniatis; fructu terminali, calycibus subcylindricis, ore angustiori tubulato ciliato.

J. Bantriensis, *Hook. MSS. olim\**. J. bidentata, var. *Brit. Jung. Synops.* p. 16. *Suppl.* tab. 3.

On sandy deposits by the Tees and its tributary streams; in the

\* I should have scrupled to retain Hooker's specific name, had it not been already published by Lindenberg and Nees in the 'Species Hepathicarum' (as I am informed by Dr. Taylor); although these authors appear to have been unacquainted with the plant, and to have presumed on its being distinct merely from Hooker's brief account of it.

greatest abundance below Winch Bridge. Sides of springs on the summit of Cronkley Fell.

Var.  $\beta$ . *minor*, foliis minutis, e basi latiori, subdistantibus. By the Tees near Winch Bridge and the High Force.

Var.  $\gamma$ . *muscicola*, surculis prostratis, foliis angustioribus subhorizontalibus. Creeping over mosses on moist rocks below the High Force.

This I believe to be the plant alluded to by Hooker in his monograph under *J. stipulacea* (*J. scutata*, W. and M.), in these terms: "A new species (*J. Bantriensis*, MSS.), which has lately been discovered by Miss Hutchins, and which has, like the present, emarginate leaves: but it differs in its much greater dimensions, in the less concave, obtusely and slightly emarginate leaves, in the small stipules, and in the situation of the calyx, rising quite leafless at the base from the upper side of the stem, as that of *J. pusilla* does." And it is very probable that the plant mentioned afterwards on the same page as having been found in Scotland by Mr. Lyell, and possessing considerable affinity with *J. stipulacea*, but differing in its twice or thrice larger leaves and their obtuse segments, is specifically the same. There is yet another *supposed species* mentioned in the same work (under *J. bidentata*), communicated also from Bantry by Miss Hutchins, and "distinguished from *J. bidentata* in having the leaves cut into three more frequently than into two segments; and in either case they are very distinctly, but irregularly toothed," which I am inclined to unite with the other two. If this opinion be correct, Hooker's remarks plainly indicate a very polymorphous species. Of these three plants, the two latter are never afterwards alluded to in the 'Brit. Jung.,' but *J. Bantriensis* is finally disposed of at page 16 of the Synopsis as a variety of *J. bidentata*, and a figure of the calyx and upper portion of the stem is given in the third supplementary plate. That my plant is the *J. bidentata* var. *Bantriensis* of Hooker has been assured to me by Dr. Taylor, who has kindly compared it with an original specimen from the late Miss Hutchins; and having had excellent opportunities in Teesdale for studying it in its various forms, I am bound to declare that it is truly distinct from both *J. bidentata* and *scutata*, as the following diagnosis will amply demonstrate:—

*Plants* forming dense tufts or patches; in habit much resembling *J. cordifolia*.

*Stems* mostly erect, flexuose, simple or sparingly and dichotomously branched, with suberect branches; yet sometimes exhibiting a laxer and procumbent mode of growth, with divaricating branches; always, however, distinct from the entangled and much-branched stems of *J. bidentata*. They vary almost indefinitely in size, but in the normal form equal *J. bidentata* and far surpass *J. scutata*.

*Leaves* secund, far rounder in outline and attached to the stem by a narrower base than those of *J. bidentata* (which are nearly horizontal in insertion and direction), gradually increasing in size from the base to the summit of the stem, the terminal ones (on the larger stems) three times the size of the lowest; all emarginate or (more rarely) tridentate, with obtuse, acute or apiculate segments; the lower with a lunulate sinus and entire margins; the upper subacutely and often irregularly emarginate, angular or toothed at the margins. The areolation a little wider than in *J. bidentata*. The colour varies from yellowish green to deep olive, but is never whitish, as we most frequently see it in *J. bidentata*. The leaves of the branches and innovations are narrower, more deeply and acutely cloven than the rest; and on the procumbent stems they are seldom secund, but merely incurved or even horizontally patent.

*Stipules* minute, seldom broader than the stem, exceedingly polymorphous, yet usually lanceolato-subulate, with one or more lateral teeth, sometimes quite entire, more rarely bifid or lacinate, often subfalcate but never *twisted*. Occasionally they appear to be quite rudimentary, and are not seldom altogether wanting, especially in the lower half of the stem. In nearly all these particulars they offer a perfect contrast to the *unusually large* and ovato-acuminate stipules of *J. scutata*.

*Inflorescence* dioicous. The *male plants* grow in separate tufts; the stems are antheriferous in their upper half, and the *perigonial leaves* are acutely divided at the summit into three *incurved* unequal teeth, the lowest tooth being the smallest; each leaf encloses 1—4 anthers, most frequently the latter number. But in *J. bidentata* the perigonial leaves are *recurved* in their upper half, and have an involute lobe at the base which contains the anthers. I have not seen perigonia of *J. scutata*, nor were they known to Hooker.

*Female flower* terminal, destitute of any *proper* perichæcium. The *calyces* which contain only pistilla are pyriform\* (as represented in 'Brit. Jung.' Suppl. t. 3), but when fully grown and fruit-bearing nearly cylindrical, depressed at the summit and terminating in a narrow tubular ciliated mouth, which is from one-fifth to one-sixth the length of the calyx: after the emission of

\* An extensive examination of *barren calyces* will bring to light a great variety of forms, but this I attribute to the imperfect state of development they often exhibit; I have even seen them wide-mouthed and almost campanulate, when they plainly betray their origin to be derived from the union of leaves in all respects similar to those of the stem, for the bi- or tridentate apices of the latter are distinctly visible. I have observed similar circumstances in other *Jungermanniæ*, especially *J. ventricosa* and *obtusifolia*, and the former of these perhaps owes its rank of a species to its having been first observed with barren calyces *only*; at least I search in vain for any permanent character to distinguish it from *J. excisa*.

the capsule, laciniated. They are entirely destitute of plicæ or furrows, the transverse section being always circular. The cellules of the tubular mouth are remarkable for being more elongated than the rest, and the terminal ones, which constitute the cilia, are longest of all; whereas in *J. bidentata*, however much the calyx may be laciniated and toothed, *the terminal cellules are always the smallest*. [The fructification of *J. scutata* offers excellent marks of distinction from *J. Bantriensis*: it is *lateral*, with a *perichatium* consisting of 2—6 leaves, entire or variously cut at the extremity, and *far smaller than the stem leaves*; and the calyx is obovate with a trigonous denticulated mouth.]

*Calyptra* obovate, much narrower than the calyx and *perfectly free*; but in *J. scutata* it is of equal width with the calyx, and *adheres to its sides*.

*Peduncle* incrassated, thicker than that of *J. bidentata*. *Capsule* smaller, more nearly spherical, its valves of a deep purplish brown hue, but in *J. bidentata* of a light brown. *Seeds* slightly smaller, and spiral filaments much shorter than those of *J. bidentata*.

In *var. β*. the stems are many times smaller than in the normal form (though intermediate states occur) and of a loosely cellular texture. Leaves broader than long, from a wide base, usually with a shallow triangular emargination; the areolation slightly wider than in the normal form. Stipules so minute as to be detected with great difficulty.

*Var. γ*, which is also of humble size, has almost exactly the habit of *J. excisa*, and might be mistaken for it if the stipules were not observed. The stems are prostrate, subramose, opaque. Leaves almost horizontal, proportionally longer and subquadrate, with a closer areolation. Stipules more uniform, yet occasionally bifid. I found *gemmae* on this variety alone: the leaves which bear them are closely imbricated at the extremity of a shoot, of delicate texture, remarkably laciniated and erose, reddish as well as the *gemmae* themselves, which are almost spherical in shape. The stipules which accompany the gemmiferous leaves are of unusual size, being scarcely smaller than the leaves themselves.

All the states of this species are remarkable when growing, or if moistened after having been dried, for their strong and rather agreeable scent; very different from that of *J. bidentata*, but not unlike that of *J. hyalina*. Dr. Taylor likens it to “recently cut cedar-wood with a dash of sweet-briar.”

Although *J. bidentata* and *scutata* are the nearest allies of *J. Bantriensis*, yet there are other species which approach closely to it, amongst which are *J. barbata*, Schreb., *J. Lyoni*, Tayl., and *J. saxicola*, Schrad.; but as the differences are obvious enough to

any one acquainted with these species, it is needless to enter into an exposition of them.

I ought to add that Mr. Wilson has favoured me with specimens of what I consider to be a state of *J. Bantriensis*, gathered by Mr. Ralfs near Dolgelley, in September last. It differs from the normal form only in its laxer habit, more distant and sub-patent leaves.

5. *Jungermannia barbata*, Schreb. Frequent, especially near the High Force; usually intermixed with mosses.

6. — *bicuspidata*, L. Everywhere.

7. — *bidentata*, L. Common; but not ascending the mountains.

8. — *byssacea*, Roth. In several localities. Few *Jungermannia* are more various in their hues than this little species: in Hell Cleft it gives to the large patches of *Barbula tortuosa* which it infests the appearance of being strewed with soot; near Maize beck it imparts a pinkish tinge to *Dicranum glaucum* and other palustrous mosses; growing on the earth near the High Force, its colour is a deep green. In the last-named locality the stems exhibit stipules, which are very minute, ovate and entire towards the base of the stems, but bifid in the upper part. Stipulaceous varieties of *J. byssacea* are not unfrequent near York, and might be mistaken for *J. Francisci*, Hook., which is however a perfectly distinct species.

9. — *ciliaris*, L. Very sparingly on Cronkley Fell. This usually alpine species flourishes in abundance on all our moors in the Vale of York, where its constant companion is *Cetraria Islandica*.

10. — *concinata*, Lightf. On rocks south-east from Cronkley Bridge, and more abundantly at the base of Holwick Scarr.

11. — *cordifolia*, Hook. In streams on the west side of Mickley Fell; on wet rocks near the Tees, in various places.

12. — *Dicksoni*, Hook. Cronkley Scarr and rocks south-east of Cronkley Bridge, but very scarce.

13. — *dilatata*, L. On trees.

14. — *echinata*, Tayl. MSS. On limestone rocks in Hell Cleft, Eppersgill beck, and on the Yorkshire side of the High Force. I have seen *J. hamatifolia*, Hook., its near congener, in precisely similar situations on slate and old-red-sandstone rocks in the south-west of Ireland.

15. — *emarginata*, Ehrh. Abundant in moist rocky situations, especially near streams.

16. — *epiphylla*, L. Near streams.

17. — *excisa*, Dicks. In many places.

18. — *furcata*, Linn. Rocks and trees.

19. — *incisa*, Schrad. Near Maize beck.

20. — *inflata*, Huds. In heathy places.

21. — *laxifolia*, Hook. At the base of the High Force; very scarce.

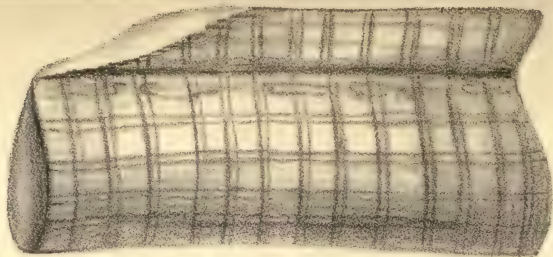
22. — *Lyellii*, Hook. I found a single plant by the Tees near Winch Bridge.

23. — *Lyoni*, Tayl. MSS. Cronkley Fell and Holwick Wood.



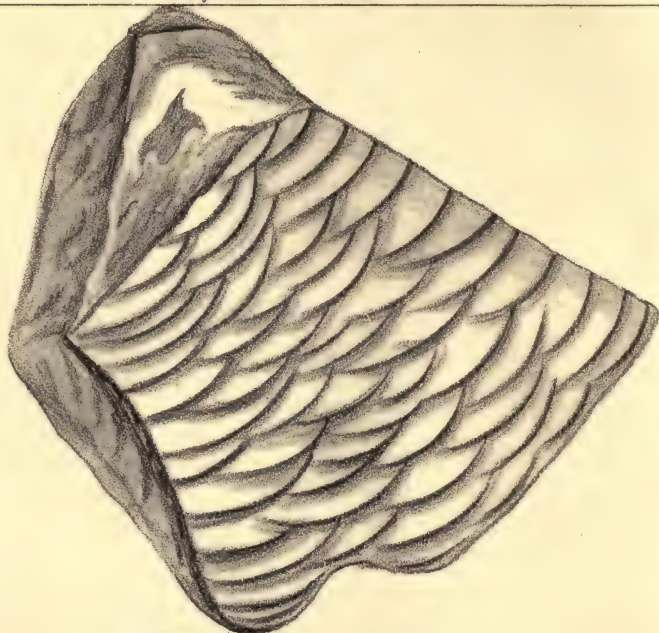


*Fig. 1.*



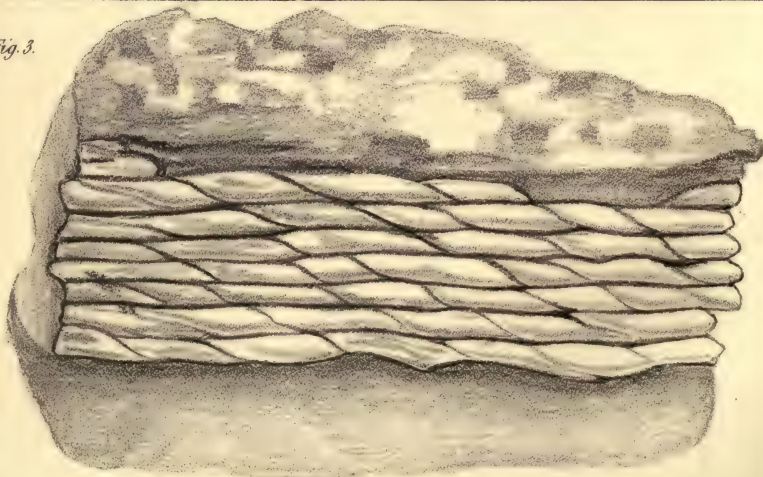
*Dictyodendron Patricii.*

*Fig. 2.*



*Lepidodendron* \_\_\_\_ ?

*Fig. 3.*



*Lyginodendron Landsburgii.*

24. *Jungermannia multifida*, L. On moist rocks among mosses; fructifying in several places.
25. — *nemorosa*, L. In a great variety of situations.  
Var.  $\beta$ . *purpurascens*, in Hell Cleft.  
Var.  $\gamma$ . *recurvifolia*, on rocks near streams.
26. — *pinguis*, L. In bogs and near streams.
27. — *platyphylla*, L. Rocks.
28. — *polyanthos*, L. On stones in the bed of the Balder.
29. — *pubescens*, Schrank. Frequent on rocks (chiefly limestone) near the Tees and its tributaries. I found *perigonia* in abundance, but no *calyces*, though I searched most minutely.
30. — *reptans*, L. Cronkley Scarr; very sparingly.
31. — *riparia*, Tayl. MSS. Sides of streams; not common.
32. — *scalaris*, Schrad. Frequent in moist situations.
33. — *serpyllifolia*, Dicks. Near the High Force, Hell Cleft and other places, yet nowhere abundant.
34. — *setacea*, Web. Heathy situations near Maize beck and Cronkley Scarr.
35. — *spinulosa*, Dicks. Near the High Force and Caldron Snout, but rather rare.
36. — *Tamarisci*, L. On rocks and about the roots of trees.
37. — *Taylori*, Hook. Cronkley Scarr and the west side of Mickle Fell.
38. — *Trichomanis*, Dicks. Frequent.
39. — *trichophylla*, L. Abundant in moist situations.
40. — *undulata*, L. Maize beck. Dr. Taylor's opinion that this is only a variety of *J. nemorosa* ('Flora Hibernica,' part ii. p. 61) is, I fear, too well founded.
41. *Marchantia androgyna*, L. Exceedingly abundant on rocks by the Tees, Ettersgill beck, and other streams.
- Collegiate School, York, Nov. 15, 1843.

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XXXVI.—*On the Fossil Vegetables of the Sandstone of Ayrshire.*  
By J. SHEDDEN PATRICK, F.R.S.E., F.R.S.S.A. &c.\*

[With a Plate.]

HAVING observed, in visiting the Museum of the Royal Society, that, although it contained many fossils of interest, especially a very beautiful and complete series from England, presented by the Earl of Cathcart, those of Ayrshire appeared to be altogether wanting, I was induced to take advantage of a few months' residence in the district of Cuninghame in that county, during the summer of 1843, to make a small collection of some of the principal fossils of the locality for the purpose of presentation to the Society's museum.

The fossil vegetables which constitute the collection were ob-

\* Read before the Royal Society of Edinburgh, Jan. 2nd, 1844.

tained from a quarry in the parish of Stevenston, where I was principally residing. The quarry, which is on the estate of Mr. Warner of Ardeer, belongs to the carboniferous group, and is considered the most valuable for white sandstone in the west of Scotland. It is thus spoken of in the 'New Statistical Account' (p. 437) :—

“This is the most valuable quarry of white freestone in the west of Scotland. The produce of it has long been well known to the public under the name of ‘Stevenston stone.’ It is of very excellent quality; the colour is good, and being firm and fine in the grain and easily wrought, it takes a fine polish and stands well. It is much used at home, and it is still more in request in Dublin and Belfast and other places in Ireland, for it can be sawn like marble, with which it vies in beauty; and it can be formed into slabs of any size required. At home and also in Ireland, it is used in the interior of houses for stairs, the pavement of lobbies and halls, and for chimney-pieces, &c.; and externally it is employed in public and private buildings for fronts, chimneys, columns, &c. Columns can be furnished of any dimensions from 10 to 20 feet and upwards in altitude. It is used for tombstones, gate-posts, &c. The quarry lies from S.W. to N.E., and the dip is to the S.W., the same as the coal strata, between the first and second of which it is found. It is in irregular layers or posts, varying from 6 inches to 6 feet in thickness. It requires to be bared, where it is at present wrought, of about 25 feet of different kinds of soil; viz. of about 4 feet of sand, 3 feet of loam, and the rest, down to the rock, till or slate-clay. The stone passes from the quarry to Saltcoats and Ardrossan by railway, and is there shipped,” &c.

The coal has been wrought out from beneath it within the remembrance of the present generation. The sandstone has been quarried to the depth of above 20 feet, and it goes about 20 feet deeper. In the 'New Statistical Account,' in a note at the foot of page 429, the Rev. author, after mentioning that there have been about seventy specimens of subfossil shells found in the coal-field, and naming twelve kinds not now found in a recent state on the shore, goes on to say, “We have had the pleasure of picking up abundance of these shells where they are boring the rock at Ardeer or Stevenston quarry. There the shells are only 5 feet under the green sward. At this depth there is a bed of coarse sea-sand, mixed with *Turbo littoreus*, &c. &c., the whelks and limpets and cockles being sound and entire. Under this bed of gravel and sand and shells there is a stratum of solid till or slate-clay 10 or 12 feet thick, overlying the beautiful sandstone of the quarry. This schistus is perforated in innumerable places to the depth of 5 or 6 inches by *Pholas crispata* or the Borer, in the same man-

ner as the progeny probably of these venerable Borers are, at the present day, piercing the same rock in the sea at Saltcoats. The bore is fully an inch in diameter. The shell still occupies the mouth of the perforation; and, though now frail, it is distinctly marked by its waved ridges and longitudinal furrows, and the groove running from the hinge to the margin. But what is much more wonderful, at the bottom of the holes which the *Pholas* has bored, there is a matted tuft of sea-weed (*Ulva intestinalis*) not petrified,—not converted into peat,—not rotten,—but retaining its sap and form, and texture and reticulations, and even its pale-green colour! This is not a little surprising. Sir Wm. Hooker, to whom we sent specimens, says that it could not have grown 5 feet under ground. From the shells then and from the *Ulva*, the sea must have been there, though at a period too remote to be now ascertained; and although the sea is now about three-quarters of a mile distant from the quarry, we can easily credit the tradition that, in ancient times, vessels were accustomed to lie at anchor north of the quarry, and about the place where Ardeer-house now stands (fully a mile from the present high-water mark). Indeed, from various phenomena that have come under our observation, we have the most thorough conviction that at a period not extremely remote, the half of this parish (Stevenston) was overflowed by the sea."

Under the sandstone strata there is a stratum of shale about 18 feet in thickness, then comes a coal called "the five-quarter coal," then another stratum of shale, and under it the parrot-coal. The quarry has been worked for upwards of sixty years, and is therefore of considerable extent. The strata very much vary in thickness at different parts of it.

The fossils are not confined to any one stratum of the sandstone, but are found in them all, wherever the sandstone is faulty. I have counted about five strata at the deepest part of the quarry, separated from each other by thin layers of shale, and fossils are found in all these strata, chiefly however where the sandstone is rendered impure by a mixture of greenstone and ironstone. There have been above thirty different kinds of fossils found in this quarry and in the schist connected with the coal: among them many beautiful impressions of ferns, reeds, *Stigmaria*, *Sigillaria*, *Lepidodendra*, and other plants unknown in the present day. Some of these were discovered 70 fathoms (420 feet) beneath the surface of the earth. Among the ferns will be found *Sphenopteris*, *Neuropteris*, *Pecopteris*, &c. The fossils which occur in greatest profusion are the *Calamites*, which are thus spoken of by Mr. Gourlay at a meeting of the Philosophical Society of Glasgow, on 15th February 1843:—(See their Transactions, p. 107.)

"The fossil plants referable to the genus *Calamites* of Bron-

gniar and other authors occur profusely in our coal-fields as well as in those of the North of England. They are found in a state of compression, which renders it difficult to determine their species, or to form an idea of their probable affinity to plants of the present day. Judging from the remarkable compression of even the largest specimens, it is likely that the Calamite had a hollow jointed stem, with transverse phragmata, resembling that of the bamboo cane, and, at least in some species, with verticillate branches, which again have verticillate leaves. Brongniart thinks that the *Calamites* must have had a close affinity to the recent genus *Equisetum*, from their striated, or rather furrowed, jointed stems, and the presence in one of his specimens of what he takes to be a sheath; but the objection to this view is, that they appear to have had both wood and bark, and consequently, with the habit of a Monocotyledonous plant, they come nearer the Dicotyledones in structure. A specimen from the Duke of Hamilton, in the Glasgow Geological Museum, was found in the sandstone in an upright position, and shows the form of the stem without the usual compression; but it is apprehended, that even were it possible to form a thin polished section, it would exhibit no trace of structure."

They are also admirably described in Lindley and Hutton's 'Fossil Flora,' vol. i. p. 49. Among the several varieties which I possess, the *Calamites nodosus* is very common. The *Calam. approximatus* is also found frequently. The *Calam. cannaeformis* is rarer: I regret that my specimens of it are poor. The following are also seldom to be met with here, although I have been able to obtain distinct specimens of them all, viz. *Calam. arenaceus*, *C. Mougeotii* and *C. verticillatus*.

The *Sternbergia approximata* is considered rare, and the specimens procured of it are in general small. Lindley calls it "a most singular coal-measure plant occurring in most coal-fields of this country, but not abundant anywhere. The specimens are usually found in sandstone, and are covered with a fine coal, which adheres either in the form of an even, thick, glossy integument, or in a powdery state to the surface of the stem." The Rev. David Landsborough, late minister of the parish of Stevenston, says, in a letter I had the pleasure of receiving from him a short time ago, "I picked from the middle stratum a fine large specimen of *Sternbergia approximata*," which shows that such are occasionally to be met with in that quarry. I have not, I regret to say, been so fortunate as to get any "fine large specimen," but have one or two very distinct ones; two with the coal still adhering, which is very difficult to obtain, as it is so extremely friable.

I had a very fine specimen of *Sternbergia nodosa* of a length

which has seldom been got out of the quarry entire, but it has most unfortunately been broken in its journey to Edinburgh.

While hunting among the *débris* of the quarry I was fortunate enough to discover a curious fossil, which I have every reason to believe is original; it bears a considerable resemblance to a piece of tartan, being divided into regular parallelograms by double lines intersecting each other at right angles (Pl. V. fig. 1.). On submitting it in September last to the inspection of Mr. Landsborough and other gentlemen in the neighbourhood, they all declared that it was new to them. I also showed it to the manager of the works and to several of the most intelligent of the overseers and colliers (most of whom had been born in the village, and passed the greater part of their lives in the works), and they all said they had not before met with it. I may therefore, I think, consider it unique. Mr. Landsborough, to whom it has since been sent for more minute inspection, writes thus: "I think, after attentive consideration, I have got an excellent name for your beautiful fossil, *Dictyodendron Patricii*; deriving the generic appellation from *δίκτυον*, a net—how like it is to network!—and *δένδρον*, a tree (we have *Dictyosiphon* (*δίκτυον-σίφων*) in recent botany for the same reason), and dedicating it by the specific name to yourself as the discoverer."

We now come to that class of fossils which is peculiar to, and the distinguishing feature of, the coal-measures, the *Stigmariæ*. Of these the *Stigmaria ficoides* is the principal. Three varieties will be found in the collection. The most curious of these is *Stigmaria radiata*: this species consisted of a central stem or shoot, which is said, at times, to have attained the height of 20 to 30 feet, and from which branches radiated in every direction, arching over and bending downward. At the time the British Association was at Glasgow, a specimen of this stem was exhibited between 4 and 5 feet in length, and which is now deposited in the Geological Museum of that city. Brongniart, in his 'Histoire des Végétaux Fossiles,' comes to the conclusion that "the *Stigmariæ* and *Sigillariæ* constitute a peculiar and extinct family (belonging probably to the Gymnospermous division of the Dicotyledons), but of which neither the fruit nor the leaves are as yet known. These fossils, it is evident, are nearly related to each other; and *Anabathra* ought likewise to form a part of the same group. Perhaps *Stigmaria* is only the root of *Sigillaria*." It is unnecessary to quote the passage further. *Stigmaria nodosa* is likewise met with in the quarry.

The *Trigonocarpum olivæforme* (or fruit of the palm-tree) is very scarce, being found only in one part of the quarry of very limited extent—in the lowest stratum next to the shale. I possess two or three specimens, one of which is in the matrix.

Another fossil very rare, in that district at least, is the *Halonia tuberculata*, of which a very fine specimen was obtained several years ago by Mr. Landsborough, adhering to the surface of the upper stratum of sandstone. A specimen was sent to me lately, purporting to be this species of the *Halonia*, but as I am dubious of the correctness of this assertion, I shall not notice it on the present occasion.

We next come to the *Lepidodendra*, of which Mr. Gourlay says, "This genus of fossil plants is one of great interest, not only on account of its abundance and the elegance and beauty of its impressions and casts, but from the affinity between the fossil *Lepidodendron* and two existing genera of plants. In the first volume of the 'Fossil Flora,' by Dr. Lindley and Mr. Hutton, the authors express their belief that the *Lepidodendra* would be found to be intermediate between the *Coniferæ* and *Lycopodiaceæ* of the present day. The first of these natural orders, the *Coniferæ*, comprehends the pines, larch, cedar, &c. The *Lycopodiaceæ*, on the other hand, are small in size compared with either the *Lepidodendra* or the *Coniferæ*, and a few species are indigenous to this country, where they are familiarly known as club-mosses. The opinion referred to has been confirmed by subsequent investigations. Some of the specimens of this genus, contributed to the Glasgow Geological Museum, are of singular beauty; and in particular some specimens of *Lep. elegans* from C. J. Baird, Esq. of Shotts Iron-work." I have three species of this fossil, *Lepidodendron Sternbergii*, *Lep. Harcourtii*, and a very curious and peculiar variety which is also rare, although Mr. Landsborough informs me he has a fine large specimen of it. Of this variety I am unable to give the proper specific name. (See Plate V. fig. 2.)

*Endogenites striata* is occasionally met with. I have one specimen.

The last of the *Coniferæ* which I shall mention at present is one which, as far as I am aware, is unique. It was discovered in 1842 by Mr. Landsborough. Most of the members of this Society are aware that, previous to the meeting of the British Association in Glasgow in Sept. 1840, a committee was appointed to make a collection of the minerals, rocks and organic remains of the west of Scotland; through their exertions, and with the zealous co-operation of many noblemen and gentlemen of the surrounding districts, particularly in the mining departments, a very extensive and beautiful collection was got together, which now forms, with the additions since that period, the Geological Museum of Glasgow. To this Mr. Landsborough presented many valuable contributions.

With regard to the fossil under consideration, Mr. Landsborough, not being able to class it with any known species, submitted



it to the inspection of the Geological Society of Glasgow, to whom it was exhibited by Mr. Gourlay on February 15, 1843, who thus reports upon it: "A most remarkable cast of a plant was lately sent me by the Rev. David Landsborough, which was found in a quarry of carboniferous sandstone at Stevenston, Ayrshire. The specimen, when found, had a coating of coal which the quarryman unfortunately picked off with his knife, but the exposed surface presents a very singular appearance, and is unlike any fossil plant which we have ever seen figured. Its peculiar feature, which is at once apparent on inspection, is its resemblance to part of a common osier-basket (Pl. V. fig. 3.): hence Mr. Landsborough has for some time been in the habit of humorously distinguishing it as 'Noah's creel' for want of a better appellation. To supply this desideratum in nomenclature, and as no such fossil appears to have been described or figured, I have ventured to name it *Lyginodendron Landsburgii*, forming the generic name from *λύγινος*, *wicker-work*, and *δένδρον*, *a tree*, and dedicating it by the specific name to my friend Mr. Landsborough, a gentleman distinguished not only as a pious and conscientious clergyman, but as an enthusiastic and most successful cultivator of natural history; one, too, whose warm-hearted and amiable disposition endears him to all who have the pleasure of his acquaintance. The fragments of the fossil were spread over a space of about two yards, the finest specimen found being about 18 inches in length by 3 in breadth, and have not been observed except in that place." He then goes on to mention some of the other productions of the same quarry, in which a great many fossil fruits occur, which are obviously those of a palm (*Trigonocarpum olivæforme*); and also specimens of the *Sternbergia approximata*, "a singular and rare coal-plant," a fine specimen of which has been deposited in the museum of the "Andersonian Institution" by Mr. J. Craig. I am happy to say I have obtained one or two specimens of this curious and rare fossil (the *Lyginodendron Landsburgii*), which will be found in the collection. Mr. Landsborough mentions that only a very few specimens exist, and, as he believes, it has not been found elsewhere: he discovered it in the middle stratum.

I may dismiss the other fossils I have to exhibit to you in a very few words. The principal ones are the *Sigillariæ*, which are thus described by Mr. Gourlay:—"The genus *Sigillaria* is so named from *sigillum*, a seal, on account of the peculiar impressions on the stems. Less is known of this genus than even the *Calamites*, and similar forms are quite unknown in the vegetation of the present day. They are found inclined in all directions, sometimes passing vertically through beds of sandstone, but most frequently in a horizontal position; and then they are crushed so extremely

thin that they seem to have been hollow like the Calamite, and to have possessed very little substance, although attaining a height of 40 or 50 feet. The compressed stems have been found as much as 5 feet in breadth. They are fluted longitudinally in general, and marked at regular intervals with single or double scars, evidently produced by leaves which have been articulated to the stem. These marks are different in the decorticated state of the fossil from those which appear on the surface of the coaly envelope representing the bark. [This is well seen in the *Sigillaria reniformis*.] M. Brongniart considers these to be the remains of the stems of arborescent ferns, but Lindley and Hutton have established that the fluted *Sigillaria* have nothing analogous to tree-ferns. On the contrary, they appear to have been plants with hollow cylindrical stems, consisting of wood and bark and clothed with leaves, attaining a height of 40 to 60 feet, but belonging to a family with no representative, or even relation, in the 'Flora' of our day." I have two varieties of the *Sigillaria*: *Sigil. reniformis*, two of the fragments of which must have belonged to very large individuals of the species, and *Sigil. oculata*.

I may remark that there is a very able and interesting article in the January Number of the 'Edinburgh New Philosophical Journal,' edited by Prof. Jameson, "On the general character of the Fossil Plants of the genus *Sigillaria*," from the pen of Wm. King, Esq., Curator of the Museum of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne, from which, however, my limits will not allow me at present to quote.

Mr. Landsborough says, "The most magnificent fossil found in the quarry is *Bothrodendron punctatum*. Only two specimens have been found, of which I possess one." He would have permitted me to exhibit it to the Royal Society, but he adds, "since leaving the Manse my minerals have got into sad confusion, and amid the press of business I have not been able to arrange them, or lay my hands upon it, although it is a specimen I could with difficulty lift from the ground." I have not been able to obtain a good specimen of this remarkable fossil, but have been fortunate enough to find, among the débris of the quarry, a very distinct impression or cover of one.

Another very curious and remarkable fossil is the *Styololithon*, of which there appears to be two distinct varieties; one with very broad stripes, the other with the lines more closely approximating to each other, but more deeply indented.

Another peculiar fossil was discovered lately by Mr. Landsborough, and has been named by him *Batodendron*, from βάρτος, a bramble, and δένδρον, a tree, from the exact resemblance it bears

to a knotted bramble. He writes me that he has never been able to meet with either any figure or description of it. He presented one specimen of it to Professor Jameson of Edinburgh.

Had the excavators of the quarry proceeded with any care, branches of trees of considerable size might have been got out uninjured; but workmen are proverbially careless and indifferent, and few of any length have been saved. My friend Mr. Warner of Ardeer, proprietor of the quarry, had one or two of considerable magnitude, both as regarded length and girth.

I have now brought to a close my remarks on the fossil vegetables; but I have still one specimen to notice of an altogether different kind.

On the estate of Ardeer, to which I have already alluded, there is a chain of coal-pits extending from W.N.W. to E.S.E. for a distance of between four and five miles. In these the dip of the strata is to the S., and consequently the rise to the N., which dip and rise decline on an average from the horizon about 1' in 7.5. In sinking the shafts for these, the miners have, in every instance, had occasion to pass through a stratum or bed of fresh-water shells about 9 inches in thickness and of extreme hardness. The matrix, in which the shells are imbedded very thickly, is an impure ironstone. In speaking of this, in the 'Statistical Account,' Mr. Landsborough calls it marble; but he had fallen into the error from having been told that a chimney-piece had been made of it, and, on seeing the fossil, at once discovered it, though too late, as the book was by that time published.

The pit from whence I obtained the masses submitted for inspection is the north-westernmost of the range (or "Turf-Dyke-pit"), and the deepest, 84 fathoms (= 504 feet). The shell-bed in it was struck at 37 feet from the surface, while in the south-easternmost (or "No. 7 pit"), now in the progress of shanking, the miners penetrated to the depth of 15 fathoms (= 90 feet) before they came upon the shell stratum, which lies immediately above the "main coal."

The shells of which the mass is chiefly composed, Mr. Landsborough was at first inclined to consider as the *Unio Pictorum* of Lamarek; but on submitting them to Dr. Fleming of Aberdeen, that celebrated naturalist pronounced them to be the *Unio Uriei*, in which opinion Mr. Landsborough on further examination concurred.

## BIBLIOGRAPHICAL NOTICES.

*Iconographia familiarum naturalium regni vegetabilis.* (*Abbildungen aller natürlichen Fam. &c.*) Von Adalbert Schnizlein, Ph. D. Heft 1. 4to. Bonn, 1843.

THIS work will supply what has long been a desideratum to the botanical student in this country, viz. a complete set of illustrations of the essential characters of the natural orders.

The 'Genera Plantarum' of Endlicher is taken as the authority, but additional plates will be given of those orders, not adopted in that work, proposed by DeCandolle, Lindley and others. Each plate will contain a complete figure (where practicable) of one or more species, with dissections of all the most important forms in *one* Order; by this means the purchaser will be enabled to arrange them as he pleases. The text will include a definition of the orders in Latin and German, scientific and practical observations in German, and a list of the genera.

The first part contains twenty carefully executed plates, partly coloured, half of which are devoted to the Cryptogamic orders, so as to give a general idea of the work; the figures are mostly original, and when this is not the case, they are copied, after careful revision, from the best authorities.

This will add another to the many obligations we owe to the Germans, by whose enterprise alone can we obtain such works as the present, Nees von Esenbeck's 'Genera,' &c., at a price within a student's means, and we cordially recommend our botanical friends to avail themselves of the assistance the wider diffusion of the science enables their continental brethren to offer.

The parts are to appear three or four times a year, and will extend to about 360 plates.

*Annales des Sciences Naturelles.*

September 1843.—*Zoology.*—M. Marcel de Serres on the large Fossil Oysters of the tertiary formations bordering the Mediterranean. Twenty-five species are described, but several of these are probably only varieties. One of them is no less than eighteen inches in length.—Bouchardat and Sandras on Digestion.—Dumas and Milne Edwards on the production of Bees-wax\*.—Experimental researches on Inanition, by Dr. Chossat. A record of barbarous experiments on the starving of animals, by a follower in the cruel path of Majendie.

*Botany.*—Tulasne on new genera of *Leguminosæ*. The new genera are *Ancylocalyx* and *Neuroscapha* (*Dalbergiæ*), *Dibrachion* (*Sophoræ*), *Diptychandra*, *Cenostigma*, *Trischidium* and *Phyllocarpus*, Riedel (*Cæsalpinia*). They are all founded on South American plants.—Dr. Duchartre on the *Lathræa clandestina*. The anatomy of the organs of vegetation.—M. Braun on the *Sileneæ* (from the 'Flora').—Fischer on the genera *Angelica* and *Archangelica*.

Oct.—*Zoology.*—Dr. Hirtl on the vascular apparatus of Fishes

\* See p. 233 of the present volume.

(from Müller's 'Archives').—M. de Quatrefages on the *Synhydra parasites*, a new genus of Polypes near *Hydra* (with a fine plate); an interesting memoir on a very anomalous animal. The reproduction of hydroid polypes by *bulbils*, which the author supposes he is the first to discover, has long been known to British zoophytologists, and is described in the writings of Johnston and others. Several points in this, as well as former excellent papers of M. de Quatrefages, show that he is unacquainted with much that has been done on this side of the Channel.

*Botany*.—Mr. Robert Brown on the plurality and development of Embryos in the Seeds of *Coniferae* will appear in the next number of the 'Annals.'—M. Gaudichaud's reply to M. Mirbel.—Dr. Lèveillé on the genus *Sclerotium*. The genus *Sclerotium*, constituted by Tode in 1790, has been made a receptacle for all kinds of anomalous fungoid productions, many of them only states of diseased vegetable tissue. M. Lèveillé in this memoir investigates the nature of these problematical vegetables with care. He regards them with Martius and Corda as *asporous*, and as only forms of undeveloped fungi, in fact *mycelia*. Two plates accompany the paper.—Count Jaubert and M. Spach, *Conspectus subgeneris Armeriastrum*. Twenty species of *Statice* of this subgenus, mostly from Persia and Western Asia, are recorded.

Nov.—*Zoology*.—M. F. Dujardin on the habits of a captive Dormouse.—M. Kœlliker's inaugural thesis on the Genesis of Insects (with three plates). A portion of this valuable memoir is devoted to a comparison of the evolution of the Articulata with that of the Vertebrata. The concluding sentence of this paper embodies an important proposition: "Articulatum nobis est animal vertebratorum embryoni simile, in quo et laminæ dorsales non coaluerunt, et systema ossium cum membris lateralibus primis vestigiis tantum formatum est."—M. Leon Dufour on the metamorphoses of *Eledona agaricicola* (with a plate). A notice of the interesting habits of the fungivorous larva of this beetle is given among the miscellaneous articles of the present number of this journal.—M. Leon Dufour on the metamorphoses of *Diaperis Boleti*. The larva of this insect has the same habit with the last.—Second part of Dr. Chossat's researches on Inanition.

*Botany*.—MM. Mirbel and Spach on the Embryogeny of *Pinus Laricio* and *sylvestris*, of *Thuya occidentalis* and *orientalis*, and of *Taxus baccata* (with plates).—Mr. Webb on the genus *Retama*. Eight species are described.—MM. Corson and Germain on *Filago* and *Logfia* (with a plate). A new species of *Filago*, nearly allied to *F. germanica*, is described in this paper under the name of *Filago Jussiei*. It is said to be distinguishable at first sight from the former species, by the foliaceous involucre of the glomerules exceeding the *capituli*; by the larger size of the *capituli*, which are fewer in each glomerule (being eight to fifteen, rarely twenty, in *Filago Jussiei*, and twenty to twenty-five in the common species), and by their not being buried in a thick *tomentum*. The new species flowers later (in November) than *F. germanica*. It appears to be common in France, and occurs

also in Greece and Western Asia: it has probably been passed over as a variety in Britain.—On a new *Marrubium* from the environs of Paris, by the same authors.—Fourth Century of new Exotic *Cellulares*, by Dr. Montagne (the 7th Decade).—Dutrochet on the spontaneous movements of Plants (commencement).

Dec.—*Zoology*.—Milne Edwards on fossil *Isopoda* (see 'Annals,' No. 82).—On the Entozoa inhabiting the species of *Sorex*, by M. F. Dujardin (with two plates).—An extract at length from the very important memoir on the *Campanulariæ* of the coast of Ostend, by M. Van Beneden (see 'Mémoires de l'Académie Royale de Bruxelles,' vol. xvii.), with a plate. The author maintains (from observation) that the *Campanulariæ* are viviparous, and that the young, or the common substance of the ovarian cell, have been wrongly regarded as a female. The eggs, like the buds, are the products of the community. The individuals have no sex. The young *Campanulariæ* towards the middle of their embryonary life have the form, organization, habits and mode of life of *Medusæ*. In this state they have muscles, nerves and organs of sense, which, when the embryo becomes fixed in order to give rise to a new colony, disappear, so that the young animals are more elevated in their organization than the adults!—On a new genus of *Medusæ* proceeding from the metamorphosis of *Syncoryne*, by M. F. Dujardin. The observations in this interesting paper agree so far as they go with those of M. Beneden; the medusa state of the polypes was, however, some years ago described by Sir John Dalyell.

*Botany*.—Dutrochet on the movements of Plants (concluded). The movements of plants are automatic; they result neither from intelligence nor from will. They depend on an interior and vital force, of which the action is *revolutive*, and which the author maintains exists in all vegetables, but manifests its existence rarely, and only in those *revolutive* movements appreciable by our senses.—Dutrochet on the Inflexion of Vegetable Stems towards coloured light. The stems of plants placed in light transmitted through coloured glass elongate much more than they would have done under the influence of ordinary light.—M. A. Trécul on the fruits of *Prismatocarpus Speculum* and *hybridus*, and on that of the *Cruciferae* (with a plate.). The author arrives at the following curious conclusions, some of which are not a little opposed to established morphological notions: 1st, between the structure of the fruits of *Prismatocarpus Speculum* and *hybridus* and that of their stems, there exists such a similitude that the fruit appears to be the continuation of the stem, its summit modified for reproduction; 2ndly, that the sepals, the petals and the stamens of the same plants spring really from the summit of the ovary; 3rdly, that the partition of the fruit of *Cruciferae* is simple; 4thly, that the stomata are not confined to the surface of plants, since they are found on the partitions of certain cruciferous fruits.—M. Baudo, Index Anagalleidarum.—The eighth, ninth and tenth Decades of the fourth Century of new Exotic *Cellulares*, by Dr. Montagne.—M. Barnéoud on two *Orchideæ* new to the French flora. These are *Orchis saccata* of Tenore, and *Orchis Champagneuxii*, a new species

said to be intermediate between *Orchis Morio* and *Orchis longicornis* (Desfontaines): it is from Hyères.—Notice of the addition of *Arceutolobium* (*Viscum Oxycedri*) to the French flora, by M. Requier, the well-known botanist of Avignon.

PREPARING FOR PUBLICATION.

*A History of the British Freshwater Algæ.* By Arthur Hill Hassall.

This work is intended to contain a complete account of the Modes of Reproduction, Growth, Vitality, Distribution, Uses, Classification, and Species of this most extensive and interesting class of plants; interesting from the importance and number of the physiological and anatomical facts connected with their history. It will comprise about 300 pages of letter-press and seventy plates of drawings, illustrating every species of the classes of *Conferveæ* and *Diatomaceæ* hitherto discovered inhabiting the fresh waters of the British Isles, almost all of which will be represented in their perfect state, or that of reproduction. The work is to be published by subscription.

Names of subscribers and communications to be addressed to the care of Mr. Van Voorst, Paternoster Row.

BOOKS RECEIVED.

*Die Sud Afrikanische Crustaceen*:—The South African Crustacea. 4to. with Four Plates. Von Dr. Ferdinand Krauss, Stuttgart.

*Handbuch einer Geschichte der Natur*:—Manual of a History of Nature. By Heinrich C. Bronn, Prof. Nat. Hist. Heidelberg. 2 vols. with several Plates.

*Elements of Natural History.* By Mrs. R. Lee, illustrated with engravings on wood. [A very excellent manual for the instruction of youth.]

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

May 9, 1843.—William Yarrell, Esq., Vice-President, in the Chair.

The following descriptions of new species of Shells belonging to the genus *Cyclostoma*, by Mr. G. B. Sowerby, were read.

CYCLOSTOMA PUSILLUM, nob., Thes. Conch. part 3. pl. 23. f. 55\*.

*Cycl. testâ orbiculari, subdiscoïdâ; apicè spiræ subprominulo; anfractibus quatuor, rotundatis, lineis incrementi solùm striatis; suturâ profundâ; aperturâ circulari, peritremate tenuiusculo, sub-reflexo, posticè prope anfractum ultimum subemarginato; umbilico patulo; operculo multispirali, extûs concavo, margine canaliculato, intûs nitido.*

Var. *a.* Found at the roots of shrubs and trees at Calauang, isle of Luzon, by H. Cuming.

Var. *b.* Found under decayed leaves in the isle of Negros, by H. Cuming.

CYCLOSTOMA RUFESCENS, nob., Thes. Conch. part 3. pl. 24. f. 36, 37. *Cycl. testâ suborbiculari, rufescente, spirâ brevi, anfractibus quatuor, rotundatis, spiralitèr costellatis et striatis, costellis crenulatis; suturâ profundâ; aperturâ circulari, peritremate tenui; umbilico magno.*

There are two varieties of this species, one of a dark red colour, the other almost white. They were communicated by Mr. Powis, from Martinique.

CYCLOSTOMA PLEBEIUM, nob., Thes. Conch. part 3. pl. 24. f. 40. *Cycl. testâ subglobosâ, tenui, obscurâ, subfuscâ, spirâ breviusculâ; anfractibus quatuor, rotundatis, rapidè crescentibus, apice obtusiusculo; suturâ distinctâ; aperturâ magnâ, circulari, peritremate tenui; umbilico parvulo; operculo multispirali, extûs albicante, maculâ centrali, depressâ, margine canaliculato, intûs nitido.*

Found in the earth under decayed leaves at Calauang, in the province of Laguna, isle of Luzon, by H. Cuming.

CYCLOSTOMA SPURCUM, nob., Thes. Conch. part 3. pl. 24. f. 75, 76. *Cycl. testâ suborbiculari, rufescente-fuscâ, spirâ prominulâ; anfractibus quatuor, rotundatis, albicante-subvariegatis, spiralitèr striatis et subcarinatis, suturâ distinctâ, subcrenulatâ; aperturâ circulari, peritremate albo, tenui, subreflexo; umbilico parvo; operculo crassiusculo, anfractibus quinis.*

From the Seychelle Islands. In Mr. Cuming's collection.

CYCLOSTOMA CINCINNUS, nob., Thes. Conch. part 3. pl. 24. f. 77, 78. *Cycl. testâ suborbiculari, subturritâ, tenui, albidâ, interdùm fusco-unifasciatâ; anfractibus quinis, rotundatis, posticè spiralitèr sulcatis, sulcis subdistantibus, anticè spiralitèr striatis; suturâ distinctâ; aperturâ circulari, peritremate tenui, versus umbilicum parvum subreflexo, apice obtusiusculo.*

Locality not known. In Mr. Cuming's collection.

CYCLOSTOMA NITIDUM, nob., Thes. Conch. part 3. pl. 29. f. 225, 226, 227. *Cycl. testâ globoso-conicâ, tenui, pellucidâ, lævi, albâ, interdùm fusco-variegatâ, spirâ acuminatâ, anfractibus quinis, rotundatis, ultimo maximo, ventricoso, aperturâ circulari, peritremate reflexo, latere columellari subsinuato; suturâ distinctâ; umbilico parvo; operculo tenui, corneo, spirali.*

Var. *a.* Shell pale, closely dotted with brown; on leaves of bushes in the isle of Guimaras.

Var. *b.* Shell pale, with brown dots and bands; from the same locality as *a.*

Var. *c.* Shell white; same locality as *a.*, and on leaves of trees at Sibonga.

Var. *d.* Shell pale; found at Cabanatuan.

Var. *e.* Shell pale, with brown streaks and dots; from the island of Guimaras.

CYCLOSTOMA CONCINNUM, nob., Thes. Conch. part 3. pl. 29. f. 223, 224. *Cycl. testâ globoso-conicâ, tenui, pellucidâ, lævi, albidâ, viridi-fusco spiralitèr lineatâ, spirâ acuminatâ, anfractibus quinis, rotundatis, ultimo maximo, ventricoso; aperturâ circulari, peri-*



*tremate reflexo, latere columellari subsinuato; suturá distinctá; umbilico parvo; operculo tenui, corneo, spirali.*

Several varieties of this very pretty species have been brought by Mr. Cuming from the Philippine Islands; they are as follows:—

Var. *a.* Shell with numerous brownish spiral lines. On leaves of trees at Jacna, isle of Bohol.

Var. *b.* Shell white, opaque, with hyaline spiral lines and a brown band in front. Found on leaves of bushes at Misamis, island of Mindanao.

Var. *c.* Shell like var. *b.* but without the brown band. On leaves of trees, island of Camaguing.

Var. *d.* Shell with broader brownish spiral lines. Found on leaves of bushes at Loon, island of Bohol.

Var. *e.* With the spiral brownish bands subinterrupted. Found at Marabojoc, island of Bohol, on leaves of trees.

Var. *f.* Shell pale brown, covered with a thin epidermis with hispid spiral lines. Found on leaves of bushes at Loboc, island of Bohol.

CYCLOSTOMA AQUILUM, nob., Thes. Conch. part 3. pl. 27. f. 131.

*Cycl. testá suborbiculari, subdepressá, tenuiusculá, lævi, fulvescente-fusco, nonnunquàm cingulo pallescente mediano; spirá brevi, acuminatusculá, anfractibus quinis, subplanulatis, primis paululùm carinatis, ultimo maximo, rotundato; aperturá circulari, expansá, albicante vel fulvescente, peritremate subincrassato, reflexo, supra anfractum ultimum interrupto, latere umbilicali subsinuato; umbilico magno.*

Found in the woods at Singapore under decayed leaves, by H. Cuming.

CYCLOSTOMA IRROBATUM, nob., Thes. Conch. part 3. pl. 27. f. 134,

135. *Cycl. testá subgloboso-conicá, tenui, lævi, pallescente, fusco-irroratá, plerumque cingulo mediano nigricante; spirá elevatusculá, apice nigricante, obtuso; anfractibus quinis, ventricosis, primùm subcarinatis, deindè rotundatis; suturá tenui; aperturá ferè circulari, posticè obsoletè subacuminatá, anfractu ultimo tenuiter modificato, peritremate crassiusculo, rotundato-reflexo; umbilico mediocri.*

Numerous specimens of this species have been imported from China within the last few years.

CYCLOSTOMA SUBSTRIATUM, nob., Thes. Conch. part 3. pl. 25. f. 95.

*Cycl. testá suborbiculari, depressá, crassiusculá, læviusculá, fuscescente, spirá brevissimá, submucronatá; anfractibus quatuor, rotundatis, posticè transversim striatis, striis ex suturá profundá radiantibus, anticè lævibus; aperturá circulari, peritremate subincrassato, subreflexo; umbilico lato; operculo multispirali, latere canaliculato, intùs nitido.*

Found in earth under decayed leaves in the island of Siquijod, by H. Cuming.

CYCLOSTOMA SEMISULCATUM, nob., Thes. Conch. part 3. pl. 25. f. 99.

*Cycl. testá suborbiculari, depressiusculá, tenuiusculá, albicante, fasciá angustá medianá, fusco-nigricante, posticè plerumque brun-*

*neo-variegatá ; spirá brevi, anfractibus quinque, posticè spiralitèr sulcatis, sulcis distantibus, anticè lævitèr striatis vel lævibus ; suturá distinctá ; aperturá ferè circulari, peritremate incrassato, subreflexo, posticè angulifero ; umbilico lato, intùs spiralitèr striato ; operculo corneo, crassiusculo, extùs sublamelloso, intùs lævi.*

CYCLOSTOMA PANAYENSE, nob., Thes. Conch. part 3. pl. 30. f. 239.

*Cycl. testá globoso-conicá, tenuissimá, pellucidá, lævi, fuscescente, spirá brevi, obtusiusculá, anfractibus quinque, spiralitèr et distantèr substriatis, rotundatis, ultimo anticè ad periphæriam cariná obsoletá munito ; aperturá magná, ferè circulari, peritremate lato, reflexo, ad ultimum anfractum interrupto, margine interno albo, externo fusco ; umbilico parvo ; operculo tenui, anfractibus 5—6.*

Found on leaves of bushes in the island of Panay and in the mountains of Basey, island of Samar, by H. Cuming.

CYCLOSTOMA LUTEOSTOMA, nob., Thes. Conch. part 3. pl. 30. f. 228,

229. *Cycl. testá globoso-conicá, tenui, pellucidá, albidá, epidermide tenui, corned indutá ; spirá acuminatá ; anfractibus quinque, rotundatis, ultimo magno, ventricoso ; aperturá subcirculari, peritremate reflexo, aurantiaco, latere columellari subsinuato, prope ultimum anfractum interrupto ; suturá distinctá ; umbilico parvo ; operculo tenui corneo, multispirali.*

On leaves of bushes in the island of Guimaras.

CYCLOSTOMA INSIGNE, nob., Thes. Conch. part 3. pl. 30. f. 232.

*Cycl. testá subglobosá, subconoided, prætenui, corned, pellucidá, viridescente fuscá, spirá acuminatiusculá ; anfractibus quinque, primis rotundatis, lævibus, duabus ultimis tenerrimè transversim striatis, margine acutè carinato, posticè subplanulatis, 5- ad 7-carinatis, ultimo maximo, ante carinam subobsoletè 2- vel 3-carinatis ; aperturá magná, subcirculari, peritremate tenui, reflexo, intùs albo, ultimo anfractu modificato ; umbilico exiguo ; operculo tenui, corneo.*

Found on leaves of trees at Calapan, island of Mindoro, by H. Cuming.

CYCLOSTOMA FIBULA, Thes. Conch. part 3. pl. 30. f. 240, 241, 242.

*Cycl. testá suborbiculari, conicá, tenui, cinerascete-fuscá vel albidá, nonnunquam fusco angulatim strigatá, spirá acuminatiusculá, anfractibus 5—6, lævibus, lineis spiralibus nonnullis elevatiusculis, ultimá magná, anticè obtusè carinatá, ante periphæriam subplanulatá ; aperturá subobliquá, rotundato-subquadratá, peritremate reflexo, supra ultimum anfractum latè interrupto, latere umbilicali rotundato revoluto ; umbilico parvo, angusto ; operculo tenui, corneo, anfractibus 6—7.*

Several varieties of this species were brought from the Philippine Islands by Mr. Cuming ; they are as follows :—

Var. *a.* Shell greyish red. Found on leaves of trees at St. Juan, in the province of Cagayan, island of Luzon.

Var. *b.* Shell white, with angular brown stripes. Same locality as *a.*

Var. *c.* Shell white, with very delicate brownish streaks. Same locality as *a.*

Var. *d.* Shell larger; white. Found upon palm-leaves near Cata-naun, in the province of Tayabas, island of Luzon.

Var. *e.* Shell small; white. On leaves of trees at Lallo, in the province of Cagayan.

CYCLOSTOMA LÆVE, Gray; *C. immaculatum*, Chemnitz.

Of this species Mr. Cuming has collected the following varieties, viz.

Var. *a.* Shell white, with an obsolete keel. Found on leaves of trees at Bulinao, province of Zambales.

Var. *b.* Shell whitish, covered with small brown streaks and dots. Same locality as *a.*

Var. *c.* Shell white, with a brown band in front. Same locality as *a.*

Var. *d.* Shell of a pale colour, with a brown circumferential band. Found on leaves of bushes at Sinait, in the province of South Ilocos, island of Luzon.

Var. *e.* Shell pale, with strongly marked irregular stripes of brown. Same locality as *a.*

CYCLOSTOMA PERPLEXUM, nob., Thes. Conch. part 3. pl. 30. f. 243, 244. *Cycl. testâ suborbiculari, subconicâ, tenui, albidd, palliddè fusco variè nubeculatâ, spirâ brevi, anfractibus quinque, subrotundatis, lævibus, ultimo ad periphæriam subcarinato, posticè lineis leviusculis distantibus nonnullis munito; suturâ indistinctâ; aperturâ subcirculari, peritremate crassiusculo, reflexo, ad ultimum anfractum interrupto, latere umbilicali revoluto; umbilico mediocri.*

Found on bushes at Abulug, isle of Luzon, by Mr. Cuming.

CYCLOSTOMA MUCRONATUM, nob., Thes. Conch. part 3. pl. 25. f. 91. *Cycl. testâ suborbiculari, depressâ, pallescente-fuscâ, tenui, spirâ brevi, mucronatâ; anfractibus quatuor, rapidè crescentibus, rotundatis, tenerrimè transversim striatis; suturâ validâ; aperturâ circulari, peritremate duplici, externo lato, subreflexo, interno angusto, lineari; umbilico lato; operculo multispirali, suturâ anfractuum lamellosâ, margine canaliculato, intus nitido.*

Found by Mr. Cuming under decayed leaves at Calauang in Luzon.

CYCLOSTOMA FULVESCENS, nob., Thes. Conch. part 3. pl. 25. f. 79, 80. *Cycl. testâ globoso-conicâ, tenuiusculâ, palliddè brunneâ, spirâ subacuminatâ, anfractibus quinque, rotundatis, confertim spiralitèr striatis, ultimo maximo; aperturâ ferè circulari, peritremate tenui; suturâ distinctâ; umbilico parvo.*

From Madagascar. Sent to Mr. Cuming by Mr. Petit.

CYCLOSTOMA LINGULATUM, nob., Thes. Conch. part 3. pl. 30. f. 208, 209, 210. *Cycl. testâ suborbiculari, subdepresso-conoidèâ, tenuiusculâ, lævigatâ, palliddè fusco variè maculatâ, vel radiatim strigatâ, spirâ brevi, subacuminatâ, apice obtusiusculo; suturâ subinconspicud; anfractibus  $4\frac{1}{2}$ , ventricosiusculis, plerumque acutimarginatis, nonnunquàm margine ultimi rotundato; aperturâ circulari, peritremate pallido, plerumque duplici, interno lineari, externo latiori, reflexo, supra umbilicum plus minusve latè extenso; umbilico mediocri; operculo corneo, tenui, multispirali.*

Var. *a.* Distinctly keeled, dark brown, white-spotted near the

suture and at the circumference. Found on leaves of bushes in the island of Siquijod.

Var. *b.* Of a pale colour, variously mottled with dark brown. Found in the same locality as var. *a.*

Var. *c.* Of a dark brown colour, with angular radiating white stripes. Found on leaves of bushes at Daleguete, in the island of Zebu.

Var. *d.* Strongly keeled, with dark brown marks radiating from the suture, and speckled with brown. Also from Daleguete.

Var. *e.* Last volution rounded. Found on leaves of bushes at Sibonga, in the island of Zebu.

Var. *f.* Last volution rounded, colour very pale, variously mottled and speckled with brown. Found on leaves of bushes at Loboc, island of Bohol.

Var. *g.* Of a very dark colour, variously mottled, and with the ligulate appendage of the lip very small. Found on leaves of bushes at Argao, in the island of Zebu.

Var. *h.* Of a paler colour, but in other respects like *g.* Found on leaves of bushes at Loboc.

CYCLOSTOMA ATRICAPILLUM, nob., Thes. Conch. part 3. pl. 30. f. 230, 231. *Cycl. testá globoso-pyramidalí, tenui, nitidulá, albicante, variè fusco-strigatá, apice nigro, anfractibus 5, subrotundatis, plus minusve obsoletè spiralitèr carinatis; suturá distinctá; aperturá rotundatá, supernè subacuminatá, peritremate acuto, reflexo, latere umbilicali subsinuato, ultimi anfractus interrupto; umbilico parvo; operculo corneo, tenui.*

Mr. Cuming has brought the following varieties, viz. :—

Var. *a.* Nearly white, mottled variously with pale brown. Found on leaves of trees and bushes at Puerto-galero, isle of Mindoro.

Var. *b.* Of a brown colour, with pale mottlings. From the same locality as *a.*

Var. *c.* Of a pale colour mottled with dark brown, and a dark and light brown articulated band in front of the suture. Same locality as *a.*

Var. *d.* Of a pale colour, with dark brown irregular stripes radiating from the suture; paler in front. Same locality as *a.*

Var. *e.* White, with similar radiating dark brown stripes; keel white; brown stripes continued over the front. Found on leaves of trees and bushes at Calapan, island of Mindoro.

CYCLOSTOMA GONIOSTOMA, nob., Thes. Conch. part 3. pl. 30. f. 223, 224. *Cycl. testá suborbiculari, conoidé, margine carinato, tenui, subpellucidá, levi, albidá, fusco variè strigatá, spirá acuminatá, apice nigricante, obtusiusculá; anfractibus 5½, planulatis, ultimo subventricosó, obsoletè bi-vel tricarinatis, margine acuto, anticè subplanulato; aperturá rotundato-subtrigond, anticè subrotundatá, posticè extùsque angulatá, peritremate tenui, angusto, reflexo; umbilico parvo.*

The two following varieties were found by Mr. Cuming at Cagayan, in the province of Misamis, island of Mindanao :—

Var. *a.* Of a pale colour, with dark brown stripes.

Var. *b.* Of an uniform dun colour.

CYCLOSTOMA ACUMINATUM, nob., Thes. Conch. part 3. pl. 30. f. 235.

*Cycl. testâ subglobosâ, pyramidalî, tenui, lævi, pellucidâ, albicante, spirâ acuminatâ, apice obtusiusculo, fuscescente, anfractibus sex, rotundatis, substriatis, ultimo magno, carinâ ad periphæriam obsoletiusculâ munito, ante carinam planulatusculo; aperturâ subcirculari, posticè subacuminatâ, peritremate tenui, reflexo, ad ultimum anfractum interrupto, latere umbilicali subsinuato; umbilico parvo.*

Found by Mr. Cuming on leaves of trees at St. Juan, isle of Luzon.

CYCLOSTOMA MINUS, nob., Thes. Conch. part 3. pl. 30. f. 249.

*Cycl. testâ ovato-oblongâ, cylindrâ, tenui, hyalinâ, lævi, nitidâ, spirâ obtusâ, apice quasi truncato; anfractibus 4 ad 5, ventricosis, primis 2 ad 3 minimis, transversim costellatis; aperturâ circulari, peritremate reflexo; umbilico nullo.*

Found under decayed leaves in the mountains of Igaras, province of Ilo Ilo, island of Panay, by Mr. Cuming.

CYCLOSTOMA CILIATUM, nob., Thes. Conch. part 3. pl. 30. f. 237, 238.

*Cycl. testâ suborbiculari, conoideâ, tenuiusculâ, lævigatâ, fulvescente, fusco radiatim strigatâ, spirâ brevi, submucronatâ; apice acuminatusculo; anfractibus quinque, subrotundatis, ultimo magno, margine carinato (carinâ epidermide ciliatâ); aperturâ circulari, peritremate reflexo, posticè emarginato; umbilico magno; operculo tenui, corneo, multispirali.*

Found under stones at Mount Isarog, in the province of South Camarinas, island of Luzon.

CYCLOSTOMA HELICOIDES, nob., Thes. Conch. part 3. pl. 30. f. 245,

246. *Cycl. testâ suborbiculari, conoidali, crassiusculâ, spirâ spirâli-  
ter striatâ, fulvescente, fusco radiatim strigatâ; spirâ brevi, acuminatusculâ, anfractibus 5 ad 6, rotundatis, anticè lævibus, posticè spirâli-  
ter striatis, obsoletè 4- ad 5-carinatis, carinis duabus posticis epidermide ciliatis; aperturâ circulari, peritremate duplici, albicante, posticè emarginato, interno tenui, levatusculo, externo angusto, reflexo; umbilico majusculo; operculo tenui, corneo, multispirali.*

Var. *a.* Dark-coloured. Found under decayed leaves at Gindulman, in the island of Bohol.

Var. *b.* Pale. Found under decayed leaves at Jacna, island of Bohol.

CYCLOSTOMA PARVUM, nob., Thes. Conch. part 3. pl. 31. f. 254,

255. *Cycl. testâ suborbiculari, depresso-conoideâ, tenui, lævigatâ, fulvescente, radiatim fusco strigatâ, spirâ brevi, submucronatâ, anfractibus quinque, rotundatis, tenerrimè spirâli-  
ter striatis, obsoletissimè 4—5-carinatis; aperturâ circulari, peritremate simplici, posticè subemarginato; umbilico magno; operculo corneo, crasso.*

Var. *a.* Found under decayed leaves at Daleguete, island of Zebu.

Var. *b.* Found under decayed leaves at Dingle, isle of Panay.

CYCLOSTOMA MACULOSUM, Thes. Conch. part 3. pl. 31. f. 256, 257.

*Cycl. testâ suborbiculari, depressâ, crassiusculâ, lævi, castaneâ, albido-maculosâ, spirâ paululim levatâ, apice nigricante; anfractibus 4, rotundatis, obsoletè spirâli-  
ter striatis; aperturâ subcircu-*

*lari, peritremate subincrassato, subreflexo, posticè acuminatusculo; umbilico maximo, spiralitèr castaneo lineato.*

In Mr. Cuming's collection.

Mr. Gulliver then communicated his notes on the blood-corpuscles of the Stanley Musk Deer.

“Since my observations\* have shown that the blood-discs of the Napu Musk Deer (*Moschus Javanicus*, Pallas) are minuter than those hitherto described of any other mammal, the size of the red particles of other allied species has become an interesting question.

“The following measurements which I have lately made of the blood-discs of the Stanley Musk Deer (*Moschus Stanleyanus*, Gray) are expressed in vulgar fractions of an English inch:—

1-11339	}	Common sizes.
1-10664		
1-16000		Small size.
1- 8000		Large size.
<hr style="width: 20%; margin: 0 auto;"/>		
1-10825		Average.

“Hence the corpuscles of this animal are nearly as minute as those of the Napu Musk Deer and smaller than those of the Ibex and of the Goat, as may be seen by a reference to the comparative measurements given of the corpuscles of the three last-named animals in my paper on the blood-corpuscles of the Ibex, published in the Proceedings of this Society, August 9, 1842.”

Various species of Bats from the Philippine Islands, collected by Hugh Cuming, Esq., Corresponding Member, were placed on the table, and Mr. Waterhouse read his notes relating to them. He observed that the specimens exhibited formed part only of the extensive series brought home, and that he should lay the remaining portion before the Society on a future occasion.

Of the genus *Pteropus*, as now restricted, Mr. Cuming's collection contained two species: one is undoubtedly the *Pteropus jubatus* of Eschscholtz; the other is perhaps new. It is rather less than the *Pteropus Edwardsii*, and does not agree precisely with any of the descriptions given by Temminck in his ‘Monographies.’ The head is rusty yellow, slightly tinted with brownish on the muzzle and around the eye; the back of the neck, down to the shoulder, is of a beautiful golden rust-colour; the hair here is loose, but from the shoulder downwards the hair is of a harsher nature, closely applied to the body, and is of a very deep brown hue, but somewhat tinted with rust-colour near the thigh; the throat is of a deep chocolate-brown colour, and the under parts of the body are of a bright rust tint, excepting at the sides, where a dusky hue prevails; the hair on the humerus and on the under side of the membrane is nearly black. The interfemoral membrane is very narrow and much hidden by the fur. The principal dimensions are—

\* Trans. Roy. Med. Ch. Soc. v. 23; Dublin Med. Press, Nov. 27, 1839.

	in.	lin.
Total length .....	9	6
Expanse of the wings .....	32	0
From the tip of the muzzle to the ear .....	2	2
Length of ear.....	0	10
Depth of interfemoral membrane about ....	0	6

The collection contains but one specimen of this species, and that is preserved in spirit; I will not venture therefore to apply a specific name, having such imperfect materials.

Of the genus *Pachysoma* the collection contains three species—*P. amplexicaudatum* (Geoff.), *P. titthæcheilum* (Temm.), and the *P. brevicaudatum* (Is. Geoff.).

*Macroglossus minimus* (*Pteropus minimus*, Geoff.).—Of this species I find three specimens in the present collection. In all, the membranes of the wings, &c. are of a rich reddish brown colour.

Genus *Rhinolophus*.—Four species of this genus were brought home by Mr. Cuming. The first and largest species, I can feel no doubt, having examined its skull in combination with the external characters, is the *R. nobilis*, Horsf. The second I have pretty clearly identified with the *R. bicolor* of Temminck, and the other two are, I believe, undescribed. Their characters may be thus expressed:—

RHINOLOPHUS PYGMÆUS. *Rhin. prosthemate superiore semicirculari; corpore supra nigricante (pilis ad basin albescentibus), subtus cinerescente; auribus acutis ad latus exterius distinctè emarginatis.*

	unc.	lin.
Longitudo ab apice rostri ad caudæ basin. . . .	1	5
———— caudæ .....	0	10 $\frac{1}{2}$
———— auris .....	0	4 $\frac{1}{4}$
———— antibrachii .....	1	5 $\frac{3}{4}$
Alarum amplitudo .....	8	6

This small species is almost of an uniform sooty colour (as seen in spirit), but the under parts are inclining to grey; and the fur on the back, though blackish externally, is nearly white next the skin; the hair on the lips and chin is white. The membranous appendages of the nose are of considerable extent, and, taken together, they form an oval figure; this is transversely divided near the middle by a slight fleshy ridge; the membrane in front of this ridge, and which encircles the nostril-openings, has its edges free, and on each side of the muzzle are two distinct longitudinal narrow folds of membrane, situated partially under the free edge of the membrane which encircles the nostrils: behind the transverse mesial ridge is what may be termed the posterior nose-leaf; this is of a semicircular form, has its margin thickened and raised, and sending forwards to the transverse ridge just mentioned three small ridges, dividing the interspace into four little hollows or pits. The ears are of moderate size, acute at the point, and have the outer margin distinctly emarginated. On the lips are some indistinct warts, and on the tip of the lower lip are two which are more prominent and distinct.

The *R. pygmæus* approaches somewhat to the *R. bicolor*, but differs

not only in colour, but in having the ears smaller and distinctly emarginated externally; the hinder nose-leaf is larger. It approaches in size the *R. tricuspιδatus*. The ears are larger than in that species, and the nose-leaf is also larger, considerably more extended in the antero-posterior direction, and differs moreover in structure.

**RHINOLOPHUS PHILIPPINENSIS.** *Rhinol. suprà obscurè fuscus, subtùs fusco-cinereus; auribus magnis, subacutis, ad latus exterius emarginatis, et lobo magno accessorio, ad apicem rotundato, instructis; prosthemate maximo lobo posteriore lanceolato, anteriore valdè elevato, ad apicem truncato, ad basin dilatato, hoc ferro- equino membranæ circumdato.*

	unc. lin.
Longitudo capitis cum corpore . . . . .	1 11
———— caudæ . . . . .	1 0
———— aurium . . . . .	0 11
———— antibrachii . . . . .	1 10
Alarum amplitudo . . . . .	10 6

This species belongs to the same section as the *Rhinolophus ferrum-equinum*,—the second section of Temminck's 'Monographies,'—and approaches most nearly to the *R. euryotis* of that author, from which however it may be readily distinguished by the much larger size of the accessory lobe of the ear, and the truncated form of the foremost of the two membranaceous nasal appendages. It also approaches, in the large size of the ears and great development of the nasal appendages, the *R. luctus* of Temminck, but is of smaller size; the ears are rather less acutely pointed; the accessory lobe at the base is longer and proportionally narrower, and the proportions of the nasal membrane differ. In spirit the colour of the fur is very dark brown; on the under parts of the body rather paler than on the upper, and inclining to greyish. The nasal membranous appendages are very complicated, and being evidently on the same type as the *R. luctus*, I will compare them with the corresponding parts as shown in Temminck's figure of that species. The large decumbent horse-shoe membrane is the same as in *luctus*, and similarly notched in front. The foremost of the two elevated appendages is nearly the same, but the lateral lobes at the base are less produced and considerably smaller; joining these lobes on each side is a small membranous fold extending outwards and backwards, and is attached to the horse-shoe membrane. The posterior lobe is lanceolate and more pointed than in *luctus*, has a transverse fold near its base as in that species, and is joined to the anterior truncated elevated lobe by a longitudinally elevated membrane. The height of the posterior lanceolate lobe is  $3\frac{1}{4}$  lines, and of the anterior lobe  $2\frac{3}{4}$  lines, or rather more. On the side of the muzzle is a longitudinal fleshy ridge. The chin presents four warts, two at the tip and one on each side of these. The extreme point of the tail is free, the free portion being however not more than half a line in length.

Lastly, Mr. Waterhouse called attention to a new species of *Megaderma*.

**MEGADERMA PHILIPPINENSIS.** *Meg. suprà cinereo-fuscus, subtùs*



*cinereus*; *prosthemate verticali, ferè ovali, ad apicem subtruncato, horizontali, paulò minori, cordiformi*; *auribus permagnis, trago elongato, attenuato, acuto, ad basin, anticè, lobo mediocri acuto instructo.*

	unc. lin.
Longitudo capitis cum corpore .....	2 8
——— <i>aurium</i> .....	1 1½*
——— <i>antibrachii</i> .....	2 1¼
Alarum amplitudo .....	12 9

This species, of which Mr. Cuming's collection contains several specimens, agrees closely with the *M. trifolium* of Geoffroy in having the foremost nose-leaf broader and the hinder one shorter and broader than in *M. Lyra*; but it differs from the *M. trifolium* in the form of the tragus of the ear, this not presenting the character which suggested the specific name; it differs moreover (judging from M. Geoffroy's figure) in having the ears considerably larger, and not quite so deeply cleft. The whole length of the divided nose-leaf is  $5\frac{3}{4}$  lines, of which the anterior cordiform portion is rather less than half; the greatest width of the posterior portion is nearly  $3\frac{1}{4}$  lines, and of the anterior portion  $3\frac{2}{3}$  or nearly  $3\frac{3}{4}$  lines. The length of the tragus of the ear is  $8\frac{1}{3}$  lines; it is very narrow and acutely pointed, and at the base has a small nearly triangular lobe about two lines in length.

The specimens from which my description is taken are preserved in spirit, consequently the proportions given of the nose-leaf, &c. are likely to be more accurate than were they preserved in a dry state.

Mr. Fraser pointed out the distinguishing characters of a new species of Partridge which had recently died at the Society's menagerie. Several specimens of this species, for which Mr. Fraser proposed the name *Perdix Bonhami*, were procured at Tehran, in Persia, by Edward W. Bonham, Esq., H.M. agent at Tabreez, Persia, and presented to the Society by that gentleman, together with a living specimen of the *Tetrao gallus Nigelli* from the same locality, which having died had been stuffed, and was exhibited at the Meeting. The new Partridge was thus characterized:—

**PERDIX BONHAMI.** *Perd. arenaceo-flava, plumis nigro adspersis præsertim apud latera, collum et pectus, hoc notè circulari ornato; strigis superciliaribus subocularibus, et frontalibus nigris; plumis auricularibus albis, laterum plumis nigro-marginatis; rectricibus caudæ quatuor externis crissoque rufis; rostro corneo.*

*Fœmina distinctiùs adspersa, quamvis notis nigris auribusque albis, maris signis, caret.*

This species is nearly allied to *Perdix Heyi*, Temm. Pl. Col., but is readily distinguished from that bird by the black stripes about the head of the male. The female differs in having a more mottled appearance.

Mr. Yarrell exhibited a specimen of the *Puffinus obscurus* from

\* I measure the height of the ears externally from the crown of the head.

the Dardanelles, and called attention to some peculiarities in its habits, as pointed out in the 'Familiar History of Birds,' &c. by the Rev. Edward Stanley (now Bishop of Norwich), to whom the specimen belonged. Considerable interest is attached to the bird exhibited, since, though often alluded to by travellers who have visited the Dardanelles (but under native names only), naturalists were not aware to what species the accounts referred; and moreover certain prejudices of the inhabitants render it extremely difficult to procure this species of Petrel from the locality mentioned.

June 13.—Prof. Rymer Jones in the Chair.

The following Notes by Prof. E. Forbes, on the species of *Neæra* (Gray) inhabiting the Egean Sea, were read:—

“Among the Mollusca inhabiting the seas of the Grecian Archipelago are four species of the genus *Neæra*, two of which have been previously described, and two are apparently new.

“The described species are the *Neæra cuspidata*, a well-known shell, and the type of the genus, extensively distributed throughout the European seas. In the Egean it is scarce, but by no means local; and of all the Greek species, is that found in the shallowest water. The second described species is the *Neæra costellata*, a beautiful bivalve hitherto recorded only in the fossil state. It was described and figured by M. Deshayes in the great French work on the Morea, from specimens found in the tertiary strata of that country. I have taken it not unfrequently in the Egean, sometimes alive and at considerable depths, even below 100 fathoms.

“Of the new species, one is nearly allied to *Neæra cuspidata*, and appears to replace it in the deeper parts of the Egean. I have called it

*NEÆRA ATTENUATA*. *N. testá oblongá, obsoletè striatá, anticè rotundatá, superiore subangulatá, posticè longi-rostratá; rostro angusto, aré lineari transversè striatá; umbonibus obtusis; dente laterali in valvulá superiori lineari*. Long.  $0\frac{5}{10}$ ; lat.  $0\frac{2}{10}$ .

“The second is an anormal and aberrant form, differing in its hinge characters from the other Egean species. It inhabits very deep water, even to 200 fathoms, and I have never taken it in less than 100. I have never met with it alive.”

*NEÆRA ABBREVIATA*. *N. testá suborbiculari, transversè leviter sulcatá, anticè rotundatá, postice brevi-rostratá; rostro lato, aré obsoletá; umbonibus acutissimis; dente laterali obsoleto*.

The following paper was then read:—

“Descriptions of new species of *Neæra*, from the collection of Sir Edward Belcher, C.B., made during a voyage round the world, and from that of Hugh Cuming, Esq., obtained during his visit to the Philippines; with notices of the synonymy.” By Mr. Hinds.

The number of species of *Neæra*, Gray, now on record permits us to generalize on their geographic distribution. They are all found in water of greater or less depth, and spread over a wide extent of latitude; the larger proportion are found in the seas of warm climates, particularly of the Indian Ocean. In the Atlantic the group

is met with in a high northern latitude, but the number of species gradually diminishes towards the seas of temperate or cold climates. A few of the recent species are found in a fossil state in the more recent tertiary deposits, and there are some fossil species which hitherto have not been noticed in a recent state. The individuality of the genus has also been maintained by M. Nardo, who has called it *Cuspidaria*.

*NEÆRA* *ROSTRATA*, Chemnitz (sp.).

*Mya rostrata*, Chem., vol. xi. p. 195. vig. C, D.; Dillwyn, Cat. vol. i. p. 45.

*Anatina longirostris*, Lamarck, Hist. des An. sans Vert., ed. Deshayes, vol. vi. p. 78.

*Neæra chinensis*, Gray. Griffith's Ed. of Cuvier's An. Kingd., Mollusca, pl. 2. f. 5.

*Neæra chinensis*, *ibid.* Index.

*Corbula rostrata*, Deshayes, ed. Lamarck. Note. Hanley's species of Lamarck.

Hab. China.

Cab. Cuming.

*NEÆRA* *CUSPIDATA*, Olivi (sp.).

*Tellina cuspidata*, Olivi, Zool. Adriatic, p. 101. pl. 4. f. 1.

*Erycina cuspidata*, Risso, Hist. Nat. des environs de Nice, t. iv. p. 366. f. 170.

Hab. As a recent shell it inhabits deep water in the Adriatic Sea; Northumberland; also the north-west coast of Sweden. Nor can I perceive any specific difference in the valve of a shell obtained from eighty-four fathoms in the China Sea, the temperature below being 66°, and at the surface 83°, except that it is the portion of a much larger shell. As a fossil it is described by Risso from 'Trinité,' and also abounds in Sicily.

*NEÆRA* *HYALINA*. *N. testâ magnâ, diaphandâ, ventricosâ, anticè rotundatâ, posticè subrostratâ, rotundatâ; valvis subæqualibus; epidermide tenui, scabrd, indutâ.* Long. 11; lat. 7; alt. 8 lin.

*Neæra hyalina*, Sowerby, *ined.*

Hab. China; Mr. G. B. Sowerby.

Cab. Cuming et Belcher.

My regard for the conchological attainments of Mr. G. B. Sowerby has induced me to adopt his cabinet name for this shell.

*NEÆRA* *ELEGANS*. *N. testâ oblongâ, tenui, lineis salientibus transversis ornatâ; rostro angulato, corrugato; valvarum margine ventrali acuto, simplici.* Long. 8; lat. 4; alt. 4½ lin.

Hab. New Guinea, China Sea, and Singapore. On a muddy floor, in from seven to eighteen fathoms.

Cab. Belcher et Cuming.

*NEÆRA* *COSTELLATA*, Deshayes (sp.).

*Corbula costellata*, Deshayes, Géologie de la Grèce, Mollusques, pl. 7. f. 1, 2, 3.

Hab. Originally described as a fossil by Deshayes, but has been subsequently obtained recent by Professor Forbes in the Adriatic Sea. A pair of valves is in the collection of Mr. Cuming, purporting as coming from the north-west coast of Sweden, and has the name of *Neæra sulcata* attached to them.

## NEERA COSTATA, Sow. (sp.)

*Anatina costata*, Sowerby, Proc. Zool. Soc. 1834, p. 87.

*Hab.* The west coast of America, between  $2^{\circ} 47'$  and  $8^{\circ} 5'$  north lat., namely at St. Helena, from six fathoms, sandy mud; Magnetic Island, twenty-two fathoms; and coast of Veragua, twenty-six fathoms, mud.

Cab. Belcher et Cuming.

NEERA GOULDIANA. *N. testâ oblongâ, fragili, hyalind, ventricosâ; costis duodecim radiantibus; valvis valdè inæqualibus; rostro lineis tribus obliquis elevatis.* Long.  $3\frac{1}{2}$ ; lat.  $1\frac{1}{2}$ ; alt. 2 lin.

*Hab.* New Guinea; Cagayan, island of Mindanao; and Bay of Manila, Philippines: in from seven to thirty fathoms, sandy mud.

Cab. Cuming et Belcher,

The specific name is in honour of Dr. Gould, the author of the able and luminous Report on the Mollusca of Massachusetts.

NEERA SINGAPORENSIS. *N. testâ oblongâ, fragili, hyalind, ventricosâ, costis 17-20 radiantibus; valvis inæqualibus; rostro breviusculo, lineis tribus obliquis elevatis.* Long.  $2\frac{2}{3}$ ; lat.  $1\frac{1}{3}$ ; alt.  $1\frac{2}{3}$  lin.

*Hab.* Singapore; in seven fathoms, mud.

Cab. Cuming. A single specimen.

A shell so very similar to *N. Gouldiana* that it might most easily be confounded with it. In that species however I find the number of radiating ribs to be so constant in a number of individuals, that I must regard it a good diagnostic character. The present species then will be found to differ from it in its smaller size, diminished number of radiating ribs, and shorter beak.

NEERA CASTA. *N. testâ oblongâ, fragili, hyalind, ventricosâ; costis numerosis radiantibus, minoribus alternantibus, transversè subtilissimè striatâ; rostro breviusculo, parvo, lineis obliquis elevatis instructo.* Long.  $2\frac{1}{3}$ ; lat.  $1\frac{1}{3}$ ; alt.  $1\frac{1}{2}$  lin.

*Hab.* New Guinea; dredged from a muddy floor in seven fathoms.

Cab. Belcher.

NEERA CONCINNA. *N. testâ oblongâ, fragili, subplanulatâ; costis numerosis, parvis, confertis, ultimâ maximâ; valvis subæqualibus; rostro parvo, breviusculo, lineis tribus obliquis elevatis instructo.*

Long.  $2\frac{1}{3}$ ; lat. 1; alt.  $1\frac{1}{2}$  lin.

*Hab.* —? Cab. Cuming.

NEERA DIDYMA. *N. testâ oblongâ, lævigatâ, albâ; costis duabus radiantibus; margine dorsali antico prominulo; rostro lato, subtruncato.* Long. 3; lat. 2; alt. 2 lin.

*Hab.* The west coast of Veragua, in twenty-six fathoms, mud; in society with *N. costata*.

Cab. Belcher.

On the anterior and ventral margin there is a disposition to the formation of a number of small ribs; the shell is otherwise smooth and left to the occupation of the two prominent ribs, which eminently distinguish it.

NEERA ROSEA. *N. testâ oblongâ, albâ, epidermide tenui striatâ indutâ; valvis inæqualibus, dextrâ majori; rostro attenuato, roseo.* Long.  $3\frac{1}{2}$ ; lat.  $1\frac{2}{3}$ ; alt. 2 lin.

*Hab.* New Guinea, in seven fathoms, mud; Cagayan, island of Mindanao; San Nicholas, island of Zebu, Philippines, in from five to thirty fathoms, sandy mud.

*Cab.* Belcher et Cuming.

Not unlike diminutive specimens of *N. cuspidata*; the anterior portion of the shell, however, does not occupy more than a third of its entire length; the beak is more attenuated and of a rose-colour; and I cannot perceive any vestige of the angular line which extends posteriorly from the umbo.

*NEÆRA PHILIPPINENSIS.* *N. testâ oblongâ, albidâ, subplanulatâ, epidermide tenui striatâ indutâ, in rostro brevi attenuatâ; valvis inæqualibus, dextrâ minori.* Long.  $2\frac{1}{3}$ ; lat. 1; alt.  $1\frac{1}{2}$  lin.

*Hab.* Cagayan, island of Mindanao, and Batangas, island of Luzon, Philippines; in from twenty to thirty fathoms, sandy mud.

*Cab.* Cuming.

*NEÆRA TRIGONA.* *N. testâ trigonâ, albâ, minutè sulcatâ; latere antico retuso; rostro brevissimo, obliquo.* Long.  $2\frac{1}{3}$ ; lat.  $1\frac{1}{2}$ ; alt.  $1\frac{2}{3}$  lin.

*Hab.* ———? *Cab.* Cuming.

*NEÆRA IRIDESCENS.* *N. testâ albidâ, ventricosâ, lævigatâ, politâ; valvis æqualibus, margine ventrali posticè emarginato; retusè rostratâ.* Long. 8; lat. 4; alt.  $5\frac{1}{2}$  lin.

*Hab.* Sual, island of Luzon, Philippines; from five to seven fathoms, sandy mud.

*NEÆRA OPALINA.* *N. testâ ovali, hyalinâ, lævigatâ, politâ, subplanulatâ; valvis æqualibus; rostro gradatim elongato, obtuso.* Long. 6; lat. 2; alt.  $4\frac{1}{3}$  lin.

*Hab.* Basse, island of Samar, Philippines; from four fathoms, among coarse sand and mud. *Cab.* Cuming.

In the foregoing ventricose species the anterior portion of the shell is considerably dominant. In this flatter species the greater bulk is devoted to the formation of the rostrum.

*NEÆRA LATA.* *N. testâ ovali, albidâ, planulatâ, iridescente, lævigatâ, politâ; valvis æqualibus; rostro lato, gradatim attenuato, planulato, obtuso; margine ventrali posticè subemarginato.* Long. 12; lat. 4; alt. 7 lin.

*Hab.* Catbalonga, island of Samar, Philippines; from ten fathoms, soft mud. *Cab.* Cuming.

These three latter species are aberrant, and hold the same relations to *Neæra* as *Nucula arctica*, Brod. et Sow., and its congeners do to that genus.

Various species of *Mammalia* from Coban, in Central America, were exhibited. These specimens were from Mr. J. Gray, who in a letter addressed to the Curator, which accompanied them, observes that the collection contains the following species: viz. *Mustela frenata*, Licht., *Didelphys Quica*, *Heteromys Desmarestiana*, *Corsira tropicalis*, *Corsira Temlyas*, *Saccophorus Quachil*, *Mus Tazamaca*, and *Mus Tegüina*; all of which species, with the exception of the first two, are new to science.

## ROYAL INSTITUTION.

Feb. 23.—At this evening's meeting Prof. E. Forbes gave a lecture "On the light thrown on Geology by Submarine Researches\*." Having alluded to the researches of two Italian naturalists, Donati and Soldani, who dredged the Adriatic about the middle of the last century, Prof Forbes entered on the important inferences which he had derived from similar investigations in the Irish Channel and in the Archipelago. His first conclusion was, that marine animals and plants are grouped, according to their species, at particular depths in the sea, each species having a range of depth appropriated to itself. Prof. Forbes illustrated this assertion by a diagram, indicating the plants and animals respectively inhabiting what he termed the *littoral* zone, which extends immediately from the coast—the *lamnarian* zone, where the broad-leaved fuci are most abundant—the *coralline*, in which there is an assemblage of mollusca, especially bivalves and corals, and the *deep sea coral*, so called because in it only we find examples of large corals on the British shores. Prof. Forbes next alluded to the fact of the number of species diminishing according to depth, so that by gaining an accurate knowledge of the fauna and flora appropriated to various sea-bottoms, the naturalist can infer their depth: no plants are found below 100 fathoms, and the probable zero of animal life is at 300 fathoms. Sedimentary deposits below this depth are consequently destitute of organic matter. This circumstance bids the geologist to be cautious in inferring that any stratum was formed before the creation of animals, on no other account than that it is devoid of organic remains: he should rather conclude from such deficiency, that the stratum was deposited in very deep water.

Prof. Forbes next remarked that British species are found throughout the zones of depth in the Mediterranean Sea; but that in that sea, the proportion of northern testacea in the lower zones greatly exceeds that in the upper, so that there is a representation of climates, or parallels of latitude, in depth. The fourth proposition advanced by the Professor was, that all varieties of sea-bottom are not equally capable of maintaining animal life. The sandy parts are usually the desert ones. Hence the scarcity of fossils in sandstone: though traces of worms (which inhabit the sand) are found in ancient sandstones. As each animal is not able to live, except on its own locality, those marine animals, as the scallop, which are gregarious, deteriorating the ground when they increase beyond a certain extent, die; then the place becomes silted up, the ground changes, and another race occupies it. This fact explains the phenomena of distribution of organic remains in rocks; *i. e.* their being grouped together in separate strata, fossiliferous strata alternating with those which are free from organic remains.

\* We would refer the reader to the paper which Mr. Forbes published in our 4th volume "On a Shell Bank in the Irish Sea, considered Zoologically and Geologically," and it will be seen how ably and successfully he has during his voyage followed out the line of inquiry which he suggested four years ago.—See also vol. ix. p. 242.—Ed.

Prof. Forbes proceeded to observe, that such animals as are common to many zones of depth are those which have the greatest horizontal range in space, and are generally those which are present in the tertiary deposits; and thus it is that the most generally-distributed fossils are such as are found in the greatest number of formations; because these are necessarily the most independent of destroying influences. But, on the other hand, as the elevation or depression of strata to a very small extent would destroy the species peculiar to any zone, or to the zone above or beneath it, it becomes an important inquiry how this destruction is compensated. In dealing with this question, Prof. Forbes announced a most important law in zoology, one altogether new to ourselves—viz. *That the mollusca migrate*. He discovered by his own observation, that this is the case even with the limpets, the most fixed of all species. This migration occurs in their egg-state, when the ova are strung together and floated over the ocean, from shore to shore. In the larva state they are swimmers. In fact, they commence their life in a form closely analogous to that which is permanent among the Pteropods; but though in this state they can live in any zone, they cannot arrive at perfection except in the peculiar zone to which they are adapted. This accounts for the very imperfect shells of prematurely-dying mollusca being found at a low depth. Professor Forbes concluded his communication by noticing its bearings on the views of the most eminent geologists of our time. 1st. With regard to Mr. Lyell's principle of distinguishing tertiary strata by the per-centage of recent species in each. This is confirmed by Prof. Forbes's investigations; only in using Mr. Lyell's criterion, the element of depth, which gives climatal character in living animals, must be taken into account. 2nd. Prof. Forbes next noticed that Sir H. De la Beche had hypothetically anticipated, what his researches established, the representations of climates and depth, ten years ago. 3rd. He lastly ascribed to Viscount d'Archiac and M. de Verneuil the credit of having announced (what he had observed and mentioned in the course of his communication), that species which are found in a great number of localities, and in very distant countries, are always those which have lived during the formation of several successive systems.—*Athenæum*.

#### BOTANICAL SOCIETY OF EDINBURGH.

This Society met on Thursday, the 8th of February, Professor Graham in the Chair.

The following communications were read:—

1. Two papers "On the British *Desmidiaceæ*," by Mr. Ralfs.
2. "On some species of *Cuscuta*," by Mr. C. C. Babington, M.A., F.L.S. &c. (Inserted in the present Number.)
3. "On the Marine Algæ of the vicinity of Aberdeen," by George Dickie, M.D., Lecturer on Botany in the University and King's College of Aberdeen.

All these will shortly appear in the 'Annals and Magazine of Natural History.'

## MISCELLANEOUS.

To Richard Taylor, Esq.

Calcutta, December 14, 1843.

MY DEAR SIR,

Up to this date the following additions have been made to my catalogue of Calcutta birds, which, if not too late, you may publish along with the rest\*: *Phenicophaus tristis*, v. *Melias tristis* of Lesson; *Ph. longicaudatus* of my monograph of Eastern Cuckoos, wherein the name *tristis* is erroneously ascribed to *Ph. sumatranus* (Raffles), vel *Diardi* of Lesson, a species common on the hill-ranges of Assam. *Lanius lephronotus*, Vigors, v. *nipalensis* of Hodgson: I have obtained three specimens. *Dicrurus cærulescens*; *Scolopax rusticola*. *Edolius retifer* I believe I before mentioned to you, and I have met with additional specimens of *Chaitaris rubeculoides*, *Phylloscopus fuscatus*, *Charadrius Cantianus*, &c. But it is chiefly in other classes that the past month has been productive of novelties, the most interesting of which are the reputed Entellus Monkey of Southern India, which is quite distinct from that of Bengal, and will bear the appellation *S. pallipes*, Elliot;—an apparently new Soosook Dolphin (*Platanida*) from the Hoogly;—and, most remarkable of all, a true Bison allied to the Aurochs and to the American species, from the Shan States bordering on China, inhabiting a suitable, cold and pine-clad region, and doubtless extending far to the north-east, within the Chinese dominions.

Calcutta, Dec. 22, 1843.

Here are some "more last words" for you, which as you will receive nearly as soon as those I sent a few days back by the "Bentinck" steamer, I may as well take the present opportunity of forwarding. The following are the *notabilia* which I have now to announce as additions to my Calcutta ornithology.

*Scops sunia*, Hodgson, As. Res. xix. 175. A pair of these beautiful little birds I have just obtained, which were taken with birdlime. I have also received the *Sc. lettia*, Hodgson, *ibid.*, from Midnapore, a species which Mr. Jerdon thinks different from his *Sc. javanica*, but which is probably enough the *Sc. javanica* of Dr. Horsfield's list of species procured by Dr. M'Clelland in Assam. Mr. Jerdon has also obtained a very small species in Madras, which appears to be *Sc. bakkamæna*.

*Lanius nigriceps*, Franklin.

*Turdus unicolor*, Gould.

*Dicrurus cærulescens* I believe that I before mentioned, but I have shot a second example of this bird here.

*Botaurus flavicollis*; *Ardea flavicollis et niger*, Auct. Of this I have now obtained a recent example, and I have no hesitation in placing it among the true Bitterns.

*Tringa alpina*, for the first time; a solitary specimen.

*Porzana akool*; *Rallus akool* of Sykes, but not of Jerdon's catalogue, which is my *Gallinula parvifrons*. The dark under tail-coverts

\* This letter and the following arrived too late for our last Number.—  
ED.



and deep brownish-red legs are conspicuous characteristics of the *Akool*. By the way, Mr. Jerdon's *Rallus rufescens* is merely a young female of *Gallinula lugubris*, Horsf., vel *plumbea* of Vieillot.

I have also had the luck to obtain, yesterday and today, two new Bats, in addition to several others which I have to describe of this group; and if a party of shikarees and stuffers had returned, as they should have done by this time, from a ten or twelve days' hunting expedition which I have sent them upon, it is probable that I should have some more novelties to inform you about. Of the gigantic heron formerly noticed, I may remark that the back-line of *A. cinerea* barely reaches to the belly-line of the new species, which will convey a somewhat definite idea of the magnitude of my splendid *Ardea nobilis*. This morning I obtained a fine new Mullet, allied to *Mugil cephalotus*, but having much larger eyes, and in other respects approximating *M. parsia*, Buch.; it is described neither by Buchanan nor by Russell, but I have not leisure now to refer to Valenciennes.

I remain, very truly yours,

E. BLYTH.

#### ON THE TRUE SITUATION IN THE SYSTEM OF TALEGALLA AND MENURA ?

Whilst prosecuting my examination of the *Foreign Anoplura* (an investigation intrusted to me by the British Association), I felt anxious to see the *Parasites* of some birds of rather doubtful character, or more properly speaking, whose place in the system had caused no little diversity of opinion amongst naturalists, from a conviction that these might throw some light upon the subject; having found from experience that certain genera were only found upon particular families of birds. I therefore applied to my friend Mr. Gould, who, from his intimate connexion with the ornithology of Australia, had better opportunity than perhaps any one else of supplying some of my desiderata\*. This, with his accustomed zeal for furthering science, he immediately complied with, and transmitted me parasites from *Talegalla Lathamii* and *Menura superba*. The first of these was placed by Mr. Swainson amongst the *Vultures*, from certain characters which he considered confirmed his views. The general appearance of the bird however is decidedly *Rasorial*, and such its *parasites* declare it to be. They are of two genera, *Goniodes* and *Lipeurus*, the former of which, if not both, infest I believe almost every *Rasorial bird*. The latter genus is also parasitic on the *Raptores*, *Grallatores* and *Natatores*, but the former never. Had *Talegalla* been *Rasorial*, we should in all probability have found the genera *Læmobothrion*, *Colpocephalum*, *Docophorus* and *Nirmus*, as well as *Lipeurus*, which was not the case. With respect to *Menura*, the parasites would indicate this bird to be truly *Insessorial*; here two genera also were found, *Nirmus* and *Menopon*, the former almost exclusively confined to the *Insessores*, *Grallatores* and *Natatores*. One or two are certainly found among the *Raptores*, and about the same number in *Rasores*, as the *Nirmus cameratus* on moor game, and *Nirmus quadrulatus* on the wood grouse; but these are by no means characteristic of the *Rasores*, as is the case

\* Mr. Denny would be thankful for similar aid from Mr. Blyth.—R. T.

decidedly with *Goniocotes*, *Goniodes* and *Lipeurus*, not one of which appears to infest *Menura*. The *Nirmus* found is I suspect the *N. marginalis* of Nitzsch and Burmeister, and approaches most nearly to those of the *Merulidæ*. If therefore any weight is to be attached to the constancy of the parasitism of certain genera upon particular families of birds, the result of my inquiry would be that *Talegalla* really belongs to the *Rasores*, not far from the turkey, and that *Menura* is *Insessorial*. The result in the latter case, which is the most debatable, appears to be confirmed from the fact, that the *parasites* were not from *one* specimen only of the bird, but *five*. Mr. Gould very ingeniously took care of this: he sent me two specimens in the first instance from *Menura*, and afterwards specimens from four different individuals of the bird, both *old* and *young*, in separate papers, but without any indication from whence they were obtained, to ask if they were *new* to me and what they approached most nearly to.

Phil. Hall, Leeds, March 19, 1844.

HENRY DENNY.

UPON THE METAMORPHOSES OF ELEDONA AGARICOLA AND DIAPERIS  
BOLETI. BY M. LEON DUFOUR.

The larvæ of both these insects feed, observes our author, upon the compact but friable substance of the *Boletus imbricatus*, in which they perforate cylindrical galleries in different directions, without any regularity, and more or less obstructed by a powdery *detritus*. When the larvæ have attained their full growth, they proceed to prepare a *nidus*, in which to undergo their metamorphoses; and this is constructed in the following very singular manner. Having selected a portion of the fungus not traversed by galleries and of a compact and solid structure, the little *Eledona*, with no other implements than its mandibles, contrives yet skilfully to chisel out (by working gradually upon the circumference of a cavity which it first of all commences) a spheroidal piece, until this has become completely isolated from its interior; feeding the while upon the materials as it is making in them its circular incision, so that when the work is finished, a white powder, composed chiefly of its *egesta*, is interposed betwixt the cell and the contained mass. The latter, which is about 7—8 millimetres long by 6—7 in width, is now perforated from one end to the other by a cylindrical canal adapted to the size of the larva. Here again it devours the materials as they are excavated; and then, after having given the cell its due proportions, and polished its interior for the reception of the delicate nymph, it closes most accurately with its powdery excrement the two apertures, curves upon itself, and becoming motionless and torpid, resigns itself to its changes, apart from further observation. The cocoon of the larva of *Diaperis* is formed in a similar manner, but I have never detected in it more than a single aperture, whereas two, as already stated, exist in that of *Eledona*. There are numbers of larvæ which fabricate a case either purely of silk, or with wood, earth, &c. interblended; in some even the skin hardens, becomes detached, and so forms a protecting envelope to the pupa; but, to my knowledge, the fact has never before been recorded of a fungivorous larva making such curious use of the very substance upon which it feeds.—*Ann. des Sc. Nat.* A. T.

## APTENODYTES.

The Antarctic Expedition having brought home several specimens of this genus, we are now enabled to clear up the doubt which has long existed with regard to the question, whether there be more than one species. The result of a careful comparison is, that there are two species confounded under the appellation of *Aptenodytes patachonica*. The Patagonian Penguin of Pennant (in the Phil. Trans. lviii. 91) is I believe the original figure, but on comparing it with those of most modern authors, there can be no doubt that they are distinct. The author who first gave the Latin specific name was Shaw, who described the figure of J. F. Miller (Illustr. Nat. Hist. t. 33.). This figure was copied from the drawings of the Forsters, who accompanied the great Cook in his second expedition; and the same figure was also copied by Pennant in his 'Genera,' t. 14, and by J. R. Forster in the 'Commentationes Gottingenses,' iii. t. 11. Now Shaw's *Aptenodytes patagonica*, taken from Forster's drawings, is not the Patagonian Penguin of Pennant in the 'Philosophical Transactions,' but a distinct species, which the voyagers term the "Emperor," while that of Pennant is their "King." The differences are—

## "Emperor."

From the tip of bill to tip of tail, 50 inches.

Tip of bill to gape, 5 inches.

Base of lower mandible not dilated.

Yellow of the sides of head passing insensibly into white on the sides of neck, where it is divided by a projecting point of the same colour as the back.

Black under the throat, short, and divided in front in the middle by a point of the white feathers of the chest.

## "King."

From the tip of bill to tip of tail, 44 inches.

Tip of bill to gape, 4½ inches.

Base of lower mandible dilated.

Yellow of the sides of head deep, and passing at once into deep orange on the chest, gradually becoming white on the breast.

Black under the throat, ending in a blunt point on the chest.

The "Emperor" is unquestionably the *Aptenodytes Patachonica* of Shaw in Miller's 'Illustrations,' but not of the same author in the Leverian Museum, where the bird figured under that name is the "King." It seems desirable therefore, to avoid confusion, both Pennant and Shaw having on different occasions given the name of Patagonian Penguin and *Aptenodytes Patachonica* to each of the two species, to suppress those names altogether, and to call Pennant's species (the "King") *Aptenodytes Pennantii*, and Forster's (the "Emperor") *Aptenodytes Forsteri*.

As a lengthened account of these birds will be given in the forthcoming work on the Zoological Collections brought home by Capt. Sir James Ross's Antarctic Expedition, it is unnecessary to enter more into detail for the present.

GEORGE ROBERT GRAY.

## ON THE TRANSMISSION OF HYDATIDS BY CONTAGION.

The following is an abstract of a very interesting paper by Prof. Klencke of Brunswick, entitled "Researches upon the Transmission of Hydatids by Contagion" (from the Gazette Médicale, Dec. 1843).

After commenting upon the vague manner in which the term hydatid has been applied in practical medicine to every abnormal production having the form of a cyst, the author proposes to limit it to the following definition:—"Every vesicular production found in living organized tissues which is provided with spontaneously moving organs, or which has at least the power of reproduction apart from the tissue in which it is lodged by giving birth to individuals similar to itself." He then gives a sketch of the specific characters of the different species included under the names of *Hydatis spuria*, *Acephalocystis*, *Echinococcus*, *Polycephalus* or *Cænurus*, and *Cysticercus*. The first of these, commonly met with in the brain and spinal marrow, and which consists of one or more simple cells filled with fluid and containing some minute globules, has, he says, been almost always confounded with the true hydatid or *Acephalocyst*, whereas it is not a distinct animal, but consists of certain elementary cells of the tissue, which by a process of normal (abnormal?) evolution have become isolated from the rest of the organism, and are capable of maintaining an independent existence. This opinion will be seen to coincide very closely with that of Prof. Owen in his Hunterian Lectures relative to the *Acephalocyst*, namely, "that it is a gigantic organic cell, not a species of animal, even of the simplest kind;" but the cellules of this species he regards on the contrary as true organized beings, having the power of generation, and in the latter part of the paper adduces reasons for regarding them as but a primary form of the *Echinococcus*; 1st, from his having found the latter chiefly in different aquatic animals, such as tortoises, frogs, fishes and water-birds, also in mammalia and man; 2nd, from having found in clear spring-water some small pyriform or lanceolated animalcules  $\frac{1}{200}$ th of a Paris line in diameter, which had instead of a coronet of hooks a disc covered with radiating striæ, and furnished in its centre with only a single spine; 3rd, that these animalcules were so exactly similar in form and character to the *Acephalocysts* at the period of their transformation into *Echinococci*, that no appreciable difference could be detected either by himself or other skilful observers between them. He thinks it not improbable therefore that the *Echinococci* may exist in nature, if not in a perfect form, at least as ovules, in the water, and that with it they are introduced into the bodies of different animals, there to undergo further development, and that they may then work their way by means of their hooks from the intestinal canal into the interior of the tissues, and from their very minute size, even into that of the circulating system. It is curious to compare our author's statement upon the identity of the *Acephalocyst* and *Echinococcus*, with one recently made by M. Eugène Livois in a work called 'Recherches sur les Echinocoques chez l'homme et chez les animaux,' Paris, 1843, who asserts "that no good examination has been yet made of the cellules of the *Acephalocyst*; that they are in reality clusters of *Echinococci* whose head is not yet protruded, but which, when they have attained their full development, separate, and are found floating in the fluid of the sac, and that in upwards of 800 examinations he never found these parasites absent in a single hydatid." Leaving this question as one still open to further investigation among microscop-

pists, the most important part of Prof. Kléncke's memoir is that occupied with an account of the experiments which he performed upon propagating hydatids by means of inoculation. Some few of these will be here detailed with the general conclusions to which they lead, with the view not merely of gratifying the reader's curiosity, but it is hoped of stimulating those who have time and opportunity to test their truthfulness for themselves, by methods, however, as consistent as is possible with the feelings of humanity.

"In order to study the reproductive power of the false hydatid, I selected two puppies and two kittens, and injected by a trocar into their abdominal cavity warm water containing some of these hydatids, which I had collected from the brain of a fresh human subject. After the injection I closed the opening carefully; the animals did not appear to suffer much from the operation, were restored to their parents and grew perfectly well. At the end of three months I found, upon examining the abdomen in setting out from the punctured wound, an adherence of the parietal layer of the peritonæum with the epiploon at the seat of puncture, and upon this adhesion as well as upon the internal surface of the peritonæum, in the neighbourhood of the cicatrix, there existed in both the puppies and in one of the kittens a very great number of false hydatids. In the other kitten, in which no adhesions had taken place, there was no trace of these productions in the neighbourhood of the cicatrix, whilst upon the peritonæal surface of the bladder a mass of false hydatids was found projecting into the abdomen.

"I took some very small hydatidic cellules from the plexus choroïdes of a man, and inoculated with them the orbit of a hen. The inflammation which supervened subsided by the eighth day. At the end of thirteen weeks the whole external wall of the orbit was tumefied and the eye pushed inwards. Upon examination after death, the orbit was found filled with a cellular mass containing a very great number of false hydatids.

"The whole brood of these hydatids was injected into the femoral vein of a kitten. At the end of three weeks the animal became sullen and habitually sleepy. Upon autopsy there was found in the heart, and especially in the right auriculo-ventricular orifice, a fibrinous and gelatinous precipitate containing an innumerable quantity of false hydatids."

The false hydatids are more rare in animals than in man, and their transmission is more easily effected when the species of animal inoculated is not far removed from that which furnished the parasite. In regard to the *Acephalocysts* and *Echinococci*, the author says that he has found the former in the milk of the cow, and floating along with them in the serum of that fluid, the small ovules that are met with in the body of these animals. Both forms of hydatid are met with daily in the flesh and blood of animals, and if the process of cooking does not destroy them, we must run continual risk of contagion. With a view of ascertaining next what effect digestion would produce upon them, he instituted the following experiment.

"I placed some full-grown *Echinococci* in the gastric juice of a dog and that of a man. At the end of three hours they appeared

dead, their head being retracted, and they exhibited no signs of movement. After having washed them well in warm water, I introduced them into the subcutaneous cellular tissue of the thigh of a kitten; eight days afterwards the wound had cicatrized. I next took some *Echinococci* which had been immersed in gastric juice diluted with half the quantity of milk or water, and inoculated a young dog by an incision in the abdomen reaching to the peritonæum, but without opening the latter, upon which I placed two of the parasites; the wound was accurately closed by suture, and at the end of three weeks I found a cellular and highly vascular cavity, containing a yellowish serosity, in which were two *Echinococci*, remarkably modified in form. They were transformed into vesicles, covered upon their external surface with a number of gemmules and isolated cells supported by pedicles. Examined under the microscope, these cells, upon being crushed, gave exit to a multitude of other small cells, similar to those found in the body of the *Acephalocysts*, and which represented the ovules. The hydatids being open exhibited upon their internal surface a still greater number of gemmules, pediculated cells, and other cells floating freely in the liquid."

The author particularly recommends this mode of experimenting, as by placing the vesicles between the peritonæum and abdominal parietes they can be disclosed for examination at different intervals, and their different stages of development followed out, without the necessity of killing the animal.

External injuries seem to favour the development of hydatids.

"I injected a fluid charged with ovules of the *Echinococcus* into the crural vein of two puppies, two old cats, and a guinea-pig. Eight days afterwards I made an incision in the tongue of one of the dogs, and the abdominal muscles of the other; one of the cats received a blow upon the liver and vomited; the second was slightly pinched with an instrument behind the left eye-ball; the skin of the guinea-pig's thigh was compressed so as to produce ecchymosis. The five animals were examined three weeks afterwards. In the guinea-pig five well-marked *Acephalocysts* were found in the cellular tissue beneath the part that had been pinched. The liver of the cat presented a sac full of *Acephalocysts*. The three other animals offered no results."

It is sufficient in experimenting with the *Cœnuri* (so often found in sheep affected with vertigo) to take a cephalic segment and introduce it by trepan into the brain of a dog, or inject it into the circulatory current, and at the end of ten or twenty days a perfect vesicle is found filled with young embryos of the parasite. If these are inclosed in a bottle and moistened occasionally with water enough to prevent their drying, they decompose at the end of four or five days and are converted into a fluid, which, with a little serum added, answers also for the purposes of inoculation. The *Cysticercus* is the most easily transmitted by inoculation. Entire specimens may be used, or the gemmules formed upon the interior and exterior of their membrane; they are found in all parts of the body, in the blood, the respiratory passages, and the internal surface of the alimentary canal. Boiling water destroys the *Cysticerci*, but not their ova; immersion

in a solution of arsenic does not prevent the development of the latter, while acetic acid and camphor destroy them. Prof. Klencke deduces the following conclusions from an extensive series of experiments :—

1st. That in all hydatids we observe a cyssiparous and oviparous reproduction.

2nd. That there are false hydatids which propagate by blastoderm (blastidie).

3rd. That all hydatids are transmitted from one organism to another, and being found in our fluid aliments and in the flesh of animals can be transmitted by infection.

4th. That the Acephalocysts are not distinct from the Echinococci, but merely the ova of the latter with or without the parent cyst.

5th. That whatever be the way by which they have entered the animal system, hydatids can be conveyed by the current of the circulation.

6th. That certain agents in the organism and medical substances have the power of destroying them.

A. T.

METEOROLOGICAL OBSERVATIONS FOR FEBRUARY 1844.

*Chiswick.*—February 1. Frosty : very clear and dry : frosty. 2. Snowing : frosty at night. 3. Frosty : clear, with bright sun : overcast and frosty. 4. Snow in broad flakes : densely clouded and rapid thaw at night. 5. Frosty : clear : severe frost. 6. Sharp frost : clear and fine : overcast. 7. Hazy, with slight rain : overcast : heavy and continued rain in the evening. 8. Frosty : very clear : frosty. 9. Frosty : lightly clouded : densely overcast. 10. Cloudy. 11. Slight rain. 12. Uniformly overcast : clear and fine : foggy and frosty. 13. Frosty, with dense fog : frosty, with fog at night. 14. Thick hoar-frost : clearing : overcast. 15. Slightly overcast and fine : hazy, with rain. 16. Clear and fine. 17. Overcast : clear. 18. Cloudy : slight rain at night. 19. Densely clouded : clear and windy. 20. Clear and frosty : fine : clear, with sharp frost at night. 21. Snowing in broad flakes : sleet and rain : hazy. 22. Snowing : clear and frosty. 23. Sharp frost : overcast : heavy rain from six till nine P.M. 24. Clear : cloudy : clear and frosty. 25. Rain : squally : cloudy and fine. 26. Heavy clouds and showers : stormy, with rain at night. 27. Clear, cold and dry. 28. Clear and cold : fine, with sun : cloudy. 29. Very fine : rain.—Mean temperature of the month 3°59' below the average.

*Boston.*—Feb. 1. Fine. 2. Cloudy : snow early A.M. 3. Fine. 4. Snow. 5, 6. Fine. 7. Rain : rain early A.M. 8. Fine : rain early A.M. 9. Fine. 10. Fine : snow A.M. 11. Snow : snow early A.M. 12. Fine. 13—15. Cloudy. 16, 17. Fine. 18. Fine : rain P.M. 19. Cloudy : rain A.M. 20. Fine. 21. Cloudy : snow P.M. 22. Cloudy. 23. Cloudy : snow early A.M. : snow P.M. 24. Stormy : snow P.M. 25. Cloudy : rain A.M. and P.M. 26. Cloudy : thunder P.M. 27. Fine : snow early A.M. : snow P.M. 28. Cloudy. 29. Fine : melted snow.

*Sandwick Manse, Orkney.*—Feb. 1. Bright : clear large halo. 2. Bright : clear : fine. 3. Bright : cloudy. 4. Damp : showers. 5. Showers. 6. Snow-showers : cloudy. 7. Rain : showers. 8. Snowing : aurora. 9, 10. Snow-showers. 11. Bright : cloudy. 12. Bright : cloudy : thaw. 13. Cloudy. 14. Drizzle : cloudy. 15, 16. Showers : sleet. 17. Bright : clear aurora. 18. Cloudy : snowing. 19. Snow-drift. 20. Snow-showers. 21. Bright : snow-showers. 22. Snow-showers : drift. 23. Bright : drift. 24, 25. Drift. 26. Bright : snow-showers. 27. Bright : haze. 28. Bright : clear. 29. Bright : large halo.

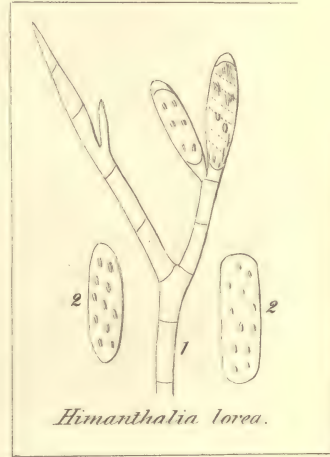
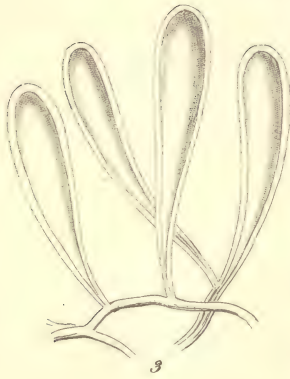
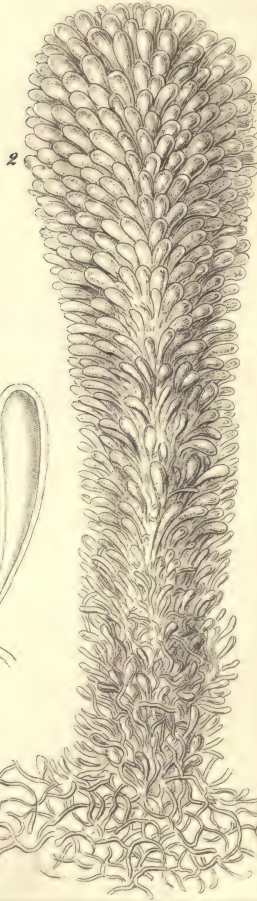
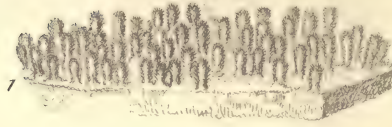
*Applegarth Manse, Dumfries-shire.*—Feb. 1. Frost. 2. Frost and snow. 3. Frost : clear. 4. More snow : frost. 5. Frost : clear. 6. Frost. 7. Snow. 8. Snow : frost. 9. Thaw. 10, 11. Frost. 12. Snow : frost. 13. Thaw. 14. Thaw and fog. 15. Fine thaw and rain. 16. Slight showers. 17. Showers P.M. 18. Very wet. 19. Rain : slight showers. 20. Frost again. 21. Frost : a little snow. 22. Frost : snow-shower. 23. Heavy fall of snow : frost. 24—27. More snow : frost. 28. Snow and thaw. 29. Rain P.M.







*Codium amphibium.*



W.H.H. del.



*Alaria esculenta.*

*Laminaria digitata.*

# THE ANNALS

AND

## MAGAZINE OF NATURAL HISTORY.

No. 85. MAY 1844.

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XXXVII.—*Description of a new species of Codium recently discovered on the west coast of Ireland.* By WILLIAM HENRY HARVEY, Esq.

[With a Plate.]

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

GENTLEMEN,

HAVING just received from my friend Mr. David Moore, of the Glasnevin Botanic Gardens, a specimen of a remarkable new species of *Codium* lately added to the Irish flora, with a request that I should make it known to the public, I lose no time, as the best means of meeting his wishes, in forwarding to you a drawing and description of it, and hope that you may find room for this notice in an early number.

The following character will abundantly distinguish it:—

*Codium amphibium*, Moore; frondibus minutis, erectis, cylindraceutis vel subclavatis, simplicibus, obtusis, in strato late effuso aggregatis.

*Hab.* On turf banks at extreme high-water mark, near Roundstone, county Galway, *Mr. Wm. M'Calla*.

*Fronde* rising from a mass of entangled, divaricately branched fibres, densely aggregated into widely spreading patches, but not woven together in a continuous mass (each little frond being distinct in itself), from a line to nearly a quarter of an inch in length, and from a quarter to half a line in diameter, erect, cylindrical or somewhat club-shaped, obtuse, simple; the *axis* composed of branched, interwoven fibres, which throw off to the circumference club-shaped ramuli, of precisely the same nature and nearly the same form as those of *C. tomentosum*. Towards the base of the frond these ramuli are less abundant, and there the entangled fibres which compose the centre are more apparent: towards the apex nothing is seen, under the microscope, but the clavate tips of the radiating ramuli, closely set together, giving that part, as Mr. Moore observes, the appearance of "a small pickling cucumber." The *colour* is much faded in my specimen, and the endochrome nearly destroyed, but traces of a rich grass-green remain on some fronds. The *fructification*, as yet unknown, will probably be very similar to that of *C. tomentosum*.

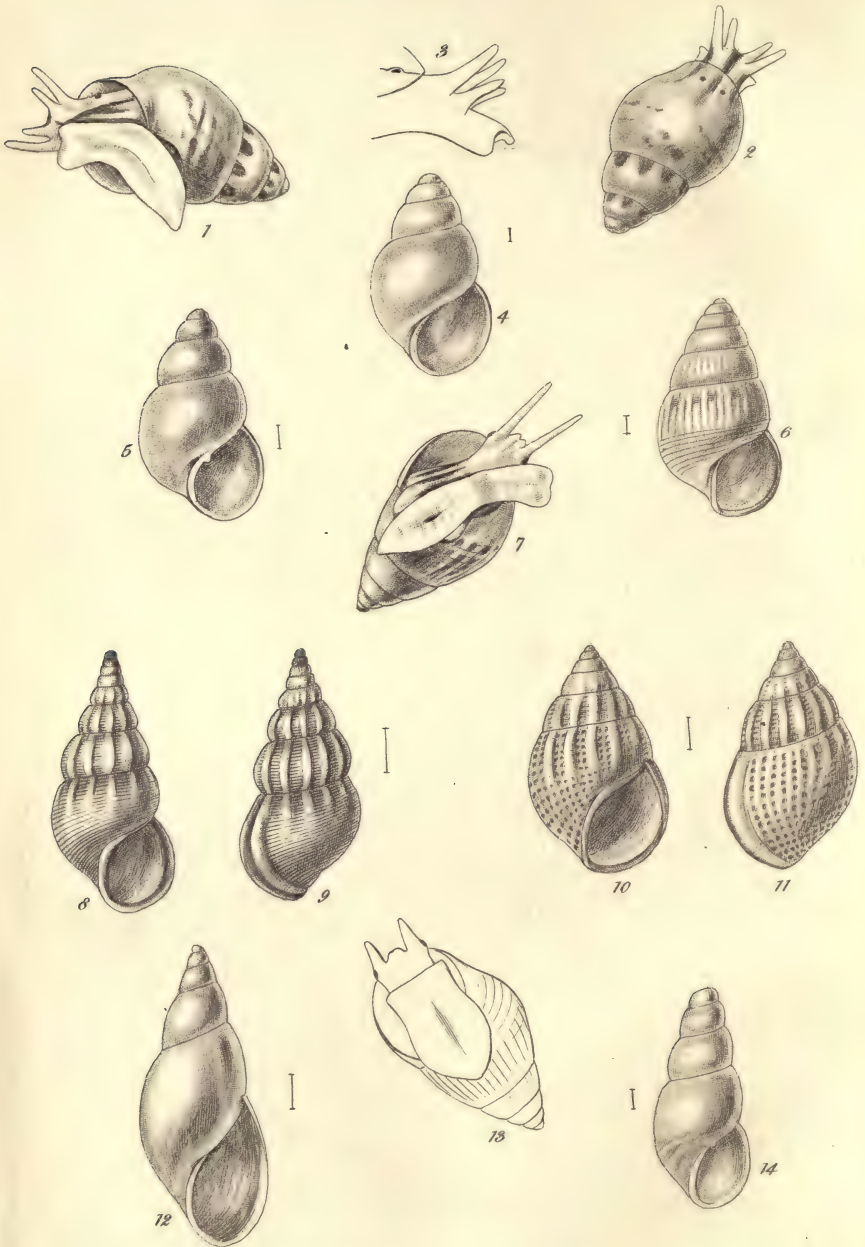
*Ann. & Mag. N. Hist. Vol. xiii.*

Y

Accompanying the specimen, Mr. Moore has favoured me with the following note:—"My first knowledge of this plant was obtained in October 1843, when Mr. M'Calla inclosed me a small specimen, requesting my opinion of it; on which I examined it, and by return of post wrote him that he was perfectly correct in supposing he had found a new species of *Codium*. In his letter he says, 'I found this remarkable plant last year, and from its habit and situation took it at first to be a sponge, but after examining it better, came to the conclusion that it was a *Codium*, in which opinion I have no doubt you will agree. It grows on turf-banks near or at extreme high-water mark, spreading in large patches to the extent of several yards. In dry weather it loses all its characters, the frond shrinking to a mere nothing, but on the return of moisture it immediately gets fresh again.' Such is M'Calla's account, and you will observe from it that he has both the merit of discovering and ascertaining it to be a species of *Codium*. On the 7th of December I again received fresh specimens, with a view of describing it which was delayed for two reasons: first, thinking I might find it noticed by some foreign author; and secondly, that it might alter its form on the approach of spring, which latter has not been the case with specimens which I placed on a moist spot, where they remain unchanged, though they have now been under my observation upwards of three months. I thought of calling it *C. cucurbitinum*, from the resemblance it bears to a small pickling cucumber under the glass."

The most curious point in the history of this interesting Alga, and which has suggested the specific name by which we have distinguished it, lies in its *habitat*, wherein it differs altogether from any hitherto recorded species of *Codium*, at the same time that its structure is so entirely identical with that of *C. tomentosum* and others of the genus, that it is impossible to place it in any other group. All known *Codia* are not merely marine plants, but are generally found far removed from high-water mark, and in places where they are either not entirely uncovered at low water or are only left bare for a very limited time, while their spongy nature enables them to retain sufficient water to prevent shrivelling. In our *C. amphibium*, however, we find these peculiarities of the genus singularly departed from. It can scarcely be called a *marine*, so much as a *maritime* plant, if it be affected, as would appear by Mr. M'Calla's statement, by the wetness or dryness of the weather. Probably it grows within the limits of spring-tides, but beyond the reach of the ordinary sea-level. It is moreover found growing in bog-earth, and doubtless deriving from the moisture of the bog a portion of its nourishment. In all these respects, as before observed, it differs remarkably from any recorded species.





*New Species of Rissoa and Odostomia.*

Its powers of life appear considerable, for if placed in a saucer of water after having long been dried, it almost immediately expands and recovers its original form, and its cells imbibe moisture more perfectly than those of *Algæ* generally do; and far more perfectly and readily than any species of *Codium*, *Vaucheria* or *Bryopsis*. It is thus admirably adapted to the circumstances of intermittent nourishment under which it is developed, and affords a new instance, to the many thousands recorded, of peculiar care exercised in providing for the welfare of even the humblest member of the organized world.

Many interesting additions to our marine flora may be expected from Mr. M'Calla's researches on the west coast of Ireland. In addition to the present new species, he has already found fine specimens of some very rare *Algæ*, as *Gloiosiphonia capillaris*, *Conferva rectangularis* and others. The last-named plant, originally discovered by Mrs. Griffiths and Mr. Borrer at Torquay, was, so far as I am aware, first found in Ireland by Mr. Reilly of Cork, who gathered a single specimen in Galway Bay some years ago, and at the same time picked up the so-called *Gelidium*? *ros-tratum* (*Heringia rostrata*, J. Ag.).

W. H. H.

March 15, 1844.

## EXPLANATION OF PLATE VI.

- Fig. 1. Patch of *Codium amphibium*, natural size.  
 — 2. A single frond, magnified.  
 — 3. Some of the ramuli of the periphery, magnified.

XXXVIII.—*Descriptions of some new British species of Rissoa and Odostomia.* By JOSHUA ALDER, Esq.

[With a Plate.]

THE genera *Rissoa* and *Odostomia* belong to a group of small mollusks which appear to hold their head-quarters in European seas, and more especially on the shores of our own islands. The number of published British species much exceeds that of any other country\*, yet several still remain undescribed in collections. I have drawn up descriptions of the following from my own cabinet, at the suggestion of my friend Mr. Thompson of Belfast, who has lately ascertained that most of them are inhabitants of the Irish coast.

*Rissoa inconspicua*. Plate VIII. fig. 6 and 7.

*Shell* ovate-conical, shining, transparent, yellowish white, with a few blotches of pale fulvous brown occasionally forming two or

\* M. Deshayes, in the 2nd edition of Lamarck's '*Animaux sans Vertèbres*,' has published thirty-four recent species of *Rissoa* (including *Odostomia*). He has not, however, admitted any British species, except such as have been re-described, mostly under different names, by French authors. The number of British species of the two genera is upwards of forty.

three rows of spots on the body whorl. Whorls five or six, not much rounded, terminating in a rather fine point, which is tipped with purple: the upper whorls smooth; the penultimate and half of the last whorls generally marked with numerous very delicate and faint ribs or plicæ, about thirty in number, the bases of which are crossed on the body whorl by a few faint spiral striæ, giving that part a reticulated appearance. The whole of the markings are very delicate and sometimes entirely wanting. Aperture margined with yellowish brown, rather small, straight at the pillar, and slightly angulated at the base beneath it. Outer lip thickened by a rib behind. Inner lip scarcely reflected, with a slight depression behind. Length about one-tenth of an inch; breadth half its length.

**T** *Animal* white, with two long setaceous tentacula, having the eyes at their external base. Head bilobed. Foot slender, produced in front, white, with a black spot in the centre of the posterior part. The sides have two lobe-like appendages, as is usual in *Rissoa*, which are margined with dark purple or black: two other lines of the same colour on each side run parallel to these; the upper one on the side of the back, the lower bordering the foot. The rest of the body is white with some blotches of yellow.

Found on corallines from deep water, Cullercoats, Northumberland.

The shell differs from *R. interrupta* in being smaller, more delicate and glossy, as well as in being striated; from *R. semistriata* in being ribbed; and from *R. punctura* in the less rounded whorls, the more delicate markings, and the transparent and glossy appearance.

One individual only has occurred of the size mentioned. Several smaller specimens were obtained, some of which, having the rib behind the pillar, appear to be full-grown, but are not above half the size, and are shorter and more ovate in the outline. The other characters are the same.

*Rissoa costulata*. Plate VIII. fig. 8 and 9.

*R. costulata*, *Risso*, *L'Europ. Mérid.* iv. p. 119.

*Shell* pale yellowish brown or purplish, ovate-oblong, produced at the apex and tapering to a fine point, with eight whorls; the four upper ones small, flat and smooth, the other four costated and rounded, especially the penultimate one, which generally bulges out beyond the rest. Ribs about ten, strong and prominent, swelling in the centre of the whorls: they seldom reach above half-way down the last whorl, which is covered with slightly undulating spiral striæ, most conspicuous at the base, and continued up the second and third whorls between the ribs: these striæ are variable in strength and sometimes nearly obliterated: the ribs also are occasionally wanting on the last whorl. Aperture small, entire, nearly circular, a little contracted above. Outer



lip slightly expanded, with a large and strong rib at a short distance behind it. Inner lip reflected a little at the base, but not umbilicated. The inner margin of the aperture as well as the tip of the spire are generally of a dark purplish brown or violet-colour. Length  $2\frac{1}{2}$  tenths of an inch; breadth one-tenth.

A variety is marked with zigzag brown lines.

Procured from small sea-weeds collected in Torbay, where it appears to be tolerably abundant.

My specimens agree with a foreign one of *Rissoa costulata*, Risso, named by M. Michaud, and kindly presented to me by W. Thompson, Esq. of Belfast.

*Rissoa rufilabrum*. Plate VIII. fig. 10, 11.

*Alvania rufilabrum*, Leach, MS. Brit. Mus.

*Shell* ovate, rather broad and thick, tapering to a pretty acute point, yellowish white or brown, more or less tinged with violet; with seven rather flat whorls; the upper ones smooth, two or three of the lower with about twelve strong ribs. The ribs are frequently only observable on the penultimate and a part of the last whorls, always disappearing before they reach the lip. The whole surface of the last whorl is covered with punctures formed by the crossing of obscure longitudinal and transverse lines. The spaces between the ribs are coarsely striated. Aperture roundish oval, slightly angulated above, generally of a violet or purplish brown colour, and having a very broad white rib behind it. Inner lip slightly reflected on the pillar, without umbilicus. Length scarcely two-tenths of an inch; breadth one-tenth.

Specimens of this interesting species from Brighton have been in my cabinet for several years, and I lately detected one or two among some small shells obligingly sent me from Torquay by Mrs. Griffiths. Dr. Farran of Dublin, to whom I am also indebted for specimens, found it in some abundance at Connemara in the west of Ireland.

This species nearly resembles the *R. violacea* of Desmarest, but is shorter and thicker, and without the spiral band. I have adopted the manuscript name attached to specimens in the British Museum. The same species, unnamed, is also in the museum of the Jardin des Plantes at Paris.

*Rissoa? glabra*. Plate VIII. fig. 1, 2, 3, 4.

*R. glabra*, Brown, *Illust. Conch.* 2nd ed. p. 13.

*Shell* ovate-conical, white, smooth, very glossy and diaphanous, with four or four-and-a-half rounded and well-defined whorls, terminating in a rather obtuse point; the last whorl occupying about two-thirds of the length of the shell. Aperture roundish ovate, entire. Outer lip thin, without rib. Inner lip slightly reflected on the pillar, forming a subumbilicus. Length scarcely a twelfth of an inch; breadth half its length. Operculum horny.

*Animal* yellowish white, with three longitudinal bands of rich brown on the body, and blotches of the same colour on the spiral portion. Tentacula four, of moderate length; the superior pair rather longer and more slender than the lower. Eyes placed very far behind on the back, large and prominent. Foot produced and strongly notched in front, grooved down the centre.

Found on small sea-weeds in pools among the rocks at Dalkey Island near Dublin, and at Cullercoats, Northumberland.

The coloured markings of the animal seen through the shell when alive have the appearance of belonging to the latter, which is however perfectly colourless, and so transparent, that though the eyes of the animal are placed beneath it, the power of vision is scarcely interrupted.

The striking peculiarities of this animal are the two pairs of tentacula and the posterior position of the eyes, in which characters it differs not only from *Rissoa* but from all the allied genera. The lateral appendages of the foot are also absent in this species. These differences are undoubtedly sufficient to constitute a new genus, which I shall content myself with merely indicating at present. The shell has no character to distinguish it from that of *Rissoa*, and affords another instance of the difficulty of determining a genus from the shell alone.

In a notice of this curious little animal communicated to the Natural-History Section of the British Association Meeting at Cork, I described it under the name of *R. albella*. Since then however I have found a shell, described by Capt. Brown in his 'Conchological Illustrations of Great Britain,' which appears to be identical with my species, and have therefore not hesitated to adopt his name.

*Odostomia nitida*. Plate VIII. fig. 5.

*Shell* ovate-conical, smooth, shining, transparent, white, of five much-rounded, well-defined whorls, the last occupying about two-thirds of the length of the shell. Aperture ovate, entire. Outer lip thin. Pillar-lip scarcely reflected, having an umbilicus behind it, and a prominent tooth a little above the centre of the inner margin. Length rather more than one-tenth of an inch; breadth about half its length.

A single specimen from shell-sand at Tynemouth.

This species has very much the contour of a *Rissoa*, and were it not for the distinct tooth, it might very readily be taken for the species last described; it is however larger, a little more elongated, and the whorls, especially the penultimate, are more rounded. The animal is unknown.

Dr. Fleming makes it one of the characters of his genus *Odostomia* to have the "peristome incomplete retrally;" but some of the species he has included in it, as well as the one here described,

have the peristome complete, though not quite so conspicuously so as is usual in *Rissoa*. The animals of the only two species of *Odostomia* which I have had an opportunity of examining in a living state, *O. pallida* and *O. spiralis*, perfectly agree with each other in character, and differ strikingly from *Rissoa* in having the tentacula and foot extremely short and thick, as well as in the absence of lateral appendages. These characters will probably hold good throughout the genus, but more extended observations are desirable. In the mean time, as no figure of the animal of this genus has yet been published, I have added an outline of *O. spiralis* (Plate VIII. fig. 13.) for the sake of comparison with the two animals described above.

*Odostomia cylindrica*. Plate VIII. fig. 14.

*Shell* nearly cylindrical, white, transparent, smooth and glossy, with four or five rounded whorls, rather flattened near the suture. Apex very obtuse. Two or three faint striæ or ridges run across the body whorl on a line with the upper part of the aperture. Aperture ovate, angulated above. Outer lip thin. Pillar-lip a little reflected, with a slight depression behind it, and a small tooth in the centre of the inner margin. Length rather more than a tenth of an inch; breadth one-third of the length.

In shell-sand from Ilfracombe and the Land's End. The sand from the latter place was sent me many years ago by Dr. Turton, but he does not appear to have observed this species. I have also obtained it from sand collected by Mrs. W. Alder at Kilkee, on the west coast of Ireland.

In form it agrees with Mr. Macgillivray's *O. oblonga*, but differs from it in not being ribbed.

A specimen of this shell in the British Museum is named *Turbo nivosus*, but I cannot believe it to be the shell described by Montagu under that name, as he takes no notice of any striæ, and distinctly says that it has no tooth. That Dr. Turton did not know the *Turbo nivosus* is evident from his comparing it to *Turbo Ulvæ* in his 'Conchological Dictionary.'

*Odostomia? obliqua*. Plate VIII. fig. 12.

*Shell* ovate-oblong, white, smooth, rather glossy and transparent, with five very oblique whorls, slightly rounded and divided by a well-defined suture tapering to a point, which is not quite central, the first whorl being a little twisted upwards. The body whorl is very large, occupying more than two-thirds of the whole length of the shell. Aperture oblong-ovate, contracted to a point at the upper angle. Peristome incomplete. Outer lip very thin. Pillar-lip a little reflected, and with a very oblique internal fold only observable in old specimens. Length two-tenths of an inch; breadth one-twelfth. Though apparently smooth, young speci-

mens, when examined with a high magnifier, exhibit very minute spiral striæ.

I have obtained two specimens from shelly sand at Tynemouth, and Mr. Thompson has obligingly transmitted specimens to me for examination sent to him from the west coast of Ireland.

It has very much the general form of a *Limneus*, the fold on the pillar adding to the resemblance. In the absence of any knowledge of the animal, I have placed it provisionally in the genus *Odostomia*, to which, among the marine mollusks, the shell has the nearest affinity; it is probable, however, that it should constitute the type of a new genus. It resembles *Rissoa vitrea* in the oblique position of the whorls, but is less cylindrical, and has the body whorl much larger and more ovate. *R. vitrea*, though described as smooth, is, when in a fresh state, more distinctly striated than this species.

XXXIX.—*Synopsis of the Genera and Species of Zoophytes inhabiting the Fresh Waters of Ireland.* By GEORGE J. ALLMAN, M.B., M.R.C.S.I., M.R.I.A., Demonstrator of Anatomy in Trinity College, Dublin\*.

THE freshwater Zoophytes of Great Britain have hitherto been all included under the four following genera, *Hydra*, *Cristatella*, *Alcyonella*, and *Plumatella*. Of these, *Hydra* has been made to include four British species, *Cristatella* one, *Alcyonella* one, and *Plumatella* has been described as containing three species. Of the above nine species I am of opinion that two must be erased, viz. the *Hydra verrucosa* of Templeton, which appears identical with *Hydra fusca*, and the *Plumatella gelatinosa* of Fleming, which is evidently the same with Blumenbach's *Tubularia Sultana*. To the seven species which now remain I am enabled to add five, of which four do not appear to have been hitherto described, and the other is only to be found noticed in the fauna of the continent.

This addition to the freshwater Zoophytes, by which the number of British species is increased more than two-thirds, requires also the establishment of an additional number of genera. The genus *Plumatella*, which was originally established by Bosc, is now made to include two forms of Zoophytes which I feel convinced it would be better to consider generically distinct. One of these forms is characterized by the tentacular disc being crescentic and the tentacula numerous, about sixty; the other by the disc being circular and the tentacula not so numerous, from twenty to thirty. The former must be retained in the genus *Plumatella*, and it would appear that Bosc had this form alone in

\* Read at the Meeting of the British Association at Cork.

view when he established the genus; but the latter would certainly be better removed and placed in a genus by itself.

To this conclusion, my observations on the freshwater Zoophytes had induced me to arrive, and indeed the above passage had been written when I happened to meet in the 'Comptes Rendus' with an abstract of a memoir by M. Gervais on the freshwater Zoophytes of the neighbourhood of Paris. I was pleased to find that in Gervais's memoir he had taken the same view of the subject with myself, and that for a Zoophyte with a circular disc, found near Paris, and which he considers identical with *Tubularia Sultana* of Blumenbach, he has constituted a new genus, giving to it, in honour of Frederic Cuvier, the name of *Fredericella*. To Gervais then is due the first accurate discrimination of the species originally included under the genus *Plumatella*, and their distribution between two distinct genera; and as this dismemberment of the original genus is founded on strict zoological principles, I shall unhesitatingly adopt it, particularly as I had myself arrived at the same conclusion without any knowledge of Gervais's researches. The Zoophytes then at present included under *Plumatella* I shall distribute between two genera, retaining under *Plumatella* those with crescentic discs, and removing to *Fredericella* those whose discs are circular.

An important addition to the British genera is *Paludicella*. This term was given by Gervais to a freshwater Zoophyte originally discovered by Ehrenberg, and called by the latter *Alcyonella articulata*. For the addition of this interesting genus to the British fauna we are indebted to Wm. Thompson, Esq., who found the polypidom cast on shore at Lough Erne in August 1837; and I have myself since obtained living specimens in the Grand Canal near Dublin, and have been enabled fully to establish its identity with the continental Zoophyte.

*Paludicella*, of which but a solitary species appears to have been discovered, is a Zoophyte of much zoological importance. While it possesses many points of structure which naturally connect it with the other ascidioid lacustrine Zoophytes, it is at the same time characterized by certain peculiarities which approach it to the marine species, and which I conceive sufficient to justify me in assuming *Paludicella articulata* as the type of a distinct family among the lacustrine Zoophytes.

In October 1842 I discovered in the docks of the Grand Canal, Dublin, a hydroid Zoophyte of much interest. It is referable to no known genus, and occupies a position between *Coryne* and *Hermia*. For the reception of this Zoophyte therefore I have been obliged to form a new genus, to which I have given the name of *Cordylophora*.

I have now found in Ireland all the species of freshwater Zoo-

phytes which have been described as British, and with the genera just noticed, and some new species which have occurred to me, a synopsis of the genera and species of the freshwater Zoophytes of Ireland will stand as follows :—

Order HYDROIDA.

Family HYDRAIDÆ.

Genus HYDRA.

*Char.*—“ Polypes locomotive, single, naked, gelatinous, subcylindrical, but very contractile and mutable in form ; the mouth encircled with a single series of granuliferous filiform tentacula.”

1. *H. viridis*,
2. *H. vulgaris*,
3. *H. fusca*.

Family TUBULARIADÆ.

CORDYLOPHORA, nov. gen.

*Char.*—Polypidom horny, branched, rooted by a creeping tubular fibre ; branches tubular. Polypes developed at the extremities of the branches, ovoid, bearing the mouth at the distal extremity, and furnished with scattered filiform tentacula.

*Cordylophora lacustris.*

Order ASCIDIOIDA.

Family LIMNIADES.

Genus CRISTATELLA.

*Char.*—Polypidom free, contractile, locomotive. Polypes issuing from apertures arranged upon the upper surface ; tentacular disc crescentic. Ova with marginal spines.

*C. Mucedo.*

Genus ALCYONELLA.

*Char.*—“ Polypidom fixed, encrusting or floating in the form of an irregular sponge-like mass, composed of vertical aggregated membranous tubes opening on the surface.” Tentacular disc crescentic. Ova not furnished with spines.

*A. stagnorum.*

Genus PLUMATELLA.

*Char.*—Polypidom fixed, coriaceous, confervoid, tubular, branched. Polypes issuing from the extremities of the branches ; tentacular disc of a crescentic form ; tentacula numerous (about sixty), arranged upon the margin of the disc in a single series, invested at their origin by a membrane.

1. *P. repens.*

2. *P. emarginata*, nov. spec.—Polypidom cylindrical, closely adherent in the greater part of its extent, but sending off several

short free branches, about half an inch in length; margins of apertures with a deep notch, which is filled up by a transparent membrane.

3. *P. fruticosa*, nov. spec.—Polypidom shrubby, adherent in but a small part of its extent, suddenly dilated towards the apertures; margins of apertures entire.

Genus FREDERICELLA.

*Char.*—Polypidom fixed, coriaceous, tubular, branched. Polypes issuing from the extremities of the branches; tentacular disc orbicular; tentacula arranged on the margin of the disc in a single series, less numerous than in *Plumatella* (about twenty-four), invested at their origin by a membrane.

1. *F. Sultana*.

2. *F. dilatata*, nov. spec.—Polypidom dilated towards the apertures.

Family PALUDICELLAIIDÆ.

Genus PALUDICELLA.

*Char.*—Polypidom fixed, coriaceous, consisting of a single series of claviform cells with a catenulated arrangement; apertures unilateral, tubular, placed near the wide end of the cell. Tentacular disc of polypes orbicular, bearing upon its margin a single series of tentacula; tentacula free.

*P. articulata*.

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XL.—On the Marine Algæ of the vicinity of Aberdeen. By G. DICKIE, M.D., Lecturer on Botany in the University and King's College of Aberdeen.

[Continued from p. 10.]

[With a Plate.]

*Himanthalia lorea*.—This remarkable plant is not uncommon at Aberdeen. It usually occurs in detached patches: many parts of the coast are destitute of it; in other spots it is in great profusion, and is most usually found near low-water mark. In this vicinity it seldom attains any great size, rarely exceeding 2 to 2½ feet.

Dr. Montagne's statement, that it possesses both *acrosperms* and *basisperms* on different individuals, is quite correct, as I have verified by examining an extensive series of specimens.

While the thong-shaped receptacles are still immature, their surface is covered with numerous pores from which filaments issue, and exactly resemble those on the species of *Fucus*, and which in a former paper were stated to be barren *conceptacles*. In *Himanthalia* they are generally all ultimately fertile, producing, as already mentioned, either *acrosperms* or *basisperms*.

Some difference of opinion has arisen respecting the nature of the frond in this plant; the peziziform expansion being considered by some as the true frond, and the elongated part as a true receptacle. In a paper on the Botany of the Antarctic Expedition, published in the 'London Journal of Botany' for June 1843, Dr. J. D. Hooker states his belief, that the frond of *Himanthalia* is an abortive bladder analogous to the trumpet of *Ecklonia buccinalis*, and finds no reason to suppose that the thongs are receptacles. He believes that *Himanthalia*, *Ecklonia* and *Durvillæa* will form a distinct group.

The young fronds are well represented by Dr. Greville in his 'Algæ.' A section shows first a cortical part composed of dense tissue, beneath which there is a subcortical less dense than the former and more transparent; in the centre the tissue is composed of jointed and branched filaments, whose general direction is from base to apex of the small dilated frond: this tissue is highly elastic. The young frond is at first turgid with a fluid partly mucus and partly water. At an early period there is no distinct stem, the vesicle being attached by a flat disc. At a more advanced stage, however, the stem becomes evident, and its general structure is the same as that of the vesicle itself, three distinct tissues being present; sometimes two vesicles originate from the same flat disc or root, and then one is usually larger than the other.

In a more advanced stage the stem becomes very distinct, having increased in proportion more rapidly than the inflated part. The vesicle afterwards becomes depressed in the centre, at which time a firm band of fibrous tissue connects the stem with the disc of the inflated part, and the two come in close contact, thus producing a depression in the centre of the vesicle, all which is produced by the contraction of the central fibrous band alluded to.

The thongs, or receptacles, first appear as small papillæ in the centre of the depressed portion, and are intimately connected with the above-mentioned fibrous band, their central tissue being continuous with it, and their outer with the cortical part of the vesicle.

Mrs. Griffiths and Dr. Greville believe the plant to be annual. Capt. Carmichael considered the cup alone to be perennial and the thongs annual; he also supposed that every part of the cup is capable of producing them, as he found them eccentric in old plants. I have never seen them eccentric excepting where the frond had become distorted from injury produced by the attacks of small mollusca and crustacea. The thongs are continuous with the fibrous band already mentioned, and cannot therefore, properly speaking, be eccentric. The peziziform part is produced one season, and in the following forms receptacles, which, when



mature, drop off near their origin, or are torn away by the action of the water. The frond never, I believe, produces fresh receptacles, although it often remains attached to the rocks for some time after the former have disappeared.

Mature specimens some time after being gathered readily give out their *basisperms* and *acrosperms*, the latter appearing in the form of a slimy mucus. Plate VI. fig. 1. represents a not uncommon form of the last; in the same conceptacle, however, several different varieties may be seen, owing no doubt to their not all reaching maturity at the same period. Fig. 2 represents the ripe sporidia after expulsion from the asci which contained them.

#### LICHINEÆ.

*Lichina confinis*, Ag.—Of the two British species, this is the only one which I have hitherto found on this coast, where it is abundant on rocks a little above high-water mark. If the other species does not actually grow here, this may be considered by some an evidence in favour of the opinion that they are distinct species, the one being considered by authors a mere variety of the other.

#### LAMINARIEÆ.

*Alaria esculenta*, Grev.—This plant is very abundant upon all parts of the coast, and is most usually found near low-water mark. Turner defines the fructification as consisting of “small pyriform pellucid seeds, internally dotted, having on their largest extremity a white transparent globule.” Dr. Greville, in his ‘Algæ,’ describes the fructification as being composed of “pyriform seeds, vertically arranged in the incrassated leaflets;” his figure, however, corresponds with Turner’s definition. In the latest work on the subject to which I have access, Harvey’s ‘Manual,’ Dr. Greville’s character of the fructification is adopted. After a careful examination of numerous specimens in different stages, I am constrained to call in question the accuracy of the above statements.

Fig. 3. tab. 4. of the ‘Algæ Britannicæ’ gives a good idea of the structure of a perpendicular section under a low magnifier.

With a higher power the true nature of the fructification becomes evident; it consists of transparent clavate tubes (*asci*) inclosing solitary simple *sporidia*. Turner’s statement respecting the terminal transparent globule must have originated from the position of the inclosed sporidia in their asci, which is evident from the accompanying figure, Fig. 3. Plate VI., the part of the tube beyond the summit of the sporidium presenting an approach to the figure of Greville when viewed with a low and ill-defining lens. Fig. 4 represents a sporidium separately. The surface of

the frond in *Alaria* is covered with scattered pores, from which protrude *simple* filaments. These pores and *simple* filaments are evidently the analogues of the basispermal fructification of the *Fuci* described in a former communication.

*Laminaria digitata*, Lamour.—This species occurs in great profusion: in pools at and within high-water mark it is of small size, the plant attaining large dimensions in deep water only.

In this species I have had numerous opportunities of examining the fructification, which, on this part of the coast at least, is usually found in June and July, at which time that of *Alaria* is also mature. The specimens of *L. digitata* which usually bear fruit most copiously are those old distorted individuals found at low-water mark, and which also never attain any great size. It occurs on the laciniaë of the frond in the form of elevated spots of an oval or circular form, and more opaque than the surrounding parts. Turner had not seen the fructification of this species, but quotes Roth and Stackhouse respecting it, doubting at the same time whether even they had seen the true fructification. The former speaks of it as immersed in the substance of the laciniaë, and showing itself by plicæ and mucifluous pores; the latter says it consists of thin inflated pellicles of various forms; it is added, the papillæ perforated at top are often discoverable, particularly after the seeds are shed, even in dry specimens; further, the seeds are like small blackish dust under a high magnifier (Turner's 'Fuci').

On making a perpendicular section of the spots alluded to, the same appearance is presented as in *Alaria*, viz. clavate *asci* arranged perpendicularly toward the surface of the frond, and inclosing simple solitary *sporidia*; the latter, however, differ in form from those of *Alaria*. Figs. 5 and 6 represent the *asci* and *sporidia* of the species under discussion. In a former paper it was stated as a reason for believing the *acrosperms* of the species of *Fucus* to be one means of propagating these plants, that the fructification of *Alaria* and *Laminaria* is essentially of the same nature, and it evidently is so, the *branched* filaments accompanying those of *Fucus* constituting the only difference; these filaments can scarcely be considered essential parts of the fructification of *Fucus*. The *acrosperms* of Montagne, and the reproductive organs of the *Laminariae*, are therefore evidently composed of *asci* inclosing solitary simple *sporidia*.

It may be observed that some authors include *Alaria* in the genus *Laminaria*, as for example Endlicher in his 'Genera Plantarum.' It is very remarkable that *L. bulbosa*, Lamour., has not hitherto been seen in this vicinity; I have often searched for it at low tides, but in vain; and among the thousands of specimens of *L. digitata*, &c. cast up after storms, not a trace of it has been

seen. It evidently presents several analogies to *Alaria*, the stem near its base sometimes presenting appendages approaching to the fruit-bearing leaflets of that plant; on its surface also pores and accompanying filaments are numerous.

*Laminaria saccharina*, Lamour.—This species is very common on all parts of the coast; it never, however, attains the great size which it does in more favourable localities. From the figures accompanying this and the former paper, it might be supposed that the *sporidia* alluded to are not simple but contain *sporidiola*; such however is not the case, the inclosed bodies being composed of granular matter cohering in masses and assuming a regular arrangement. In *L. digitata* this granular matter is very abundant and has less tendency to cohere, and the regular arrangement of it is also not very evident.

[To be continued.]

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XLI. — *Catalogue of Irish Entozoa, with observations.* By O'BRYEN BELLINGHAM, M.D., Fellow of and Professor of Botany to the Royal College of Surgeons in Ireland, Member of the Royal Zoological, Geological and Natural History Societies of Dublin, &c.

[Continued from p. 260.]

### Order 3. TREMATODA.

(Derived from *τρήμα, foramen*.)

“Corpus depressum vel teretiusculum, molle. Pori suctorii. Omnia individua androgyna.”—*Rud. Synop.*

THE order *Trematoda* corresponds very nearly to the order *Porocephala* of De Blainville. The species included in it, though differing much in shape from one another, have this general resemblance, that they are all provided with one or more distinct pores or suckers, disposed upon the body in different ways; and according to the number of the pores, or their disposition upon the surface, the genera have been formed.

The head is rarely separated from the body by a neck. The body is soft, either flattened, oval, elliptical, linear or cylindrical. Each individual possesses the organs of reproduction of both sexes. The species occur in mammalia, birds, reptiles and fish; they generally inhabit some part of the alimentary canal.

#### Genus 10. MONOSTOMA.

(Derived from *μόνος, unus*, and *στόμα, os*.)

Body soft, either flattened or subcylindrical. A single anterior pore; no abdominal pore, or posterior terminal orifice.

This genus was established by Schrank under the name *Festucaria*, changed to *Monostoma* by Zeder, and adopted by Rudolphi and all zoologists since.

The species are not numerous: Rudolphi enumerates thirty species, of which seven are doubtful. They are most numerous in birds and fish, less common in reptiles, and are very rare in mammalia. They inhabit the alimentary canal principally; a few have been detected in the abdominal cavity and in the lungs.

The species are arranged by Rudolphi in two sections, according to the situation of the anterior solitary pore. Those included in the first section have the orifice of the pore inferior, occur only in fish, and have been by some classed together under the name *Hypostoma*. The few species in this list belong to the second section, in which the orifice of the pore is anterior.

*Pori apertura antica.*

- |                                  |   |  |
|----------------------------------|---|--|
| 1. <i>Monostoma attenuatum</i> * | { | Cæca of shieldrake ( <i>Tadorna Bellonii</i> ).    |
|                                  |   | Cæca of widgeon ( <i>Mareca Penelope</i> ).        |
|                                  |   | Cæca of laughing-goose ( <i>Anser albifrons</i> ). |
| 2. ——— <i>verrucosum</i> †       | { | Cæca of pochard ( <i>Fuligula ferina</i> ).        |
|                                  |   | Cæca of shoveller ( <i>Anas Clypeata</i> ).        |
|                                  |   | Cæca of water-hen ( <i>Gallinula chloropus</i> ).  |
|                                  |   | Cæca of bald-coot ( <i>Fulica atra</i> ).          |

\* The *Monostoma attenuatum* was discovered by Rudolphi in the cæca of the snipe; he mentions the cæca of the shoveller duck as another habitat. I have obtained it from three other species; it occurred in greatest abundance in the shieldrake. This and the next species appear to be altogether confined to the cæca of birds.

The *Monostoma attenuatum* is a minute species, measuring only a line and a half in length; the colour is whitish, with a shade of yellowish red. The body is slender, flattened and smooth, obtuse and rounded posteriorly, becoming more slender anteriorly; the pore is anterior, terminal, orbicular and slightly prominent. The ovaries are situated in the posterior half of the body. From the anterior pore two white lines (apparently vessels) are seen to run backwards; they are obscured when they meet the ovaries, but posteriorly they are again seen, and can be traced to the posterior extremity.

† The *Monostoma verrucosum* has been named so from the little tubercular prominences with which the body is provided; these are seen only upon one surface, and Rudolphi calls it the abdominal surface; it appears to me to be the dorsal surface of the animal; it is in general convex. I have found this species upon two occasions in considerable numbers in the cæca of the common shoveller (*Anas Clypeata*); they are about a line in length, and about a third of a line in breadth, of a reddish yellow colour. When placed in water they

- [*Monostoma ocreatum* \*. Small intestine of mole (*Talpa europæa*).]  
 [————— *trigonocephalum* †. Stomach of turtle (*Chelonia imbricata*)]
- 

became contracted and curved, the abdominal surface apparently forming the concavity. Three rows of little prominences are seen upon the convex surface, which run parallel to one another from one extremity of the body to the other; the lateral margins of the body are subpellucid, inflexed in some. The pore is orbicular and very small. On the abdominal surface there is the appearance of two parallel vessels running through the greater part of the body.

The specimens of *Monostoma verrucosum* from the pochard (*Fuligula ferina*) are larger than those from the shoveller duck; the prominences upon the dorsal surface are also better marked, and can be seen with the naked eye. When first removed from the animal and placed in water, they become curved: the prominences being upon the convex surface, and the anterior pore projecting outside, gave them the appearance of little hedgehogs. Their colour is yellowish red or a dirty yellow; after they had lain for twelve hours in water they changed to white, and many unrolled themselves and became flat. In several there is the appearance of a posterior pore, which is not quite terminal and not prominent: in others this is wanting.

The specimens from the bald-coot (*Fulica atra*) resemble those from the shoveller duck in almost every respect. From the anterior pore the two white lines resembling vessels (before mentioned) are seen to run backwards, parallel to one another, in their course passing through the ovaries, which fill the thicker portion of the body, and to approach each other near the posterior extremity.

\* The *Monostoma ocreatum*, though it cannot be considered an Irish species, as the mole (*Talpa europæa*), in which alone it is found, is not a native of this country, is a very beautiful species, and differs remarkably from the two last-described species, which occur only in the cæca of birds. The specimens which I possess are about an inch in length (Rudolphi says it sometimes attains the length of two inches) and about half a line in breadth; in one a knot has formed upon the body, as we sometimes see in the *Tania*; the greater part of the body has a reddish brown colour, owing to the contents of the ovaries being seen through the parietes. The body is sublinear, rather flattened than cylindrical; it increases suddenly in diameter near the posterior extremity; indeed this part has somewhat the shape of a boot (*ocrea*), from which circumstance it has received its name.

† The *Monostoma trigonocephalum*, which inhabits the stomach of the turtle, cannot either be regarded as an Irish species; but as the turtle has occasionally been thrown upon the English coast, and is included in Jenyns's 'Manual of British Vertebrate Animals,' this species of Entozoon has an equal claim to be considered as British. It is about three lines in length and nearly a line in breadth; colour dirty white after remaining in spirits of wine; the head is distinct

## Genus 11. AMPHISTOMA.

(Derived from ἀμφί, *utrinque*, and στόμα, *os*.)

Body soft and cylindrical. Two pores, one anterior, the other posterior. No abdominal pore.

The genus *Amphistoma* was established by Abildgaard under the name *Strigea*, because the animal serving as the type had been discovered in the owl. Rudolphi gave it the name which it at present bears.

The species are not numerous; Rudolphi enumerates but twenty-one, of which three are doubtful. They are most common in birds; a few occur in mammalia and reptiles. They inhabit generally the alimentary canal.

They have been arranged by Rudolphi in two sections, according as the head is distinct or continuous. The species in this list (which have been determined) belong all to the first section.

*Capite discreto.*

- |                                      |   |  |
|--------------------------------------|---|--|
| 1. <i>Amphistoma longicolle</i> * .. | { | Small intestine of herring-gull ( <i>Larus argentatus</i> ).     |
| 2. ———— <i>macrocephalum</i> †       | { | Small intestine of moor-buzzard ( <i>Buteo rufus</i> ).          |
|                                      | { | Small intestine of peregrine falcon ( <i>Falco peregrinus</i> ). |

from the body, and has a triangular shape (hence its name). The pore is orbicular, rather inferior than anterior, when the animal has been kept in spirits for some time. The body is somewhat broader posteriorly than anteriorly, convex upon the dorsal, concave upon the abdominal surface; the posterior extremity is distinctly notched.

\* The *Amphistoma longicolle* was so named from the length of the neck; it occurs only in birds of the gull or heron tribe. It is about half an inch in length, cylindrical, and of a reddish brown colour. The head is distinct, of a subcordate shape, broadest where it joins the neck; the neck is wrinkled transversely, and increases in thickness until it meets the body; the latter is shorter than the neck and smooth. This species is well figured in Bremser's folio work.

† The *Amphistoma macrocephalum*, from the small intestine of the moor-buzzard (*Buteo rufus*), is a minute species, the longest specimen measuring only a line and three-quarters; colour yellowish white; head thicker but shorter than the body, from which it is separated by a narrow fissure, as if a string had been tied round it; body subcylindrical, incurved; anterior pore irregularly lobed; lobes apparently four or five; posterior pore small and orbicular; margin sometimes crenate; in a few specimens a small cylindrical body projected slightly from it.

- |                                  |  |
|----------------------------------|--|
| 3. <i>Amphistoma isostomum</i> * | { Small intestine of wild duck ( <i>Anas Boschas</i> ).<br>{ Small intestine of northern diver ( <i>Colymbus glacialis</i> ).<br>{ Small intestine of heron ( <i>Ardea cinerea</i> ).<br>{ Small intestine of rook ( <i>Corvus frugilegus</i> ). |
| 4. ——— <i>gracile</i> † . . . .  |  |
| 5. ——— <i>cornu</i> ? † . . . .  |  |
| 6. ——— <i>sphærule</i> § . . . . |  |

*Species dubiæ.*

- |                                   |  |
|-----------------------------------|--|
| 7. <i>Amphistoma</i>    . . . . . | { Small intestine of sparrow-hawk ( <i>Accipiter fringillarius</i> ).<br>{ Small intestine of moor-buzzard ( <i>Buteo rufus</i> ). |
|                                   |  |

\* The *Amphistoma isostomum* has a general resemblance to the *A. macrocephalum*; it is however much smaller. My specimens are about half a line in length: the animal appears to be divided into two equal parts by a simple fissure extending round it; the anterior is regarded as the head, the posterior as the body; the former has a white colour, the latter is yellow.

† The *Amphistoma gracile* is rather a rare species; Bremser discovered it in the *Mergus Merganser*. I found it in the small intestine of the *Colymbus Immer* (young of *Colymbus glacialis*). It is about two lines and a half in length; colour white. The head is distinct from the body, nearly of the same diameter as it, and about a third of its length. The body of the recent animal is cylindrical; it becomes flattened in spirits of wine, and sometimes concave on the abdominal, and convex on the dorsal surface. The anterior pore is large and cup-shaped; after it has lain in spirits it presents a lobated appearance: the posterior pore is somewhat triangular, not quite terminal, more upon the inferior surface of the caudal extremity; it becomes orbicular and terminal when kept in spirits of wine.

‡ I have only once met with this species; the specimens which I possess are very minute, and have some of the characters of the *Monostoma cornu*, with which Rudolphi says it may be readily confounded.

§ The *Amphistoma sphærule*, from the small intestine of the rook (*Corvus frugilegus*), is scarcely a line in length, and of a dirty yellow colour; the head and body are distinct, but this is not so well marked as in other species; the body is cylindrical, about twice the length of the head. The anterior pore is lobed, the posterior orbicular and smaller.

|| This species of *Amphistoma*, which I found in the small intestine of the sparrow-hawk and moor-buzzard, has some resemblance to the *Amphistoma pileatum* of Rudolphi's 'Synopsis'; from which it differs in the terminal pore being larger than the anterior, and in the body being shorter and thicker.

8. *Amphistoma* \* Small intestine of black scoter (*Oidemia nigra*).  
 9. ——— .. Small intestine of crow (*Corvus Corone*).  
 [————— .. Intestines of turtle (*Chelonia imbricata*).]

\* I only once met with this species of *Amphistoma*, and have only a single specimen; it was alive when removed from the intestine of the bird. It is nearly two lines in length; the head distinct, about half the length of the body, whiter, and more cylindrical; body flattened and wider, the edges crenate. The pores appear to be of equal size; if there is any difference, the anterior is rather larger; it is also rather inferior than terminal. The oviducts run along each side of the body near the margin, and appear to contain numerous ova; a yellowish canal is seen in the median line, commencing where the head and body join, and passing backwards towards the terminal pore.

[To be continued.]

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XLII.—*Notices of British Fungi*. By the REV. M. J. BERKELEY,  
M.A., F.L.S.

[Continued from vol. vi. p. 439.]

[With a Plate.]

257. *Agaricus rachodes*, Vitt. Mang. p. 158. t. 20; Fr. Ep. p. 13.

I have found this species in great abundance and perfection in Lord Fitzwilliam's park at Milton. The flesh when broken becomes red, the substratum of the pileus is beautifully silky, and there is a peculiarity about the habit; besides it is not edible; still it must be confessed that it is extremely near to *Ag. procerus*, to which it has been referred by authors. There is no doubt, notwithstanding the hesitation of Fries, that Sowerby's figure, tab. 190, represents the true *Ag. procerus*. I take this opportunity of remarking that *Ag. piluliformis*, Fr. Ep. p. 25, is nothing more than the young of *Ag. spadiceus*, as indeed is noticed in the text of Bulliard and Ventenat.

258. *Ag. chrysodon*, Batsch, f. 212.

This very beautiful species occurred in profusion in a wood at King's Cliffe in the autumn of 1842. I had never seen it previously. It not only grew under the lime-underwood, but amongst grass in the open glades. It resembles very closely in many respects *Ag. eburneus*, but is beautifully distinguished by the golden yellow pubescence which is sprinkled here and there over the plant, but principally on the stem and margin of the pileus. Sometimes the gills are elegantly edged with yellow flocci. The smell is strong, like that of *Ag. cossus*.

\*259. *Ag. Columbetta*, Fr. Syst. Myc. p. 44. In woods, King's Cliffe.







\*260. *Agaricus blandus*, Berk. = *Ag. brevipes*, Bull., Kl. in Fl. Reg. Bor. t. 374. My plant is a long-stemmed variety of the species figured by Bulliard. Klotzsch's figure is very characteristic.

\*261. *Ag. murinaceus*, Bull. t. 520; Sow. t. 106. King's Cliffe, Sept. 10, 1841.

Pileus  $4\frac{1}{2}$  inches across, at first campanulate, slightly umbonate, then expanded, thin, firm, but very brittle, mouse-coloured, cracked and virgate, silky, not the least viscid; flesh white. Taste bitter, unpleasant, rather acrid. Smell neither powerful nor nitrous. Stem 3 inches high, 1 inch thick at the top, cracked and streaked, silky, with minute black scales, solid but fibrous, not the least stuffed or hollow. Gills very broad, undulate, distant, having a tendency to become forked and anastomosing, brittle, often marked with raised lines, cinereous, powdery; interstices slightly veined; edge at length black. Individuals occur much thicker and larger.

Having at length found this species, I am able to state positively that it is not the plant of Fries. The specific name refers to the colour, not to the scent, which is very slight and by no means nitrous. It is not at all moist or viscid, but has a clothly feel, being virgate and silky. The gills are not olivaceous when rubbed. Its affinities are rather with *Ag. argyraceus* than with *Hygrophorus*.

262. *Ag. ovinus*, Fr. Syst. Myc. vol. i. p. 109. In pastures, Apethorpe. Not so frequent as *Ag. cuneifolius*.

263. *Ag. platyphyllus*, P., Fr. Syst. Myc. vol. i. p. 117. *Ag. grammacephalus*, Bull. t. 594. On the ground in woods, like Bulliard's plant, not on wood like that of Fries. King's Cliffe, September 6, 1841.

Pileus 5 inches or more across, smooth, hygrophanous, expanded, with a broad umbo, sinuated and undulate; thin except in the centre; umber shaded with bistre, more or less virgate, but by no means silky, though it has a sleek shining aspect, like that of *Ag. rhodopodius*; flesh brownish beneath the subcartilaginous cuticle, but in other parts firm and white. Stem  $2\frac{1}{2}$  inches high,  $\frac{1}{8}$ th of an inch thick, nearly equal, obtuse, stringy, slightly twisted, streaked, smooth, not rooting in my specimens. Gills broad, truncato-adnexed, at first white, at length pallid, distant. Smell, like that of *Ag. grammopodius*, strong; taste not unpleasant.

There is no reason to doubt that this species is the *Ag. platyphyllus* of Fries, notwithstanding the difference in the habitat. It is exactly the plant of Bulliard, which, like mine, is terrestrial.

264. *Ag. elixus*, Sow. t. 172. Pileo obconico umbonato demum explanato fuligineo, sericeo minutissime virgato; stipite deorsum incrassato concolore depresso-pubescente; lamellis an-

gustis arcuato-decurrentibus distantibus albis ; interstitiis venosis. King's Cliffe. On the ground in woods where there is little underwood. Oct. 6, 1840.

Pileus 2 inches broad, at first very strongly umbonate, obconical, at length flat or even depressed, with the border flexuous, not the least involute in any stage of growth; disc fuliginous, very minutely virgate; border whitish, with dingy sodden spots. It is not viscid, though it has a damp appearance. Stem 1 inch high,  $\frac{3}{8}$ ths of an inch thick, or 2 inches high and  $\frac{2}{8}$ ths of an inch thick; sometimes short and stout, sometimes much elongated, dingy like the pileus, clothed with matted down which reaches up to the base of the gills, often smooth at the base, which is buried amongst leaves and attached to them by the downy mycelium; solid, mottled within, slightly discoloured beneath the cuticle. Gills very distant, decurrent, white, interstices more or less veined. Spores elliptic; spicules long.

Much eaten by slugs. This is certainly quite a distinct species from *Ag. camarophyllus*, to which Fries refers it. The gills are by no means thick; they are narrow and white, not glaucous. The whole in moist weather is like a sponge sodden with water. It does not appear to me to have any affinity with *Hygrophorus*. When young, the pileus has quite the form of *Gomphidius glutinosus*.

\*265. *Agaricus gilvus*, P. Syn. p. 448. Wothorpe Grove, Oct. 7, 1840.

Pileus 3 inches broad, fleshy, plane, with the border convex and involute, opaque-white, smooth, with a few dirty ochraceous patches; flesh white, brittle. Stem 2 inches high, about 1 inch thick, blunt, opaque-white with a slight tinge of fawn-colour. Gills crowded, decurrent, white with a reddish tinge, somewhat forked at the base. Smell strong but not unpleasant.

266. *Ag. calopus*, P. Syn. p. 373; Lib. Pl. exs. Ard. no. 318. The specimens referred formerly to *Ag. Vaillantii* belong to this species; at least they are identical with what Madame Libert has published as the plant of Persoon, and her authority is confessedly very great. My specimens have the gills as in *Ag. Vaillantii*, and by no means merely adnexed; but this accords with the observation of Fries in the 'Systema Mycologicum.' We must therefore still depend for *Ag. Vaillantii*, as entitled to a place in our Flora, on Withering.

\*267. *Ag. umbelliferus*, L. The beautiful yellow variety represented by Holmskiöld, vol. ii. t. 34, occurred at Capel Curig in 1842, and Mr. Salwey has sent it to me from Llyn Howel.

\*268. *Ag. stellatus*, Fr. On bramble, Oct. 7, 1840, Wothorpe. I have also received it from the west of England from Mr. Salwey.

\*269. *Agaricus carneo-tomentosus*, Batsch. *Ag. carnosus*, Bolt. On the stump of an old tree hanging over the rivulet immediately below the waterfall in Hestercombe Park, Som., Dec. 1838, Rev. T. Hugo; King's Cliffe, Aug. 1843.

270. *Ag. Leightonii*, n. s. Sessilis; pileo primum oblique conico umbrino, demum plumbeo furfuraceo setulis intermixtis; strato superiore gelatinoso; lamellis crassiusculis alutaceis distantibus basi subfurcatis leviter undulatis; interstitiis vix reticulatis. Montford Bridge near Shrewsbury, Dec. 1, 1841, Rev. W. A. Leighton.

Pileus 5 lines broad, at first cyphellæform, obliquely conical, umber-brown, gradually becoming paler, at length of a pallid lead-colour, furfuraceous, especially behind, where there are a few bristles; flesh consisting of two distinct strata, of which the upper is gelatinous and of the colour of the pileus, the lower white. Stem none. Gills of a pallid tan colour, thickish, distant, undulated, obscurely wrinkled at the base, but the interstices can scarcely be said to be reticulated; sporophores with short spicules.

This species, of which I can find no account, belongs to the same section as *Ag. mastrucatus* and *algidus*. *Ag. ponticola* is analogous, but it belongs to the dark-seeded series.

PLATE IX. fig. 1. *a*, *Ag. Leightonii*, nat. size; *b*, section of do.; *c*, sporophores with their spicules.

271. *Ag. petasatus*, Fr. Ep. p. 142. In Mr. Marshall's wine-vault at Hitchin, immersed for about two inches in saw-dust, with the base of the stem resting on the bare brick, Jan. 20, 1843.

An excellent drawing of this noble species was kindly communicated to me by Mr. Isaac Brown, but unfortunately without any description or specimen. It accords, however, so closely with the characters given by Fries, that I have no hesitation in referring it to his *Ag. petasatus*. The only point of difference is that the border of the pileus is not, strictly speaking, membranaceous. That others may have an opportunity of judging, I have thought it best to give a figure.

PLATE IX. fig. 2. *a*, *Ag. petasatus*, nat. size; *b*, section of do.

272. *Ag. pholideus*, Fr. Syst. Myc. p. 219. In wood, King's Cliffe. My plant is clearly that figured by Bulliard under the name of *Ag. psammocephalus*.

273. *Ag. vervacti*, Fr. Ep. p. 197. Near Bromley, Kent, Mr. G. Sparkes.

274. *Ag. semiorbicularis*, Bull., Fr. Ep. p. 197. A very common species in rich pastures, often confounded with *Ag. virosus*.

275. *Marasmius urens*, Fr. Ep. p. 373. Bristol, H. O. Stephens, Esq.

276. *Marasmius archyropus*, Fr. Ep. p. 378 ; Pers. Myc. Eur. p. 135. t. 25. fig. 4. Bristol, H. O. Stephens, Esq.

A very elegant species. Mons. Desvaux informs me that Persoon's plant is identical with *Ag. hariolorum*, Bull. Persoon's figure exactly accords with what I have received from Mr. Stephens.

277. *M. amadelphus*, Fr. Ep. p. 380. Bristol, H. O. Stephens, Esq. On ash twigs.

278. *Boletus viscidus*, Linn. Fl. Suec. no. 1248. Bristol, H. O. Stephens, Esq.

Distinguished at once from *B. luteus*, *Grevillii*, &c. by its brown spores.

\*279. *Dædalea confragosa*, P. I have received fine specimens of this rare species from H. O. Stephens, Esq., gathered near Bristol, and from C. E. Broome, Esq., collected at Spye Park, Wilts. Precisely the same species occurs in New Zealand.

280. *Hydnum graveolens*, Delastre, Fr. Ep. p. 509. Found two successive summers at Dolgelly by J. Ralfs, Esq., from whom I received my specimens.

When fresh he informs me it is extremely beautiful, being dark in the centre with a white border. The prickles are pale, and the sporidia evidently white. The whole plant smells extremely strong of melilot, and after it has been dried three or four years the scent is as strong as ever.

281. *H. spathulatum*, Fr. Ep. p. 517. Apethorpe, Norths. On an old log of wood.

I have found this species once only. The whole plant separates easily from the wood, and the teeth are broad and spathulate, by which characters it is readily distinguished.

282. *Grandinia papillosa*, Fr. Ep. p. 528 ; Libert, Pl. Ard. no. 21. Wiltshire, C. E. Broome, Esq. On sticks which have not yet lost their bark. By no means confined to fir or pine.

283. *Thelephora caryophyllæa*, Fr. Ep. p. 536 ; Berk. Brit. Fung. Fasc. 4. no. 241. Abundantly at Bungay, Mr. D. Stock.

This is perhaps the most beautiful of the British *Thelephoræ*. It assumes every form from that of a perfect cup with a central stem to a much and irregularly branched frond, in which state it is *Clavaria flabellaris*, Batsch. When once seen it cannot be confounded with any of the neighbouring species.

\*284. *T. cristata*, Fr., Berk. Brit. Fung. Fasc. 4. no. 243. Bungay, Mr. Stock.

This species is, I believe, often confounded with *T. mollissima*, which is in reality of a very different nature. This is much more after the fashion of *T. incrustans*, with which it agrees as to the colour of the spores, and has the hymenium white.

285. *Thelephora fastidiosa*, Fr. Bristol, H. O. Stephens, Esq. ; near the Box Tunnel, C. E. Broome, Esq.

Distinguishable at once by its abominable odour, which remains for a long time in dried specimens. I have never myself met with it.

286. *T. mollissima*, P. Syn. p. 572 ; Berk. Brit. Fung. no. 245. *Merisma cristatum*, var. *fusco-badium*, Desm. ! no. 362. Extremely common in the Northamptonshire woods, running over moss, small sticks, &c.

I have seen precisely the same species gathered by Delastre in the south of France. The plant published by Desmazières is just the same. I have found a specimen of this growing freely from a central stem and assuming the form of *Thel. palmata*.

287. *Corticium arachnoideum*, n. s. Totum effusum niveum, molle tenerrimum mycelio latissime-serpente arachnoideo, hymenio lævi glaberrimo. Creeping over mosses and lichens on fallen sticks, Northamptonshire.

Forming delicate effused arachnoid patches of a snowy white ; threads by no means forming fibres, but spreading like a delicate web, and often remaining barren, but under favourable circumstances giving rise to a smooth even hymenium, consisting of elliptic sporophores arranged in little bunches. I have not yet seen perfect spores. The species appears to me undescribed, and is very distinct from all with which I am acquainted. Its habit is not unlike that of *Thel. bombycina*. The genera *Thelephora* and *Corticium*, it may be observed, are very far from being completely settled. The character upon which Fries mainly relies, of endosporous and exosporous fructifying cells, is manifestly untenable, as all species with endosporous asci must be removed from *Hymenomycetes*.

PLATE IX. fig. 3. Part of the hymenium of *C. arachnoideum* highly magnified.

288. *C. velutinum*, Fr. Lambley, Notts, Rev. M. J. Berkeley ; Linlithgowshire, C. E. Bauchop, Esq.

A very elegant species of a pale pink, remarkable for its floccose mycelium, and the delicate pile with which the whole of the hymenium is clothed, giving it a velvety appearance.

289. *Cyphella griseo-pallida*, Weinm. Fl. Ross. p. 522. Minima, primo granuliformis demum elongata erecta cupulæformis stipite brevissimo basi fibris brevibus strigosulis albis affixa, demum dependens subintegra, extus floccosa, hymenio lævi pallide gilvo. On hard gravel where discoloured with minute algæ, Apethorpe, Jan., Rev. M. J. Berkeley.

Whole plant one-third of a line in diameter, at first granuliform, then regularly cup-shaped, with a short stem and attached by a few radiating, white, substrigose, short threads, at length de-

pendent, mostly entire, clothed with white villous down; hymenium even, pale reddish gray; border slightly undulated.

A very elegant and distinct little species, according exactly with the description of Weinmann.

290. *Geoglossum glutinosum*, Fr. El. p. 582; Moug. ! exs. no. 780. Edinburgh, J. C. Bauchop, Esq.

291. *Clavaria contorta*, Holmskiold, t. 29. Grace Dieu Wood, Leic. On dead branches of hazel.

292. *Nematelia encephala*, Fr. Ep. p. 591; Berk. Brit. Fung. Fasc. 4. no. 291. Abundant in Wales on larch, J. Ralfs, Esq.

The species formerly published under this name in the 'English Flora' is almost identical with *Nematelia nucleata*, an American species, and very different from this. The figure in Römer's 'Magazin für die Botanik,' part 4. tab. 4. fig. 14, is extremely characteristic. This I had not seen at the time of the publication of the 'English Flora.'

*Hymenogaster*, Vitt. Mon. Tub. p. 20. "Fungi globosi læves basi absorbente præditi, carnosi, firmi vel molliusculi, fragiles nec gelatinoso-tenaces, intus cellulosi cellulis cavis hymeniferis, hymenio plerumque subæquali; sporophoris prominulis mono- vel 2-sporis (rarius 3—4-sporis) quandoque cystidiis immixtis; sporis crassis ovatis, citriformibus vel cuspidatis, lævibus vel rugulosis et papillois, opacis hyalinisve, guttulis sæpius refertis sessilibus vel brevissime fulcitis. Exoleti subfriabiles evadunt, rarius putridi deliquescunt; maturi siccati obdurescunt."—Tul. Ann. d. Sc. Nat. vol. xix. p. 373.

\*293. *H. citrinus*, Vitt. l. c. p. 21; Berk. Brit. Fung. Fasc. 4. no. 284. Audley End, Essex, Rev. J. E. Leefe. Found abundantly in Wiltshire by C. E. Broome, Esq. The yellow veins, subfusiform, rough, dark-coloured spores, the frequently coloured sporophores, and the strong cheese-like scent which communicates itself to everything which it is near, are the criterions of this species. The species which I have referred below to *H. olivaceus* is sometimes very difficult to distinguish, especially when it has been imbued with the odour of *H. citrinus*. It may however be known by its reddish substance, larger cells, more transparent, paler and smoother spores, which are more frequently abruptly acuminate. When young *H. citrinus* is of a greenish yellow, but this soon wears off when rubbed or exposed to air.

In this species the sporophores occasionally become of a much darker colour than the neighbouring cells, and have a resinous appearance. In some specimens so circumstanced there is not the slightest trace of spores, but the sporophores project beyond the general surface of the hymenium, and do not show any indication of becoming bifid. In other specimens some of the sporophores have two more or less imperfect spores extremely variable



in outline and very dark, while others project very much and are paler and barren. In other specimens again the spores are nearly of the normal form, and the sporophores but little darker than the neighbouring cells. If I am not mistaken, the cells vary very much in different specimens, and even in different portions of the same individual, as to length, thickness, articulation, &c., which is not to be wondered at, if the sporophores, which are modifications of them, and their spores vary. The length of the peduncle also varies extremely, and occasionally, though rarely, the spores are as much acuminate as in *H. olivaceus*. Were it not for this circumstance, I should have thought, from a sketch communicated by Mr. Broome, that he had met with *H. decorus*, Tul. I also observe, that amongst the abortive spores a large number have no trace of the terminal papilla. This may perhaps illustrate the state or variety of *Melanogaster ambiguus*, to be noticed presently.

I have not hesitated in these observations to bring a portion of the Truffles into contact with other Hymenogastrous Fungi, leaving the ascosporous species to come in their proper position amongst those fungi which agree with them in the structure of the parts of fructification. The relation between the two series is merely analogical, for there is no real affinity whatever, the general resemblance arising merely from their common place of growth.

I am indebted for the greater part of the Hypogæous Fungi which I have now the pleasure of recording as British to the unwearied researches of C. E. Broome, Esq., who has also accompanied his specimens with notes and sketches, which are the more necessary as no fungi stand more in need of an inspection, not merely in a recent state but in their place of growth, and under the different phases of evolution, than the Truffles. In consequence of not being able to do this, though I have had hundreds of specimens sent to me in a recent state, my observations are still very imperfect, and will not for a moment bear comparison with those of Messrs. Tulasne, to whom I am indebted both for information and specimens. Those who are interested in the subject will do well to consult their short memoir in the 19th volume of the 'Annales des Sc. Naturelles,' a memoir of such interest, as, though confessedly a mere sketch, to raise to the highest pitch one's expectations from the full detail which they promise. I have been so fortunate as to see a large quantity of the illustrations prepared for the more complete history of the French species, than which nothing can be more beautiful.

294. *Hymenogaster luteus*, Vitt. l. c. p. 22. Rudloe, Wiltshire, C. E. Broome, Esq. Abundantly.

Distinguished by its bright permanently yellow hymenium,

and smooth, papillate, very variable, often triangular spores. The tint varies according to the quantity of spores. Some specimens have but little scent; others, especially the larger ones, are powerfully foetid.

295. *Hymenogaster olivaceus*, Vitt. l. c. p. 24; *H. populetorum*, Berk. Brit. Fung. Fasc. 4. no. 304. Abundant in the neighbourhood of Corsham, Wilts, during the greater part of the year, C. E. Broome, Esq.

I am now convinced that I have too hastily considered this as identical with *H. populetorum*, Tul., of which I have authentic specimens. It agrees perfectly in outward appearance and in the nature of the cells, but there is more difference in the sporidia (which are very much smaller and of a different form and texture) than is consistent even with the known inconstancy of form, not merely in different individuals but within the same peridium. The spores are precisely what are represented by Vittadini under *H. olivaceus*; but in the absence of authentic specimens of that species, and with the hesitation on the part of Messrs. Tulasne, to whom specimens were communicated to refer it definitively to *H. olivaceus*, I cannot but speak cautiously myself.

The species varies in size from that of a hazel-nut to that of a walnut. Peridium at first white, slightly tinged with lemon-colour; cells at first white, gradually becoming of a dull buff, and then of a reddish gray or brown. The smell is exactly like that of *Ag. theiogalus*, or in some specimens of *Ag. gambosus*, with rather less pungency than in the pink-fleshed species to be described presently. Spores ovate, shortly pedicellate, with an abrupt, elongated, sometimes irregular apex; in general smooth and transparent, and containing two or three nuclei, but sometimes slightly rugose, though by no means opaque as in *H. citrinus*. The colour within is far less bright than in *H. luteus*, from which also it differs as regards the sporidia. It is possible, from some more or less important differences which occur amongst the species as regards the size of the cells, &c., that there may be one or more species confounded with it, but in this department of fungi great caution is needful. Messrs. Tulasne remark in one of their letters, "la forme des spores n'est pas très constante, et n'est pas toujours suffisante pour caractériser les espèces; il faut voir les plantes vivantes bien des fois, les suivre dans leurs développemens et surtout les recueillir soi-même car quelques heures d'exposition à la lumière, le toucher ou le moindre accident modifient singulièrement leur couleur et leur aspect." These judicious remarks I have borne especially in mind, as I have not been able to collect the species myself; I have not however had merely my own eyes to trust to, but Mr. Broome has himself taken the greatest pains in observing every change of form, and illustrating his remarks

by specimens. I must also plead guilty to not having observed sufficiently the differences between the sporophores and adjacent cells in the several species, which has arisen in great measure from not being able to examine the specimens on the spot at the exact moment when these bodies were in perfection, and before the external characters had become at all disguised. Indeed, under the most favourable circumstances to do so, requires much patience and some discrimination.

296. *Hymenogaster albus*; *Hymenangium album*, Kl.! Fl. Regn. Bor. t. 466; *Rhizopogon albus*, Eng. Fl. vol. v. pt. 2. p. 229 (exclusis omnibus synonymis).

This has been found at Glasgow only. The single individual in Sir W. J. Hooker's collection accords perfectly with German specimens kindly communicated by Klotzsch himself. It is quite distinct from any of the other British species. It is not exactly known what Bulliard's *Tuber album* is, but I suspect it will prove to be the same species with a truffle collected by Dufour in the west of France, and respecting which he has published some observations in a Departmental Agricultural Journal, to which I am not able at this moment to refer. Sowerby's *Tuber album* must also be regarded at present as very uncertain. I have tried in vain to procure it.

297. *H. tener*, n. s. Parvus, globosus, mollis, externe albus sericeus peridio tenui interne pallide roseus, demum umbrino-griseus, basi absorbente manifesta alba; cellulis laxioribus; sporis parvis late ellipticis papillatis minute verrucosis. *H. lilacinus*, Berk. Brit. Fung. Fasc. 4. no. 305. Abundant about Rudloe, Wiltshire. Found also sparingly at Hazlebeech, Norths, C. E. Broome, Esq., spring and summer. On the surface of the ground in beech and fir plantations. Here and there one is buried in the earth. The plant is always covered by moss or dead fir-leaves, so as not be visible till the ground is raked.

About the size of a bean or large hazel-nut; globose, soft and tender, white and silky externally; peridium thin, at length dingy, at first white within, but soon acquiring a delicate pink tinge, which, as the spores ripen, changes to an umber-gray. Absorbing base white, very distinct, exactly as in *Tuber nitidum*. Cells looser than in *H. olivaceus*. Spores much smaller than in the neighbouring species, broad, elliptic, with a minute papilla, never acuminate, minutely verrucose. Smell like that of *Ag. theiogalus*. When inclosed in numbers in a box they give out a disagreeable suffocating odour. Decayed specimens have a strong smell like that of old mushrooms.

I at first referred this to *H. lilacinus* with the sanction of Messrs. Tulasne, but I am now convinced that it is quite distinct. The form and size of the sporidia are very constant, and quite

different from those of *H. lilacinus*, and the soft delicate texture is very remarkable. It accords also very closely with *H. niveus*, Vitt., but its odour has no resemblance to that of *Geranium Robertianum*. I have seen no specimen of Vittadini's plant, and therefore dare not consider mine the same, especially as he has not represented in his figure the very important character of the white absorbing base.

*Hysterangium*, Vitt., l. c. "Fungi globosi, solidi, carnosio-cartilaginei, demum mucosi diffuentes, appendicibus radicalibus instructi, intus minute cellulosi; cellulis cavis; parietibus basidiis, sporas 2 rarius 3—4 oblongas obtusas subsessiles gerentibus, compositis; sporis minutissimis lævibus guttulas 2 vel plures includentibus."—Tul. l. c. p. 375.

298. *H. nephriticum*, n. s. Depresso-globosum, polyrrhizum, punctis variis mycelio candido valde ramoso adhærens; peridio crassiusculo firmo elastico solubili demum discreto lævi tomentoso candido; substantia cartilagineo-glutinosa pellucida pallide cærulea fungi ad basim crassiore atque inde radiante; cellulis irregularibus vacuis floccis tenuibus percursis; sporis minutis oblongis brevissime pedicellatis utrinque obtusis lævibus pellucidis pallidissime argillaceis. Clifton, Som., Feb. 1844, C. E. Broome, Esq. Abundantly.

Above  $\frac{1}{2}$ —1 inch across, gregarious, sometimes confluent, snow-white, downy, seated on a white, flat, branched mycelium which penetrates deeply into the clayey soil, and is attached at various points to the peridium; peridium firm, elastic, easily separating from the fructifying mass, but in the process of drying in young plants adhering closely to it, in older plants often separating entirely; when rubbed or cut contracting sometimes a pale rufous tinge; substance firm, cartilagineo-glutinous, proceeding from the base and radiating into the mass, the arrangement of which has a strong resemblance to that of a kidney, of a pale blue or gray, which in parts exhibits a green tinge from the subjacent spores; in very young specimens, before the spores are formed, there is not the slightest blue tinge but a very pale pink; cells irregular, minute, sometimes straight and radiating, clothed with very pale argillaceous oblong spores, and emitting from their walls irregular threads which either terminate abruptly or cross over to the opposite wall. As the plant dries, the blue and consequently the green tint vanishes almost entirely, and the mass is of a very pale clay-colour from the spores. The central mass contracts extremely, and the outer surface becomes more or less irregular. Smell scarcely any at first, then like that of some *Hypericum*, at length precisely like that of a decaying puffball.

If the fungus is cut exactly through the centre, the arrangement of its tissue is seen distinctly to proceed from the base; but if the

section fall on either side, it appears to be central. In an injured specimen I find the cells darker, and mixed with the spores are a multitude of smaller globose bodies.

This species is doubtless extremely near to *H. Pompholyx*, of which I have specimens from Messrs. Tulasne, but it is larger; the peridium is firm, and in old specimens does not contract together with the central mass; the spores not rose-coloured, and perhaps rather longer. There is besides no mention made by those gentlemen of the presence of filaments projecting from the walls, and they themselves sanction me in considering it as undescribed. It approaches also to *H. membranaceum*, Vitt., but differs in several respects from it. I am the more induced to keep it distinct, as I have the authority of Messrs. Tulasne, whose opinion ought to have the greatest weight, that the species of hypogæous Fungi are really more numerous than might at first be supposed. In this and other exosporous truffles, spicules (sterigmata) are not formed first, as is the case in the higher Hymenomycetes, but the sporophores give off the spores immediately. I do not mean to affirm that there are no exceptions to this, but I have not myself observed any.

*Hydnangium*, Wallr., Klotzsch. "Fungi globosi carnosi solidi fibrillis radicalibus seu basi absorbente peridioque solubili nudo instructi, intus eximie cellulosi; cellulis cavis, ad parietes subæquales hymeniferis; sporophoris 2—4-sporis; cystidiis conicis immixtis; sporis sphaericis echinatis sterigmatibus longis suffultis."—Tul. l. c.

299. *H. carotæcolor*, n. s. Oblongum, eradicatum, peridio tenui demum ruguloso sublateritio; substantia interiori minute cellulosa aurantio-lateritio; cellulis non faretis; sporis subellipticis pallidis echinulatis, nucleo globoso. In a fir-wood, Bristol, Sept., Nov., H. O. Stephens, Esq.

Oblong,  $\frac{3}{4}$ ths of an inch in diameter, externally slightly tomentose, pale orange-red, fleshy, but by no means deliquescent, rootless; peridium thin, at length rugulose, within minutely cellular; substance of a beautiful orange-red; cells hollow, clothed with obtuse bisporous sporophores and slender cystidia: the cells are also traversed from wall to wall by slender, occasionally branched threads. Spores subelliptic, strongly echinulate, supported on short but distinct sterigmata.

I have seen but three specimens of this species, communicated by Mr. Stephens in three successive years, which is perhaps one of the most beautiful of the group to which it belongs. The colour is very vivid, exactly like that of a fine carrot. When dry it communicates a lemon-coloured stain to the paper in which it is preserved.

It is undoubtedly congeneric with *Hydnangium carneum*, of

which I have fine specimens from Dr. Klotzsch, and with the following species. I have not seen *H. candidum*, Tul., but suppose that also congeneric, and I have consequently adopted Messrs. Tulasne's characters for the genus.

The principal difference between *Hydnangium* and *Hymenogaster* consists in the echinulate spores, for the peridium does not burst in all the species, neither, as far as I have seen in the British species of *Hymenogaster*, do the cells deliquesce. *Hymenogaster albus*, whose characters it is which are contrasted by Klotzsch, I have seen only when dry. The trama of the cells becomes dark in drying, giving to a section of the hymenium a peculiar appearance which is not usual in *Hymenogaster*. I have at present not had an opportunity of examining young specimens, and must therefore beg leave to have some allowance made, should my description of the interior of the cells not be altogether correct. In any case however there will be no difficulty in ascertaining the species.

300. *H. Stephensii*, Berk. Irregulare, oblongum, externe rufum; basi plicato-rugosa cribrosa radicibus fibrosis insidenti; intus album, minute cellulosum lactifluum, demum aëri expositum rufum; cellulis non fartis; sporis globosis demum echinulatis. Clifton, Aug. 1843, C. E. Broome, Esq., and H. O. Stephens, Esq.

About  $\frac{3}{4}$ ths of an inch in diameter, oblong, attached by a branched fibrous root, smooth, not cracked, dark rufous, curiously plicate at the base and cribose; within white, yielding when cut a white milky fluid; substance when cut and exposed to the air soon acquiring a red tinge, which is not however permanent, and in young specimens vanishes almost entirely in drying, in which state the hymenium is cream-coloured; cells minute; spores at first irregularly globose, with a broad rugulose border, somewhat after the fashion of the young spores of *Scleroderma*, at length echinulate.

This is a very curious species, remarkable for its milky juice, smooth dark peridium and plicate base. I have not seen it with the sporophores perfect. It cannot be confounded with any other hypogæous fungus. The smell in my specimens was slight, resembling that of *Ag. theiogalus*.

*Melanogaster*, Corda in Sturm's Deutschl. Fl. "Fungi carnosi, solidi, undique filamentis crassis funiformibus ramosis hinc applicatis, et in peridium suberosum crassum abeuntibus; illinc liberis cum mycelio confusis terram petentibus obvoluti; basi absorbenti propria distincta (an semper?) orbat, intus cellulosi, cellulis ab initio fartis septis crassis immutabilibus distinctis; materie intercellulari tandem pultacea diffuente atra, e filamentis mucilaginosi implexis apice tetrasporis constanti; sporis subsessilibus minutis lævibus hyalinis."—Tulasne, l. c.

\*301. *Melanogaster Broomeianus*, Berk., Tul. in Ann. d. Sc. Nat. vol. xix. p. 377. *Tuber moschatum*, Sow. t. 426; Berk. Brit. Fung. Fasc. 4. no. 285.

I have received this species in great abundance and perfection from C. E. Broome, Esq., who finds it in Wiltshire, near Corsham, from May to November, under Lombardy poplar and beech, in tufts of five or six together, and several of such tufts under each tree, half of them being in general exposed and half beneath the soil. When fresh it is minutely tomentose, of a reddish ochre, which however becomes less bright when handled or badly dried. The veins are for the most part pale, sometimes becoming red when dry, but sometimes unchangeable. I have never seen them bright yellow as in *M. variegatus*. At first it is white within, then of a very pale yellow, at length fuliginous. When very young it has not much scent, but as the spores advance it acquires first an odour like that of *Agaricus theiogalus*, and then a sweet treacly smell like that of *Agaricus pyriodorus*. The spores are elliptic and minute, without any papilla; they contain one or two globose nuclei. In ripe individuals, spherical bodies of the size of the nuclei are often mixed with the spores. In an early stage of growth the sporophores are very conspicuous, each bearing four spores. The cavities however are soon filled up, and the number of spores is at length so great, and the walls of the cavities alter so much, that the structure cannot be ascertained. It is highly probable that the sporophores bear a succession of spores, as has been proved lately in the case of the fructifying threads of the genus *Vaucheria*.

This species, though little noticed by botanists, has been long known at Bath under the name of the Red Truffle, and is eaten there in considerable quantities, being preferred to the common truffle. It must however have an entirely different flavour. The species is undoubtedly extremely near *M. variegatus*, Vitt., differing principally in the colour of the veins and the less powerful odour. I have not yet received *M. variegatus* as British, but both it and the present species are found in France. The differences may arise, as Messrs. Tulasne remark, from difference of climate. In a portion of an authentic specimen of *M. variegatus* from Vittadini, given to me by Dr. Montagne, the walls are still of a bright yellow.

As regards the genus to which Messrs. Tulasne have referred this and the cognate species, it appears that they have exercised great judgement. Few matters in botany are more perplexed than the synonymy of the hypogæous Fungi. Unfortunately Vittadini, from want of authentic specimens and the little intercourse between the north and south of Europe, has not always been able to clear up difficulties, and in some cases has unavoidably added to the confusion.

It is probable that *Rhizopogon luteolus*, Fr., belongs to this genus, though this is far from certain; but if so, the characters of the genus are mainly drawn up from a species, whatever it be (with which however the generic name does not accord), belonging to the ascophorous group of Truffles. Corda indeed has applied the name to those truffles referred by Vittadini to his genus *Choiromyces*, but not happily, as the structure of the plant of Fries is uncertain, and Bulliard's species not less so. *Hyperrhiza*, Bosc, can scarcely be the same thing, as it is described as splitting in a stellate manner at the apex, and I have a *Scleroderma* from Texas which in many respects calls Bosc's plant to mind. Klotzsch therefore cannot be considered as judicious in adopting that name. *Bullardia*, Junghuhn, was proposed in the year 1830 for a truffle, according in many respects with the present genus, but so remarkable from the presence of free threads projecting from the walls of the cavities, that in the absence of specimens it would have been hazardous to adopt that name, though filaments traverse the cells of some other genera in which filaments usually are not present. Besides, the name was given so early as 1801 by DeCandolle to *Tillæa aquatica*, and is at any rate retained as a sectional name. Corda in the following year proposed for a species evidently congeneric the name of *Melanogaster*, which Messrs. Tulasne have adopted, having the priority of *Argyllum* proposed by Wallroth in 1833. Vittadini included the species in his genus *Octaviana*, proposed also in 1831; but this name has been reserved by Messrs. Tulasne for a species with echinulate spores, differing very materially from the others.

302. *M. ambiguus*, Tul. l. c. *Octaviana ambigua*, Vitt. Mon. Tub. p. 18. *Hyperrhiza liquaminosa*, Klotzsch! Fl. Regn. Bor. tab. 468. Under fir-trees, Apethorpe, Norths, July 1843, Rev. M. J. Berkeley, C. E. Broome, Esq.; Sibbertoft, Norths; Bowood, Spye Park, Wilts, C. E. Broome, Esq.; Clifton, H. O. Stephens, Esq.

Known at once by its much larger ovate spores with a papilla at the apex, and its abominable smell, which resembles that of assafœtida. A single specimen in a room is so strong as to make it scarcely habitable. The walls of the cells when cut are whitish, but soon become red: this is not however constantly the case. I have specimens of this both from Germany and France.

*β. intermedius*. Spores obovate, obtuse and even, very rarely slightly papillate.

This form, or more probably species, of which I have seen only an imperfect specimen, was found at Spye Park in August by Mr. Broome. It is as large as *M. Broomeianus*, of which it has the bright rusty colour, but the spores are much larger, equalling in size those of *M. ambiguus*, though of a very different form.



There is scarcely ever the slightest indication of a papilla, and they are obovate with a single globose nucleus. The smell resembles that of *M. ambiguus*. The walls of the cells are yellowish, and are red in the dry specimens.

\*303. *Batarrea phalloides*, P. Sent to Sir W. J. Hooker in 1843 from Dropmore.

304. *Clathrus cancellatus*, L. Isle of Wight, Dr. Broomfield and Mr. Kippist.

\*305. *Vibrissea truncorum*, Fr. Llyn Howel, Rev. T. Salwey. Asci lineari-clavate, giving out a quantity of very slender, long, curved, linear sporidia.

\*306. *Peziza badia*, P. Milton, Mr. J. Henderson, by the side of a pond. The specimens were of a rich dark brown. This species also occurred abundantly on rubbish in the Botanic Garden, Regent's Park, towards the end of 1842. The specimens in this instance, found by Mr. J. D. C. Sowerby, were of a beautiful vinous purple.

307. *P. pustullata*, P. Milton, Mr. J. Henderson. The specimens grew in abundance on the bare soil, and were far more strongly furfuraceous than any specimen I ever saw of *P. vesiculosa*. There is besides no tendency as in that species to become expanded, the margin, as far as I have seen, being always inflected.

\*308. *P. cupularis*, P. Bristol, H. O. Stephens, Esq.; Bungay, Mr. D. Stock; Caistor, Norths, Mr. J. Henderson.

The specimens sent by Mr. Stephens are perfectly stemless. Those of Mr. Henderson have a very distinct stem, are dark externally and yellow within, and come near to *P. carbonaria*, which appears to be but a variety. Mr. Stock's specimens have a stem like those of Mr. Henderson, but are of a far paler colour.

\*309. *P. brunnea*, A. and S. Rudloe, C. E. Broome, Esq.

M. Desmazières's plant (of which I have a specimen) appears to me the same with Mr. Broome's, and both to accord with Mr. Sowerby's. My friend however—see Ann. d. Sc. Nat. vol. xix. p. 367—has come to a different conclusion.

310. *P. caulicola*, Fr. On stems of herbaceous plants. Not uncommon.

311. *P. corticalis*, P. Bristol, H. O. Stephens, Esq.; Thame, Dr. Ayres; Rudloe, Wilts, C. E. Broome, Esq.

312. *P. eriobasis*, n. s. *Gregaria nivea sessilis*, cupulis ut plurimum distinctis tomentososis planis rotundis siccitate flexuosis tomento basi affixis, hymenio albo, sicco ochraceo. On the smooth inner surface of bark, Sherwood Forest, Notts.

Gregarious but generally distinct; cups half a line broad, flat, orbicular, tomentose, fixed to little, round, snow-white, cottony spots, which sometimes, though rarely, become confluent, but do

not form a continuous stratum. When fresh the whole plant is white, but when dry the disc acquires a yellow tinge. Asci slightly clavate or obtusely lanceolate, sporidia oblong.

This species has very much the habit of *P. porioides*, but differs in its tomentose flat cups and scattered mode of growth. Its nearest ally however is *P. Chavetiae*, Libert, which perhaps is the same species with *P. casia*. From both of these it differs in its larger cups, pale disc, and in several other points. The cups are sometimes extremely thin, crowded, and pressed very close to the matrix, but this is not usually the case.

313. *Peziza Johnstoni*, n. s. Sessilis; cupulis globosis sub-turbinate demum tantum apertis rufis sericeo-nitentibus, subtus subiculo lato nigro-fusco grumoso-piloso affixis. Berwick, Dr. Johnston.

Forming a uniform stratum on decayed sticks. Cups half a line broad, at first brown and pulverulent, at length rufous, rather thin with a satiny lustre, subturbinate, with the margin permanently inflected, at first quite closed. Subiculum granulated, grumous, obscurely floccose.

I have seen no other specimen of this remarkable species, which has some resemblance to *P. fusca*, but is in reality extremely different, and has rather a tropical than an European habit. If the figure of *P. fusca* by Letellier be not exaggerated, it may possibly be the same species, but I am inclined to think such is not the case.

I have in vain waited to obtain further information respecting this species, and am now unable to give any account of its fructification as I cannot find any perfect asci.

The specimens given for *P. fusca*, no. 286 in the fourth Fasciculus of 'British Fungi,' do not belong to that species, but are a variety of *P. Rosa* growing on sycamore. They were gathered at Speke Hall near Liverpool.

314. *Stictis Hysterioides*, Desm. Ann. d. Sc. Nat. vol. xix. p. 365; Berk. Br. Fung. Fasc. 4. no. 308. On dead leaves of *Carices*. Thame, Dr. Ayres; Rudloe, Wilts, C. E. Broome, Esq. This species appears to me to be the same with *Hysterium rufum*, Fr., but my specimens of that species are not so good as might be wished.

*Genea*, Vitt. Uterus rotundato-diformis, cavus extus intusque plicato-lacunosus, apice pervius. Asci cylindrici, transversim ac parallele dispositi, sporidiis octonis, subglobosis, seriatim positis; peridio extus intusque floccoso vel papilloso-muricato, hinc illinc duplicato-intruso. Klotzsch, Vitt. (paucis mutatis).

315. *G. papillosa*, Vitt. l. c. p. 28. Bowood Park, C. E. Broome, Esq., Oct. 1843.

Hemispherical,  $\frac{1}{3}$ rd of an inch broad, convex above, rather con-

cave below, black, warty. Peridium scarcely at all intruded, attached by copious brown flocci at the base. Fructifying stratum white. Asci linear, containing eight elliptic warty sporidia.

I have but a single specimen of this species, which differs essentially from *G. verrucosa* in its elliptic sporidia. It differs also from *G. papillosa*, Vitt., in being black, not brown; but this difference is less essential, and might vanish on the discovery of a series of specimens. The peridium also is minutely warty, exactly as in *Genea sphaerica*, Tul., and *G. verrucosa* (at least Klotzsch's plant), whereas Vittadini describes his species as papillose in contradistinction to verrucose. The species is possibly new, but I have not sufficient materials to warrant me in proposing it as such.

I have another species from the same locality differing in its black flesh and intruded peridium, which I cannot refer with any probability to a recorded species; but of this also I have only a single imperfect specimen. Young unexpanded specimens of *Peziza rhizopus* with their tufted rooting fibres bear a strong resemblance to a *Genea*.

316. *Genea bombycina*, Vitt. l. c. p. 29. Bowood Park, Wilts, Oct. 1843, C. E. Broome, Esq.

Distinguished from the foregoing by its floccose peridium, which is rather soft and dirty white, and is so much intruded as sometimes to leave no cavity. One specimen exceeds half an inch in diameter and has no central cavity. The sporidia are globose, at first smooth, at length verrucose. With age they lose their transparency. The smell is very strong and disagreeable, resembling that of *Melanogaster ambiguus*. A small slice of it placed in a drop of water on the field of the microscope produced when dry a quantity of fine radiating crystals.

*Hydnobolites*, Tulasne. "Peridium vere nullum; substantia carnosa compacta similis irregularis, extus anfractuosa exarata, intus sinubus serpentinis parcis, fungi ad superficiem apertis, varie pertusa; sporangia ovato-elliptica inordinate in substantia nidulantia, sporidia octo sphaerica reticulato-echinata (vel reticulata) foveantia."—Tul. l. c. p. 379.

317. *H. Tulasnei*, n. s. "Depresso-globosa, basi plicata cribroso-porosa, rufa velutina; cellulis magnis, parietibus albis pubescentibus; trama rufa; ascis longis; sporidiis globosis, demum lateritiis reticulatis, non echinulatis."—Berk. Brit. Fung. Fasc. 4. no. 302.

In sandy ground, Spye Park, Wiltshire, C. E. Broome, Esq., August 1843.

Depresso-globose, 1 inch or more in diameter, ferruginous with a tinge of vermilion, velvety, cribroso-porous at the base. Cells irregular, large, especially in mature individuals, pubescent; sub-

stance rufous; asci oblong-elliptic, containing eight globose spores, reticulated but not echinulate. In the centre of each reticulation there is a single globule.

This species so closely resembles *Balsamia vulgaris*, at least when dry, that without microscopic examination it is difficult to distinguish it. The walls of the cells have the same pubescent covering, which in the present case seems to arise from the admission of air, and is in fact, though blanched from its internal situation, of the same nature as that which clothes the outer surface, there being no true peridium. The asci and sporidia are however very different, and bring the plant much nearer to the true Truffles. Till a late period of growth the sporidia are much like those of *Picoa*, being colourless, globose and smooth, with a large nucleus; but they gradually acquire an irregular outer surface, and are at length reticulated, but not as far as I have seen echinulate, and of a fine brick-red. It is perhaps one of the finest species of hypogæous Fungi, differing remarkably from *H. cerebriformis*, of which I have specimens, in its highly coloured surface and in the smooth sporidia. Messrs. Tulasne, to whom I have dedicated the species, at once pronounced it to belong to their recently proposed genus *Hydnobolites*.

*Balsamia*, Vitt. "Uterus mollis sessilis arrhizus, semper clausus, celluloso-carnosus. Asci oblongi membranacei pedicellati octospori, cellularum parietibus immersi ac seriatim dispositi. Sporidia cylindracea, lævia, pellucida."—Vitt. l. c. p. 30.

318. *B. platyspora*, n. s. Minor globosa rufa, minute verrucosa; substantia pallide flava, minute cellulosa; sporidiis primum latiusculis oblongo-ellipticis, nucleo globoso magno, demum leviter elongatis nucleis tribus. Rudloe, October to December, C. E. Broome, Esq.

Globose, about the size of a horse-bean, rufous, with the interstices of the minute warts of a light yellow tint, from the exposure of the internal substance. Cells minute; sporidia at first broadly oblongo-elliptic with a large globose nucleus and a number of minute granules; in a specimen found in December the sporidia were slightly elongated, with one large and two small nuclei. Smell strong.

Assuming Tulasne's *Balsamia polyspora* to be the true plant of Vittadini, the specimens described above must constitute a distinct species. The sporidia are much larger and of a different form. In the older plant I do not find them so long as in that of Messrs. Tulasne, and the nuclei are very remarkable. It is right to remark, that Messrs. Tulasne's plant was not determined on a comparison of authentic specimens; therefore, though I have no doubt of the distinctness of my plant from theirs, I am not without doubts as to Vittadini's synonym. *Balsamia vulgaris*, of which

I have an authentic specimen, as also French specimens from Messrs. Tulasne, differs in its large cells and in other particulars.

*Choiromyces*, Vitt. l. c. p. 50. "Uterus polymorphus, sessilis arrhizus l. basi absorbente præditus, extus lævis vel spongioso-verrucosus interne carnosus solidus; caro venis seminiferis variegata. Asci longissime pedicellati, l. breviter pedicellati oblongo-elliptici lagenæformes octospori, simplici serie ad latera venarum distributi. Sporidia spherica echinulata." Vitt. (paucis mutatis).

319. *C. melanoxanthus*, Tul. MSS. Minor angulato-globosus, basi absorbente manifesta; externe niger spongioso-verrucosus, interne olivaceo-flavus, venis fructiferis nigris. Bowood Park, Wilts, October, C. E. Broome, Esq.

About the size of a horse-bean, globose, but more or less compressed and angular, furnished with a distinct absorbent base. Externally black, clothed with obtuse but not rigid warts, which are less manifest when the plant is dry. Flesh of a dirty olive-yellow with broad black veins, which consist of a loose slightly branched tissue arising from hexagonal cells, the ends of the threads of which become oblong-elliptic, distinct, pedicellate asci, containing eight dark, globose, echinulate, but not reticulate sporidia. Smell in some specimens like that of some agaric, in others strong and rather nauseous.

This very interesting species was communicated by me to Messrs. Tulasne under the name of *Tuber melanoxanthum*, with the remark however that the genus required revision, as this species and some others differed in structure from the real Truffles. I received from them in return French specimens under the MS. name of *Choiromyces viridis*, for which, with their permission, I have substituted the name of *C. melanoxanthus*. It differs considerably in habit and colour from the other known species, and further researches may perhaps make it necessary to separate it. Mr. Broome has found another species of *Choiromyces* belonging to the same group as *C. mæandriiformis*, but unfortunately in too young a state to ascertain exactly its characters.

320. *Tuber melanosporum*, Vitt. l. c. p. 36. Budloe, Wilts, C. E. Broome, Esq., October to January.

A very distinct species from the common truffle, but in some states difficult to distinguish. When fresh the warts are of a bright brown, showing in the interstices the pale tint of the inner substance; in drying however the brown tint is entirely lost. The sporidia are small, elliptic, ciliated, but I believe not reticulated. The veins are very broad with narrow interstices. Smell very different from that of *Tuber æstivum*, at length rather disagreeable. The largest specimens that have at present occurred do not exceed  $\frac{3}{4}$ ths of an inch in diameter.

321. *T. nitidum*, Vitt. l. c. p. 48; Berk. Brit. Fung. Fasc. 4.

no. 303. Hartham, Rudloe, Spye Park, Wilts, C. E. Broome, Esq.

In the young plant the asci are precisely of the form of those of *Choiromyces mæandriiformis*, but with age they enlarge, and are at last obovate as in *Tuber æstivum*. Distinguished from the following by its smooth pale peridium, and the veins springing from a distinct, generally single basal point.

\*322. *Tuber rufum*, Pico, Vitt. l. c. p. 48. Rudloe, Wilts, C. E. Broome, Esq.; Audley End, Essex, Rev. J. E. Leefe.

[To be continued.]

XLIII.—On the Family Procellariidæ, with descriptions of Ten new Species. By JOHN GOULD, F.R.S. &c.

To Richard Taylor, Esq.

DEAR SIR,

THERE is perhaps no group of birds respecting which so much confusion exists, and the extent of whose range over the surface of the ocean is so little known, as that forming the family *Procellariidæ*; it may not, therefore, be uninteresting to ornithologists if I furnish you with some observations on and a short account of those species contained in my own collection, which in nearly every instance were procured during my voyage to and return from Australia. I have endeavoured wherever possible to identify them with those described by Forster, Banks, &c., whose drawings and descriptions have been consulted for the purpose; I must observe, however, that the descriptions of Latham and the older authors are in most instances so meagre and confused, that it is quite impossible to decide in every case to which species they have reference, and hence I have been induced in some cases to give new specific appellations to birds which may have been described by them, but which it is impossible, for the reasons above given, to identify.

I am, Dear Sir, your obedient servant,

April 17th, 1844.

JOHN GOULD.

*Diomedea exulans*, Linn.—This species is very numerous between the 30th and 60th degrees of S. lat., and is to be met with in every part of the circle encompassing the world bounded by those degrees; its range, however, extends much farther south, even to within the Antarctic circle.

*Diomedea cauta*, Gould, Proc. of Zool. Soc. part 8. p. 177.—Very abundant off the southern coast of Van Diemen's Land. I shot several specimens in the neighbourhood of the whaling station in Recherche Bay, where they were feeding upon the offal of dead Cetaceæ.

*Diomedea culminata*, Gould in Proc. of Zool. Soc.—Rather abundant both in the Pacific and Atlantic oceans, between the 30th and 50th degrees of S. lat.

*Diomedea chlororhynchos*, Lath.—I observed this bird both in the Atlantic and Pacific oceans, between the 30th and 60th degrees of S. lat.

*Diomedea melanophrys*, Temm.—The most abundant species of the southern seas, being equally numerous in every part between the 30th and 60th degrees of S. lat.

*Diomedea fuliginosa*, Gmel. (*Diomedea fusca*, Audubon, Birds of Am. pl. 407.)—This species is also to be met with in every part of the ocean between the 30th and 60th degrees of S. lat., and is equally common off the coast of Van Diemen's Land, Cape Horn and the Cape of Good Hope.

*Diomedea gibbosa*, n. sp.—Face, ear-coverts, chin, abdomen, upper and under tail-coverts white; the remainder of the plumage very dark brown, approaching on the occiput, back of the neck and wings to black; bill yellowish horn-colour, becoming darker at the tip and at the base; feet in the specimen dark brown, but doubtless of a bluish gray, inclining to flesh-colour in the living bird.

Total length 30 inches; bill 4; wing 21; tail 7; tarsi 4.

The above is the description of a new species in the collection of the Zoological Society of London, to whom it was presented by F. Debell Bennett, Esq., who had procured it in the North Pacific. It differs from every other that has come under my notice in the peculiar swollen and raised form of the base of the upper mandible, which moreover rises high upon the forehead.

*Diomedea olivaceorhyncha*, n. sp.—I propose this name for a species, examples of which are wanting to our collections, and of which a bill only has as yet come under my notice. In all probability it will prove to be most nearly allied to *Diomedea chlororhyncha*, and in size less than any other species yet discovered. The bill, which is in the possession of Sir Wm. Jardine, Bart., is 3 inches and  $\frac{3}{8}$ ths long from the gape to the tip, is of a uniform olive-green, and in form is more slender and elegant than that of the other members of the genus. The locality in which it was procured is not known, but it is supposed to have been obtained in the China seas.

The foregoing list comprises all the species of Albatros known, with the exception of the *Diomedea brachyura* of M. Temminck, which is an inhabitant of the North Pacific ocean. There is, however, another bird in the Royal Museum at Berlin, which is said to be the young of *D. brachyura*, but which, as it differs considerably in structure, may prove to be another and entirely distinct species from those above enumerated. It is of a uniform

dark chocolate colour, and has the bill and legs more slender than *D. brachyura*; the label attached to it was inscribed "*Diomedea brachyura*, Buff.—963?" It had been sent to the Berlin Museum by M. Brandt of St. Petersburg, and had been collected by Kitzlitz on the western coast of America.

*Procellaria gigantea*, Gmel. (Large Black Petrel).—Very common between the 35th and 55th degrees of S. lat., particularly at the Cape of Good Hope, Van Diemen's Land and Cape Horn. It is the largest member of the genus.

*Procellaria æquinoctialis*, Linn. (White-throated Black Petrel).—From what I have observed of this species, it would appear to be more abundant off the Cape of Good Hope than elsewhere; it is also to be met with, but more sparingly, off the coasts of Australia, and in all probability, like most of the other members of the genus, it makes a circuit of the globe.

I have some specimens in my possession of a petrel which I observed to be very abundant in the Atlantic and Pacific, and which have a broad stripe of white crossing the forehead, passing down before and beneath the eye, and then turning upwards nearly meeting at the occiput, the bill short and compact, and the middle toe and interdigital membranes quite black: in consequence of these differences, I had intended to characterize these birds as distinct from *P. æquinoctialis* under the name of *P. conspicillata* from the white markings of the head; but upon reconsideration, I think it best to refrain from so doing until I have had further opportunities for observation and of examining other specimens; in the event of their proving to be distinct, the name I have proposed may not be deemed inappropriate.

*Procellaria Atlantica* (Black Petrel), n. sp.—Male: the whole of the plumage deep chocolate-black; bill and feet jet-black.

Total length  $15\frac{1}{4}$  inches; bill  $1\frac{5}{8}$ ; wing  $11\frac{1}{2}$ ; tail, cuneiform, 5; tarsi  $2\frac{5}{8}$ ; middle toe and nail  $2\frac{3}{8}$ .

This is one of the commonest species inhabiting the Atlantic, and no ship passes between our shores and the Cape of Good Hope without encountering it; it is a species respecting which very considerable confusion exists in the writings of nearly all the older authors. It is the *P. fuliginosa* of Forster's Drawings, no. 93 B, and the *P. fuliginosa* of Lichtenstein's edition of Forster's MSS. p. 23, which term cannot be retained, as it had already been applied by Latham to a very different bird from Otaheite; it is the *P. grisea* of Kuhl but not of Linnæus, who has applied the term to another species, consequently *grisea* cannot be retained for it; and hence I have been induced to give it a new appellation, and thereby prevent misapprehension for the future.

*Procellaria macroptera*, Smith? (Gray-faced Black Petrel).—I think that a bird I killed in the seas off Van Diemen's Land,



where it was tolerably abundant, and which differs from the last in being of a larger size, having much longer wings and a grayer face, may be identical with the *P. macroptera* of Smith, and I therefore retain it under that appellation with a mark of doubt, in preference to assigning it a new name.

*Procellaria Solandri*, Gould in Proc. of Zool. Soc. March 26, 1844 (Robust Black Petrel), n. sp.—Head, back of the neck, shoulders, primaries and tail dark brown; back, wing-coverts and upper tail-coverts slate-gray, each feather margined with dark brown; face and all the under surface brown, washed with gray on the abdomen; bill, tarsi, toes and membranes black.

Total length 16 inches; bill  $1\frac{3}{4}$ ; wing 12; tail  $5\frac{1}{2}$ ; tarsi  $\frac{3}{4}$ ; middle toe and nail  $2\frac{5}{8}$ .

This is a remarkably robust and compact bird. I shot a single individual in Bass's Straits on the 13th of March 1839. M. Natterer thought that it might possibly be identical with the bird figured in Banks's drawings, and to which Dr. Solander has affixed the term *melanopus*, an opinion in which I cannot concur; I have therefore named it in honour of that celebrated botanist. The specimen above described may possibly prove to be not fully adult, as the dark colouring of the under surface only occupies the extreme tips of the feathers, the basal portions of which are snow-white.

*Procellaria leucocephala*, Forster.—This very fine species inhabits all the Australian seas, and doubtless, from its great powers of flight, extends its range round the world. I observed it in nearly all parts of the ocean from the Cape of Good Hope to Van Diemen's Land; it is a most conspicuous bird when on the wing, but is so shy and wary that it is all but impossible to procure specimens, even though a boat be lowered for the purpose. A single specimen only graces my collection, which I shot during my passage from Van Diemen's Land to Sydney, Feb. 20, 1839.

*Procellaria mollis*, n. sp.—Adult. Crown of the head and all the upper surface slate-gray, the feathers of the forehead margined with white; wings dark brown; before and beneath the eye a mark of brownish black; face, throat and all the under surface pure white, interrupted by the slate-gray of the upper surface advancing upon the sides of the chest, and forming a faint band across the breast; centre tail-feathers dark gray; outer feathers grayish white, freckled with dark gray; bill black; tarsi, base of the toes, and basal half of the inner interdigital membrane pale fleshy white.

Total length  $13\frac{1}{2}$  inches; bill  $1\frac{1}{8}$ ; wing  $9\frac{3}{4}$ ; tail, cuneiform, 5; tarsi  $1\frac{5}{8}$ ; middle toe and nail  $1\frac{7}{8}$ .

The young differs in having all the under surface dark gray, and the throat freckled with gray.

This is one of the commonest birds inhabiting the South Atlantic, and must have been observed by every one who has crossed the line, yet strange to say, I find no description in any of the older writers to which it can be referred with certainty; in which opinion my lamented friend, M. John Natterer of Vienna, who had paid great attention to the members of this group, coincided. The following note was attached to my specimen by him when last in England:—"The *Procellaria lugens* of Banks's drawings, no. 22?; *Procellaria grisea*, Kuhl (not of Gmel.), pl. 11. fig. 9; does not agree with Banks's drawings, but agrees with Kuhl's *grisea*. A new name is certainly requisite, if no other can be found."

It is very abundant from the 20th to the 40th degrees of S. lat. The term *mollis* has been suggested by the peculiar character of the under plumage, which is much more dense and soft than that of most other members of the group.

*Procellaria leucoptera*, Gould in Proc. of Zool. Soc. March 26, 1844, n. sp.—Crown of the head, all the upper surface and wings dark slaty black; tail slate-gray; greater wing-coverts slightly fringed with white; face, throat, all the under surface, the base of the inner webs of the primaries and secondaries, and a line along the inner edge of the shoulder pure white; bill black; tarsus and basal half of the interdigital membrane fleshy white; remainder of toes and interdigital membrane black.

Total length 13 inches; bill 1; wing  $8\frac{1}{2}$ ; tail 4; tarsi  $1\frac{1}{8}$ ; middle toe and nail  $1\frac{3}{8}$ .

Nearly allied to *P. mollis*, but much smaller in size, and differs also in the white line along the under surface of the wing, formed by the white basal halves of the feathers. It breeds in great numbers on Cabbage-tree Island, at the mouth of Port Stephen's Harbour, New South Wales, and is very abundant in all parts of the ocean between that locality and New Zealand.

*Procellaria carulea*, Gmel.—This bird may be distinguished when on the wing from every other of the smaller Petrels by the conspicuous white tips of the centre tail-feathers. It is a very powerful flier, and I observed it in every part of the ocean I traversed between the 40th and 55th degrees of S. lat., both in the Atlantic and Pacific.

As much confusion exists with respect to this species, I beg to state that it is the *Procellaria similis* of Forster's Drawings, no. 86, and of Lichtenstein's edition of Forster's MSS. p. 59; the *Procellaria carulea* of Gmelin, Latham and Kuhl, and the *P. Forsteri* of Smith but not of Latham.

*Procellaria hesitata*, Kuhl. Forster's Drawings, no. 92.—This is also a most powerful bird on the wing, and in its passage over the ocean mounts higher in the air than most other members of the group. It enjoys so wide a range of habitat, that it may be said

to be universally diffused between the 30th and 55th degrees of S. lat.

*Procellaria flavirostris*, n. sp.—Feathers of the head and all the upper surface brown with paler edges, fading into white on the tips of the upper tail-coverts; wings and tail deep blackish brown; all the under surface pure white; the feathers of the under surface of the shoulder with a streak of brown down the centre; bill yellow, passing into dark horn-colour at the tip; tarsi and feet fleshy white.

Total length 19 inches; bill  $2\frac{5}{4}$ ; wing 15; tail  $6\frac{1}{2}$ ; tarsi  $2\frac{5}{8}$ ; middle toe and nail  $3\frac{1}{8}$ .

This fine species was procured off the Cape of Good Hope, in lat.  $36^{\circ} 39'$  S., long.  $10^{\circ} 3'$  E., by His Excellency Governor Grey, on his passage to South Australia. It is distinguished from its congeners by its much larger size, and by the yellow colouring of the bill. The female is somewhat smaller than her mate.

This bird so nearly approaches in form the members of the genus *Puffinus*, that it is almost questionable whether it should not be included in that group.

*Procellaria Antarctica*, Gmel.—Inhabits the whole of the frozen regions of the Antarctic circle, out of which it is rarely to be met with.

*Procellaria Glacialoides*, Smith.—Abundant between the 30th and 50th degrees of S. lat. I have a specimen killed at New Zealand, and I observed it to increase in numbers as we approached Cape Horn; it is also equally abundant off the Cape of Good Hope. I caught many of this species with the hook and line.

*Procellaria nivea*, Gmel.—An inhabitant of the icy regions of the Antarctic circle. My specimens differ so much in size as to suggest the idea that there may be more than one species of these snow-white Petrels.

*Puffinus brevicaudus*, n. sp.—Found in all the Australian seas, and breeds in the greatest abundance on several of the islands in Bass's Straits.

*Puffinus carneipes*, Gould in Proc. of Zool. Soc. March 26, 1844, n. sp.—The whole of the plumage chocolate-black; bill fleshy white; the culmen and tips of the mandibles brown; legs, feet and membranes yellowish flesh-colour.

Total length 15 inches; bill  $1\frac{5}{4}$ ; wing 12; tail 5; tarsi 2; middle toe and nail  $2\frac{1}{2}$ .

Numerous on the seas bounding the western coast of Australia, and breeding on the small islands off Cape Leeuwin, where my specimens were procured.

*Puffinus sphenurus*, n. sp.—All the upper surface dark chocolate-brown, which gradually deepens into black on the primaries

and tail; feathers of the scapularies, which are very broad in form, washed with lighter brown at their tips; face and throat dark brownish gray, the remainder of the under surface grayish brown; bill reddish fleshy brown, darker on the culmen and tip; legs and feet yellowish flesh-colour.

Total length  $15\frac{1}{2}$  inches; bill  $1\frac{5}{8}$ ; wing  $11\frac{1}{2}$ ; tail 6; tarsi  $1\frac{7}{8}$ ; middle toe and nail  $2\frac{5}{8}$ .

This species was procured by Mr. Gilbert on the Houtmann's Abrolhos off the western coast of Australia. Both this and *P. carneipes* agree tolerably well with Lesson's *P. chlororhynchus*; but as the members of this group are very numerous, and his description, which is far too concise, applies equally well to both, it is impossible to say whether it has reference to either of them or to some other.

*Puffinus assimilis*, Gould, Proc. of Zool. Soc. part 5. p. 156.—Found on the seas bounding the eastern coast of Australia, and on Norfolk Island, where it breeds.

*Puffinuria Urinatrix*.—Very numerous in the seas adjacent to the coasts of Van Diemen's Land and New Zealand. Specimens brought home by Captains King and Fitzroy from the Straits of Magellan do not differ from those obtained in the localities above mentioned.

*Daption Capensis*, Steph.—Found in all parts of the ocean round the globe from the 15th to the 55th degrees of S. lat.

*Prion vittatus*, Cuv.—Very common off Kerguelen's Land and in all the seas to the southward of Australia.

*Prion Banksii* (*Pachyptila Banksii*, Smith).—Found in the temperate latitudes of the Atlantic and Pacific, and I believe in similar latitudes all round the globe.

*Prion Turtur* (*Procellaria Turtur*, Kuhl, and of Banks's drawings).—This species differs from the last in the delicate blue of the upper surface, in the narrower form of the bill, and in the laminæ being scarcely visible. I have shot it in company with *P. Banksii*, and it appears to enjoy a similar range of habitat, being equally numerous in the temperate latitudes of the Pacific and of the Atlantic.

*Prion Ariel*, Gould, Proc. of Zool. Soc.—I killed this species in Bass's Straits, where it was rather numerous.

*Thalassidroma tropica*, n. sp.—Head, back, wings, tail and breast dark sooty black; chin, under coverts of the wings, abdomen, flanks, under tail-coverts, and a broad crescent-shaped band across the upper tail-coverts snow-white; bill, feet and legs black.

Total length  $7\frac{5}{4}$  inches; bill  $\frac{7}{8}$ ; wing  $6\frac{1}{2}$ ; tail  $3\frac{1}{2}$ ; tarsi  $1\frac{5}{4}$ ; middle toe and nail  $1\frac{1}{4}$ .

I observed this species in the Atlantic, where it is confined to the equatorial regions, being most abundant in the vicinity of the

line. It is the largest member of the genus with which I am acquainted, and is rendered very conspicuous by the white mark on its throat.

*Thalassidroma marina*, Less.—Very common in all the Australian seas. The specimens in my possession were found breeding and procured on the islands near Augusta, on the western coast of Australia.

*Thalassidroma Wilsoni*, Bonap.—After a careful examination of numerous specimens from the Australian seas with others taken in the North Atlantic, I cannot come to any other conclusion than that they are identical; an anomalous fact, since it is the only species with which I am acquainted that frequents the seas on both sides of the equator.

I met with it in considerable numbers in Bass's Straits, and observed it in every degree of temperate latitude.

*Thalassidroma Nereis*, Gould, Proc. of Zool. Soc. part 8. p.178.—I have never seen this highly interesting species in any other parts of the ocean than Bass's Straits and the seas washing the southern shores of Australia.

*Thalassidroma melanogaster*, n. sp.—All the plumage deep sooty black, with the exception of the upper tail-coverts and flanks, which are snow-white; bill, legs and feet black.

Total length  $7\frac{1}{2}$  inches; bill  $\frac{5}{4}$ ; wing 6; tail 3; tarsi  $1\frac{5}{8}$ ; middle toe and nail  $1\frac{1}{4}$ .

This species is very abundant in the South Pacific and Indian oceans, particularly off the islands of St. Paul's and Amsterdam. I also met with it midway between those islands and Van Diemen's Land. It is a species which cannot be mistaken at sea, from the black mark which occupies the centre of the abdomen, and contrasts so strongly with the white flanks.

*Thalassidroma leucogaster*, n. sp.—Head and neck deep sooty black; back grayish black, each feather margined with white; wings and tail black; chest and all the under surface and upper tail-coverts pure white; bill and feet jet-black.

Total length  $7\frac{1}{4}$  inches; bill  $\frac{5}{4}$ ; wing 6; tail 3; tarsi  $1\frac{1}{2}$ ; middle toe and nail 1.

This bird was killed in  $36^{\circ}$  S. lat.,  $6^{\circ} 47'$  E. long., by His Excellency Governor Grey.

I have a small petrel presented to me by Mr. Denison, who killed it near the coast of Australia on his passage to Sydney, in which the nostril-tube is much more lengthened than in any other species, and its apical portion turned upwards or recurved, instead of being attached to the bill throughout its entire length as in the other members of the genus. In the distribution of its colouring it is very nearly allied to *T. tropica* and *T. leucogaster*, and it may be a mere variety of one or other of those species;

but the bill, in addition to the feature pointed out above, is of a more slender and attenuated form than is observable in any other.

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**XLIV.**—*On the Plurality and Development of the Embryos in the Seeds of Coniferæ.* By ROBERT BROWN, Esq., F.R.S., F.L.S., and Foreign Member of the Academy of Sciences in the Institute of France\*.

[With a Plate.]

THE following short paper on a subject which I intend to treat at greater length, contains a few facts of sufficient interest perhaps to admit of its being received as a communication to the present meeting.

In my observations on the structure of the female flower in *Cycadææ* and *Coniferæ*, published in 1826†, I endeavoured to prove that in these two families of plants the ovulum was in no stage inclosed in an ovarium, but was exposed directly to the action of the pollen.

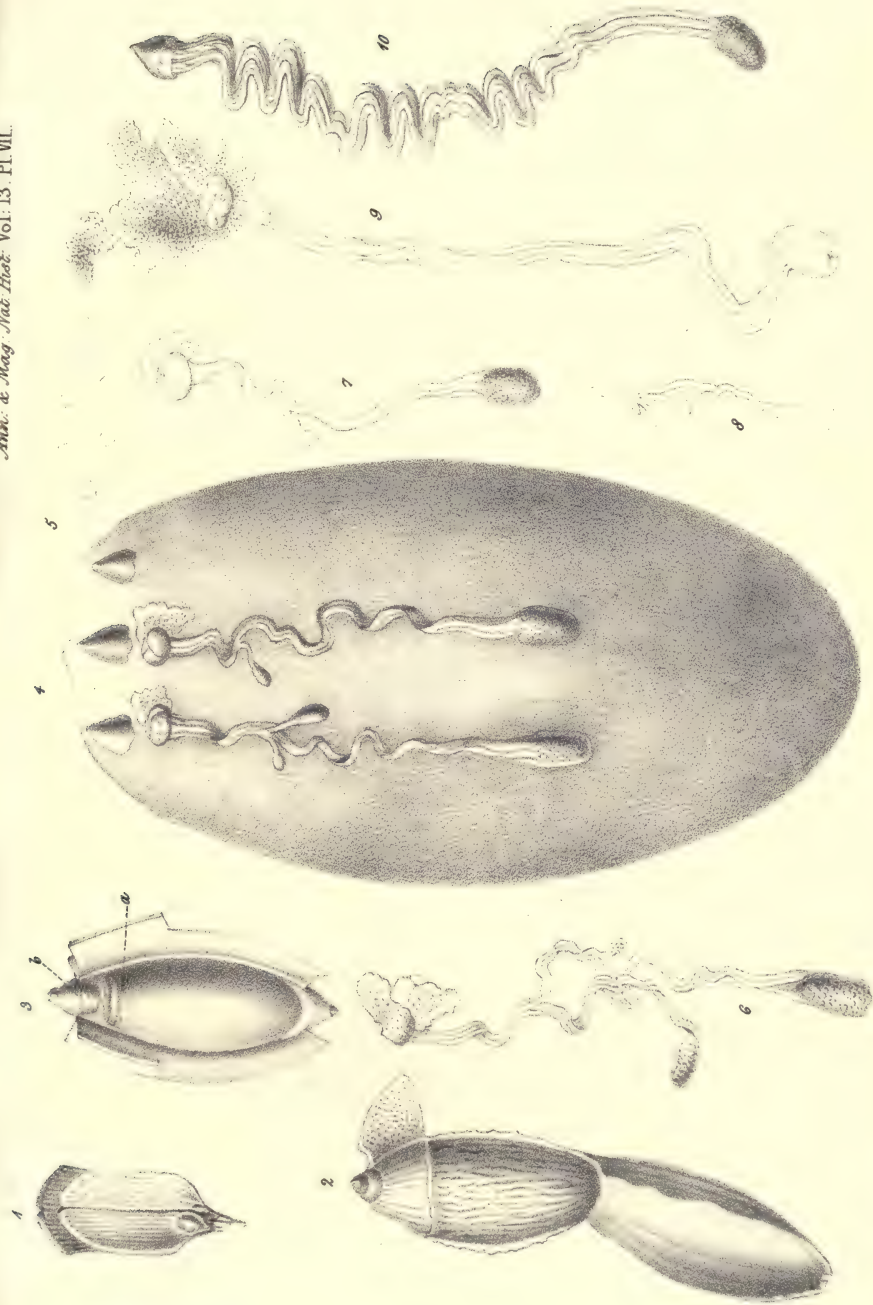
In support of this opinion, which has since been generally, though I believe not universally adopted, the exact resemblance between the organ until then termed ovarium in these two families, and the ovulum in other phænogamous plants, was particularly insisted on; and I at the same time referred, though with less confidence, to their agreement in the more important changes consequent to fecundation.

I noticed also the singular fact of the constant plurality of embryos in the impregnated ovula of *Cycadææ*, and the not unfrequent occurrence of a similar structure in *Coniferæ*. In continuing this investigation, in the course of the same summer in which the essay referred to appeared, it seemed probable, from the examination of several species of the Linnæan genus *Pinus*, namely, *Pinus Abies*, *Strobus* and *Larix*, that the plurality and regular arrangement of embryos were as constant in *Coniferæ* as in *Cycadææ*; for in all the species of *Pinus* here referred to, the preparation for the production of several embryos was equally manifest, and the points or areolæ of production were in like manner disposed in a single circular series at the upper extremity of the amnios.

From these observations, which I have since confirmed in the same and also in other species of *Pinus*, an additional and important point of resemblance is established between *Cycadææ* and

\* Read before the British Association at Edinburgh in August 1834, and published in the *Annales des Sciences Naturelles* for October 1843.

† In the Appendix to Capt. King's Voyage.







*Coniferæ*; and it is worthy of remark, that while the female organ in these two families exists in a simpler form than in other phænogamous plants, the normal state of the impregnated ovulum is much more complex, and might even be considered as compound, or made up of the essential parts of several confluent ovula.

On considering the well-known œconomy of several *Coniferæ*, and especially of the genus *Pinus*, as at present limited, namely in their requiring (at least) two seasons to ripen their cones, it occurred to me that these plants, from the extreme slowness in the process of maturation, conjoined with the considerable size of their seeds, and also from the striking peculiarity already noticed, were probably the best adapted for an investigation into the origin and successive changes of the vegetable embryo.

With this view chiefly I commenced in the present summer (1834) a series of observations, intending to follow them up from the period when the enlargement of the impregnated cone begins to take place, to its complete maturity at the end of the second or beginning of the third year.

*Pinus sylvestris* was selected for this purpose, corresponding observations being also made on other species, particularly *Pinaster* and *Strobus*; and although the investigation is necessarily incomplete, the facts already ascertained appear to me of sufficient importance to be submitted to physiological botanists.

In an essay on the organs and mode of fecundation in *Orchideæ* and *Asclepiadææ*, published in 1831, I have given some account of the earliest changes observable in the impregnated ovulum of the former family; and in noticing the jointed thread or single series of cells by which the embryo is suspended, I remarked that the terminating cell or joint of this thread is probably the original state of what afterwards, from enlargement, subdivision of its cavity, and deposition of granular matter in its cells, becomes the more manifest rudiment of the future embryo.

I had not indeed actually seen this joint in its supposed earliest state; the following observations on *Pinus*, however, will perhaps be considered as giving additional probability to the conjecture.

But before entering on my account of the origin and development of the embryo in *Pinus*, I shall state briefly the still earlier changes consequent to impregnation that take place in this genus; not only with a view of rendering the account of the embryo itself more readily intelligible, but also in confirmation of the opinion formerly advanced on the nature of the female organ in *Coniferæ* and *Cycadææ*.

The first and most evident change observable is the production or separation of a distinct body within the nucleus of the ovulum, which, before impregnation, is a solid uniform substance.

In this stage the upper extremity of the included body, or amnios, is slightly concave, and has a more or less rough or unequal surface; the inequality being in consequence of the laceration of the cellular tissue, by which it was in its early stage attached to the apex of the original nucleus, or rather to a short cylindrical process arising from it and corresponding in size and form with this concave upper extremity, from which it separates when the amnios has attained its full size.

On this concave upper extremity of the amnios a few minute points of a deeper colour, and disposed in a single circular series, are sometimes observable; in general, however, they are hardly to be distinguished.

Below the concave apex the amnios itself is slightly transparent for about one-fourth of its length, the remaining portion being entirely opaque.

On dividing the whole longitudinally it is found to consist of a pulpy cellular substance, in which no definite cavity is originally observable; the upper transparent portion is however of a looser texture, and on the included embryos becoming manifest, a cavity irregular both in figure and extent is formed in its centre.

But before the embryos themselves or their funiculi become manifest, the areolæ, or portions of the substance destined for their production, are visible.

These areolæ, as I observed them in the common larch in May 1827, are from three to five in number, of nearly cylindrical form, arranged in a circular or elliptical series, and are seated near the apex, with which they probably communicate by the similarly arranged points of its surface already noticed.

In the amnios of *Pinus sylvestris*, as observed in June and July last, the corresponding parts were found considerably more advanced. In the specimens then examined, the remains of the embryoniferous areolæ, from four to six in number, were still visible, but consisting of conical membranes of a brown colour, presenting their acute apices towards the surface, and at the base seeming to pass gradually into the lighter-coloured pulpy substance of which the mass of the amnios consists.

Corresponding and nearly approximated to each of these conical membranes, a filament, generally of great length, and either entirely simple or giving off a few lateral branches, was found. This filament or funiculus consisted generally of four series of elongated transparent cells or vessels, usually adhering together with firmness, but in some cases readily separable without laceration; and in one of the species examined, *Pinus Pinaster*, the transverse septa of the funiculus were either very obscure or altogether wanting.

The upper extremity of each funiculus was in all cases manifestly thickened and of a depressed spheroidal form; and in each of the four cells or vessels of which it consisted exhibited a small opaque areola analogous to the nucleus of the cell, so frequently observable in the tissue of Monocotyledonous plants, and which also exists, though less commonly, in Dicotyledones.

A lacerated and extremely transparent membrane was generally found surrounding and adhering to the thickened origin or head of the funiculus.

In the earliest state examined of *Pinus Pinaster*, the funiculus was found equally transparent through its whole length, and having no appearance of subdivision or any other indication of embryo at its lower extremity. In a somewhat more advanced state of the same plant, as well as in the two other species observed, namely *Pinus sylvestris* and *Strobus*, the lower extremity of the funiculus was subdivided into short cells, sometimes disposed in a double series, but more frequently with less regularity and in greater numbers, the lowest being in all cases the most minute and also the most opaque, from the deposition of granular matter, which is nearly or entirely wanting in the upper part of the cord. This opaque granular extremity of the funiculus is evidently the rudiment of an embryo. When the funiculus ramifies, each branch is generally terminated by a similar rudiment, and these lateral embryoniferous branches not unfrequently consist of a single vessel or cell, while the embryo of the trunk or principal branch is as generally derived from more than one.

That each of these opaque bodies terminating the trunk and branches of the funiculi are really rudimentary embryos, is proved by tracing them from their absolutely simple state to that in which the divisions of the lower extremity become visible, and those again into the perfect cotyledons.

The results of this investigation in its present incomplete state are, 1st, that the plurality of rudimentary embryos in *Pinus* (and probably in other *Coniferæ*) is not only constant, but much greater than could well have been imagined independent of actual observation; each impregnated ovulum not only containing several distinct funiculi, but each funiculus being capable of producing several embryos. In the ripe seed, however, it is a rare occurrence to find more than one of these embryos perfected.

2ndly. That an embryo in *Coniferæ* may originate in one or in more than one cell or vessel even in the same cord; and it also appears that the lower extremity of the funiculus, the seat of the future embryo, is originally in no respect different from the rest of its substance.

The greater part of the appearances now described are represented in the accompanying Plate.

April 20, 1844.

POSTSCRIPT.—It is necessary to notice the recent publication of a very important memoir by MM. de Mirbel and Spach on the development of the embryo in *Coniferæ*\*.

These excellent observers confirm the principal statements of the preceding essay, with the brief abstract of which only they were acquainted.

They have also extended the investigation to *Thuja* and *Taxus*, two genera which I had not examined, and in which, especially in the latter, the structure appears to be remarkably modified; and they have ascertained some points in *Pinus* itself that I had overlooked.

In this memoir M. de Mirbel refers to his early observations on the structure of the seeds of *Cycas* which occur in an essay read before the Academy of Sciences in October 1810, and soon after published in the 'Annales du Muséum †.'

These observations and the figures illustrating them clearly prove M. de Mirbel's knowledge of the plurality of embryos in *Cycas* at that period. And in his recent memoir on *Coniferæ* he regards them as giving the earliest notice of that remarkable structure; stating also that my first publication on the same subject was in 1835.

But as the 'Prodromus Floræ Novæ Hollandiæ' was published before M. de Mirbel's essay in the 'Annales du Muséum,' which appears from his references to that work in the essay in question, he must have overlooked the following passages:—

"In *Cycadi* angulata puncta areæ depressæ apicis seminis totidem canalibus brevibus respondent gelatina homogenea primum repletis et membrana propria instructis, unico quantum observavimus embryonifero, quo augente reliqui mox oblitterati sunt."—*Prodr.* p. 347.

"Structura huic omnino similis hactenus absque exemplo nec ulla analoga (nempe embryones plures in distinctis cavitatibus ejusdem albuminis) nisi in *Cycadi* et nonnunquam in *Visco* cognita sit."—*Prodr.* p. 307.

I may add, that this structure of *Cycas* was ascertained in living plants on the east and north coasts of New Holland in 1802 and 1803.

The earliest observer of the principal fact, however, was probably the late Aubert du Petit Thouars, who in a dissertation on the structure and affinities of *Cycas* published in 1804 ‡, distinctly notices the points on the surface and the corresponding corpuscula within the apex of the albumen, into which corpuscula he

\* Annales des Sc. Nat. 2 série, November 1843.

† Annales du Muséum d'Hist. Nat. tom. xvi. p. 452. tab. 20.

‡ Histoire des Végétaux des Iles d'Afrique, p. 9. tab. 2. n.

hazards the conjecture that the grains of pollen enter and become the future embryos. This, in regard to *Cycas*, might be considered the revival of the general hypothesis advanced by Morland in 1703\*, and some years afterwards adopted, but without acknowledgement, by C. J. Geoffroy†, and which seems to have entirely originated in the discovery by Grew of the existence of a foramen opposite to the radicle of the embryo in the ripe seeds of some Leguminous plants‡.

But as M. du Petit Thouars had evidently no intention of extending his hypothesis beyond *Cycas* and probably *Zamia*, it can hardly be said to anticipate the general and ingeniously supported theory of Dr. Schleiden, respecting which physiological botanists are at present almost equally divided. On this theory it is not my intention at present to express an opinion; nor did the question of the mode of action of the pollen form any part of my object in the preceding essay. I shall only here remark, that according to the latest statements of Dr. Schleiden with which I am acquainted§, although he admits that his investigation is not in all points complete, he seems to have no doubt that his theory of the origin of the vegetable embryo in the pollen tube is applicable to *Coniferæ*. He has in the first place ascertained the existence of my areolæ or corpuscula, which he denominates large cells in the embryo-sac or albumen, in all the European genera of *Coniferæ*||; and in *Abies excelsa*, *Taxus baccata*, and *Juniperus Sabina*, he states that he has succeeded in preparing free the whole pollen tubes from the nucleary papillæ to the bottom of the corpuscula. But as (if my observations are correct, and they seem to be confirmed by those of M. de Mirbel) the corpuscula are not developed in *Pinus*, as the genus is at present limited, until the spring or even beginning of summer of the year after flowering, and if Dr. Schleiden's statement be also correct, the pollen must remain inactive for at least twelve months.

The quiescent state of pollen for so long a time is indeed not altogether improbable on considering the analogous œconomy in several tribes of insects, in some of which the male fluid remains inactive in the female for a still longer period¶; and in plants, though for a much shorter period, I may refer to *Goodenovia*, in which the pollen is applied to the stigma a considerable time before that organ is sufficiently developed to act upon or transmit its influence\*\*. But the supposed protracted state of inactivity

\* Philosophical Transactions, vol. xxiii. part 2. n. 287. p. 1474.

† Mém. de l'Acad. des Sc. de Paris, 1711, p. 210.

‡ Anat. of Plants, p. 2. § Schleiden, Grund. der Bot. 2 Theil, p. 374.

|| *Op. cit.* pp. 354 et 357.

¶ Herold. Entwickel. der Schmetterl. &c. 1815, et Siebold in Müller's Archiv, 1837, p. 392.

\*\* Append. to Flinders's Austral. p. 560.

in the pollen of *Pinus* does not necessarily lead to the adoption of Dr. Schleiden's theory. With respect to *Cycadeæ*, whatever opinion may be adopted as to the precise mode of action of the pollen in that family, it is certain that the mere enlargement of the fruit, the consolidation of albumen, and the complete formation of the corpuscula in its apex are wholly independent of male influence, as I have proved in cases where pollen could not have been applied, namely, in plants both of *Cycas* and *Zamia* (*Encephalartos*) producing female flowers in England at a time when male flowers were not known to exist in the country.

## EXPLANATION OF PLATE VII.

*Fig. 1.* A scale of the cone of *Pinus sylvestris*, with its winged seeds, one of which is abortive: natural size.

N.B. The remaining figures are more or less magnified.

*Fig. 2.* An unripe seed, of which the testa, in this state cartilaginous, is cut open, partly removed and thrown back to show the included body, which is the half-ripe original nucleus with its sphaclated apex and the free portion of the inner coat, extending from the apex to about one-third of the length of the nucleus, below which it is intimately connected with and inseparable from the outer coat.

*Fig. 3.* The amnios or albumen, with the coats opened and laid back.

*a.* The body of the albumen, with its slightly concave upper extremity: in this stage separated from *b*, the apex, which is conical above, below cylindrical, and which was suspended from the top of the original nucleus.

*Fig. 4.* A plan rather than actual representation of a longitudinal section of any one seed examined, but the parts accurately copied from the calyptræform membranes, the funiculi or suspensors, and the nascent embryos of seeds of *Pinus sylvestris*.

In this stage the funiculi are distinct from the calyptræform membranes within which they originated.

*Fig. 5.* is also a plan of the slightly concave apex of the amnios or albumen, with its semitransparent points or pores circularly arranged; in this species (*Pinus sylvestris*) seldom exceeding five, and not unfrequently being only four or even three.

*Fig. 6.* One of the funiculi or suspensors, with its dilated upper extremity, to which the lacerated remains of a thin transparent membrane adhere: the funiculus itself ramified, each of the two lateral branches consisting of a single elongated tube or cell terminating in a rudimentary embryo: the trunk of the funiculus composed of several (apparently four) tubes or cells terminated by a single embryo, which is already slightly divided, the divisions being the commencement of its cotyledons.

*Figs. 7 and 8.* Two other funiculi belonging to the same seed less advanced, but both ramified.

*Fig. 9.* A funiculus of *Pinus pinaster* with its thickened head, in which the nuclei of its component elongated cells or tubes, and its adhering lacerated membrane are visible. The figure is given particularly to show that in this (the only one observed) there is no opaque granular portion of the compound funiculus; in other words, no indication of a nascent embryo.

*Fig. 10.* A funiculus of *Pinus Abies*, Linn., with its rudimentary embryo and thickened head, still partly inclosed in the calyptræform membrane.

XLV.—On the British Desmidiæ. By JOHN RALFS, Esq.,  
M.R.C.S., Penzance\*.

IN a former paper† I followed the example of most preceding writers on these plants and referred them to the *Diatomaceæ*; but further observation has convinced me that they must be removed from that tribe, which should comprise only the Algæ with siliceous covering, which I called *Cymbelleæ*. I have in that paper pointed out many of the differences between these tribes; they also differ greatly in another respect. The *Diatomaceæ* (*Cymbelleæ*) for the most part quickly acquire an offensive odour after being gathered; the *Desmidiæ*, on the contrary, are remarkable for the length of time they may be preserved in a moist state without material change. Many indeed I have kept unaltered for weeks in a damp piece of linen. As drying often produces a great change in their appearance, it is fortunate that they can be thus preserved until it is convenient to examine them.

They are generally very minute, and, with the exception of a few not hitherto detected in this country, are all found in fresh waters, either mixed amongst other Algæ or in old peat-pits, and such shallow pools as do not become dry in summer‡.

These Algæ have attracted but little attention from British algologists, and only two species of *Desmidium* and two of *Euastrum* are described in our Flora. I am convinced that these have even a stronger claim to be considered plants than the *Diatomaceæ*. This was also Meyen's opinion; for whilst he allows that the true place of the latter is somewhat uncertain, yet, speaking of the *Desmidiæ*, he remarks, "This family includes those true Algæ of whose nature there can be no doubt."

Ehrenberg, who refers them to the animal kingdom, lays the greatest stress upon their "spontaneous division," which indeed is the only reason he produces for denying the vegetable nature of some genera§. It has however been shown by Meyen, Mr. Hassall|| and others, that growth by the elongation and bisection of the cells is very frequent, if not universal, in the more simple Algæ.

The *Desmidiæ* have, in general, their cells more or less constricted in the middle, and the endochrome divided into two por-

\* Read before the Botanical Society of Edinburgh, Jan. 11th, 1844.

† See Annals of Natural History, vol. xi. p. 448.

‡ They frequently form finger-like tufts at the bottom of the pool, and if gently separated by passing a knife or the finger beneath them, rise to the surface, when they can be taken out and put into a bottle or placed on linen and drained, and afterwards scraped off with a knife.

§ "The increase by voluntary division is the character which separates animals from plants." *Ehr.* See Annals of Nat. History, vol. ii. p. 123.

|| See Annals of Natural History, vol. ix. p. 431.

tions. In *Euastrum* this constriction is so great that the fronds seem to consist of two segments united by a narrow central chord, whence most authors, erroneously as I think, describe the plant as binate.

In the *Diatomaceæ*, where the frustules are often truly binate, as each frustule is complete in itself, though they be separated from each other, their respective contents will still be protected on all sides, and even if one be broken the contents of the other will not be disturbed. In this tribe, on the other hand, as there is no septum between the parts, if these separate or an opening be made in one, the contents of both escape. In *Desmidium* the constriction is often but slight, and although the endochrome is most frequently in two portions, yet in an advanced state it is sometimes collected into a single central spot. Whatever may be the shape of the frond, this connecting portion is always nearly or quite cylindrical; and this is equally the case in the triangular fronds of *Staurastrum* and the compressed ones of *Euastrum*, as in those species having cylindrical fronds. Of course the more the plant is compressed the narrower will be the connecting portion, whilst in the cylindrical species the constriction is often but slightly marked. In *Closterium* there is generally only a transverse central line which divides the endochrome into two portions; but in all the *Desmidiæ*, when the plant is mature, the cells separate at the centre and allow the granules to escape. In all the species, the growth by the repeated division of the cells is extremely rapid. In *Desmidium* the process is exactly similar to what occurs in the *Conjugatæ*: the joint first elongates, and then becomes double by the formation at the centre of internal transverse septa; but in most of the other *Desmidiæ* the fronds are simple, or consist of only a single cell, which, as I have observed above, is more or less evidently in two segments. *Euastrum* has these united by a narrow chord, and therefore in that genus the manner of their increase by division can be most easily observed. The central chord elongates, and two new segments are formed, which gradually increase until they attain the same size as the halves of the original frond. About this time it separates into two distinct fronds, each of the old segments having united with one of the new ones: during this process the original halves do not undergo any alteration, except in being separated by the two new segments, all the growth taking place in the central chord that united them. As this addition is continually taking place in those fronds which have reached their full size, the two segments of a frond are very often unequal.

All the species are binate during the production of the new portions and until separation takes place.

In describing *Meloseira*, *Isthmia*, &c., I have shown that those



genera also increase by a new growth interposed in the centre of the frustule. May not the growth in some of the higher Algæ also be confined to the centre of the joints, instead of being an extension of parts already formed? Should this suggestion prove correct, such a fact would be an additional proof of the vegetable nature of the *Desmidiæ*, and may perhaps also lead to further knowledge of the physiology of the *Conferveæ*.

It will be more difficult to ascertain whether this is the case in the latter; in *Tyndaridea* however, the genus best adapted for observation, I believe that its occurrence can be proved, for in each joint two stellæ are present; and I think that whilst these always remain distinct on their outer side and at the same distance from the septum, they first become more distant from each other by the growth of the intermediate and central portion of the joint, and that two new stellæ are then formed between them, which at first connect the original stellæ, and gradually become more distinct as the joint prepares to divide. If this opinion be correct, the new septum will always be formed where the new portion of the joint is formed. At length the plant ceases to grow, the division of the joints is not repeated, the endochrome alters in appearance, the reproductive organs are formed, and the individual perishes. So in the *Desmidiæ*: the fronds at length no longer divide, the internal matter assumes a different appearance, and what I consider the reproductive granules are perfected.

Meyen adduces the presence of starch as a conclusive proof of the vegetable nature of the *Desmidiæ*. He states that in several genera he has "distinctly seen that the large and small granules contained amyllum, and were sometimes even entirely composed of it," and that in the month of May he had observed "many specimens of *Closterium* in which the whole interior substance was granulated, and all the grains gave with iodine a beautiful blue colour, as is the case with starch, which is not an animal product." These experiments if correctly made would appear decisive, but Meyen's assertions have not been allowed to pass unquestioned. Mr. Dalrymple, in a very able and interesting paper on the *Closteria*\*, observes of his own attempts to repeat Meyen's experiments, "In no one instance had the action of iodine produced its ordinary effects upon starch or vegetable matter by colouring it violet or blue, although Meyen asserts it did in his trials." In the 'American Journal of Science and Arts,' vol. xli. No. 2, is an article by Professor Bailey, of the U. S. Military Academy, on the American "*Desmidiaceæ*," in which he gives copious extracts from Mr. Dalrymple's paper accompanied by his own remarks.

He bears testimony to the general correctness of Mr. Dalrymple's

\* Annals of Natural History, vol. v. p. 415.

observations, but with regard to those on the action of iodine he says, "I cannot otherwise account for Mr. Dalrymple's statement, that iodine 'in no instance produced in the *Closteria* the violet or blue colour indicating starch,' than by supposing that the specimens he examined were not in the proper state to exhibit it. Meyen expressly states, that it is 'at certain times, particularly in spring,' that the starch may be detected. . . . I am able by conclusive experiments to confirm Meyen's statement as to the presence of starch in these bodies. In specimens gathered in November, I find no difficulty in producing the blue colour with tincture of iodine. Sometimes, however, the specimen becomes so opaque by the action of this reagent, that the purple colour of the granules can only be detected after crushing the specimen by means of the compressor. *The characteristic colour of iodide of starch is then shown most distinctly.* I have repeatedly treated in this way *Closterium Trabecula* as well as others, and have uniformly found that a portion of the interior takes the purplish colour."

Professor Bailey, however, does not "consider the presence of starch in these bodies as conclusive evidence that they are plants;" for he suggests with some ingenuity, "Is it not possible that they are animals which feed, wholly or in part, on amylaceous matter extracted from the aquatic plants among which they live? If so, the detection of starch in their stomachs is not surprising."

Having been indebted to Mr. Dalrymple for much information respecting this tribe, and invariably found his observations most accurate, I was puzzled how to reconcile these contradictory results of the test of iodine; I have therefore repeatedly and carefully noted the effects of iodine on many of the *Desmidiæ*.

In a young state the cells are filled with a green homogeneous fluid, which, as the plant approaches to maturity, becomes denser and minutely granular. Scattered amongst this minutely granular matter larger granules make their appearance; these Ehrenberg calls ova; but I cannot perceive the slightest difference between them and the granules present in the higher Algæ, and Meyen informs us that he "had observed their development into spores."

On applying diluted tincture of iodine to different species of the *Desmidiæ*, these large granules became very dark with a purplish tinge, showing the presence of starch. When the tincture of iodine is used in its undiluted state, the colouring matter becomes so dark as to appear nearly black and conceal the bluish tint; in some specimens too this colour is hardly perceptible, whilst in others it is very apparent.

In no instance have I found the presence of starch indicated unless these granules were present, as the fluid colouring matter always becomes brownish. The application of iodine to *Conju-*

*gate* in different stages of growth was followed by a precisely similar result. In the young plant no starch was detected, but the colouring matter became changed to an orange-brown. On the other hand, in the conjugated filaments the granules became blue, and the spores especially appeared of the very dark colour often observed in the *Desmidiæ*, and did not exhibit any blue tint until they were crushed\*. As the large granules are not present in the early state of the plant, and as it has been shown above that they alone contain starch, the opposite results of the experiments by Meyen and Mr. Dalrymple may be thus explained †.

In the preceding remarks I have classed the *Closteria* with the *Desmidiæ*. Ehrenberg indeed describes them as a distinct family, but his opinion has, I believe, very few advocates. Meyen says, "I see no good reason why *Closterium* should not be placed near *Euastrum*;" and Professor Bailey says, "I have before stated that I consider the genus *Closterium* most closely related to *Euastrum*, and therefore to the *Desmidiaceæ* generally. This relation to *Euastrum* is manifest in their apparent identity in internal structure; the chief difference between them is only in the external forms; and even in them we find there is a perfect transition from the highly-lobed and tabular forms of some species of *Euastrum*, to the entire, elongated and fusiform species of *Closterium*. It is therefore without hesitation that I place *Closterium* (as indeed most writers do) among the *Desmidiaceæ*."

I am aware the following account of the British *Desmidiæ*

\* I would advise those who wish to repeat the experiments, and have not been accustomed to see the effect produced on starch by the application of iodine, to apply it first to a few grains of flour, and afterwards to some species of *Zygnema* in which the spores are about to form; as they will thus become familiar with the appearance of iodide of starch when formed in the *Algæ*.

After the tincture of iodine is applied let them add a little more water, and then dry the specimen by the application of heat; this will drive off the free iodine, and thus in a great measure remove the brownish stain which obscures the purple tint. They should then add a drop of water, and on applying the highest power of the microscope the peculiar colour of the iodide of starch can in general be easily perceived.

† I have the satisfaction to add, that since I wrote the present paper I communicated the tenor of it, with accompanying specimens of *Closterium digitus*, to Mr. Dalrymple, who acknowledged the presence of iodine in the following terms:—"I have examined the specimens sent up, and in several I can detect the blue colour of the iodide of starch: this is by no means however universal, some being merely stained yellowish brown; but in those instances there appears to be an absence of granular matter; the fact of blue granules in some is however decisive of the presence of starch." He also says, "I am glad to see your explanation of the facts. It is a probable circumstance that iodine may act differently at different stages of growth, and that starch may not always be present in the specimens."

Mr. Jenner also informs me that he has repeated my experiments with success.

will necessarily be imperfect. I have seen no specimens named by original authorities, and I have derived much less assistance from British algologists than I had when treating of the *Diatomaceæ*, as many valued correspondents, whose discoveries and notes greatly aided me in the descriptions of the *Diatomaceæ*, have not studied this tribe.

I should however be ungrateful to omit stating, that my friend the Rev. M. J. Berkeley has, during the preparation of these papers, as on former occasions, supplied many useful hints, and assisted me in determining the species and synonyms; and that Mr. Jenner has not only favoured me with numerous specimens, but sent me several drawings made from his own observations, and necessary for the illustration of different species.

#### BIBLIOGRAPHICAL NOTICES.

*List of the Specimens of Mammalia in the British Museum.* Printed by order of the Trustees. London, 1843.

*List of the Specimens of Birds in the British Museum.* Part I. *Accipitres*, 1844.

It is by no means so generally known as it ought to be, that the Trustees of the British Museum have lately set an example which the Directors of all national museums would do well to imitate. Many persons now visit the zoological galleries of the British Museum, not as a mere holiday show, but as a place of scientific study. To this class of visitors the popular 'Synopsis' sold at the door is far too superficial to be of use; a demand has consequently arisen for a more exact scientific account of the contents of the collection, and this demand is now in the course of being supplied. The officers of the several departments have been directed to draw up accurate catalogues of the contents of the Museum, which are revised by Mr. J. E. Gray, the chief officer of the zoological department, and are sold in a cheap and portable form to the public.

The advantages of this measure are manifold. These catalogues may have the desirable effect of converting the mere sight-seer into the scientific student, while they guide the working naturalist to rare and authentic specimens not elsewhere to be met with. For the arrangement of provincial or private collections they will serve as useful models, showing the latest improvements which have been made in classification. They will greatly facilitate scientific intercourse, and the exchanging of duplicates with the public museums abroad, showing at once the amount of our riches and of our wants, while they will also tend to diffuse through the zoological world a well-digested and universally accepted nomenclature. The value of these catalogues is further increased by their enumerating not merely every *species* but every *specimen*; the latter being indicated by the letters of the alphabet, with a statement of the exact localities and

donors of each. As a large portion of the collection consists of *type-specimens*, i. e. of the actual individuals on which explorers and naturalists have founded their definitions of new species, this exact identification of each specimen becomes peculiarly necessary.

Such being the scientific importance of these catalogues, it is satisfactory to find that the laborious task of preparing them is in general executed with judgement and accuracy. The classification is in conformity with the most recent researches, the scientific names are based upon the "law of priority," the synonyms are fully enumerated, and the individual specimens are indicated with precision.

The plan of the catalogues is therefore very good; still it is not perfect, and as they are the commencement of a series which may have considerable influence on the progress of zoology, we shall not hesitate to point out the defects which occur to us.

In the first place, *every species* of mammal and of bird is indicated by a so-called English name, which precedes the Latin or systematic one. Of the expediency of this regulation we have great doubt. The vast majority of foreign species never have had, and never can have, a vernacular English designation, simply because mankind have no occasion to speak of them in common discourse. The authors of the catalogues have therefore been obliged to manufacture English names for such species as did not possess them already, and these names will be useless to the multitude and unintelligible to the scientific; they are therefore an incumbrance to the catalogue, loading the memory if retained in it, and increasing the liabilities to error. We ought rather to induce the unlearned to speak the language of science, than tempt the scientific to descend to vulgarity. Let us remember how greatly Buffon retarded zoological science by his jealous opposition to the admirable nomenclature of Linnæus, and the influence of that fascinating writer still operates too strongly on the continent. Should the arrangements of our national Museum ever accustom British naturalists to use a vernacular terminology in preference to the Linnæan one, it will be a most serious detriment to the progress of science.

We believe that these English names are employed rather in obedience to a popular desire, than from any value attached to them by the scientific officers of the Museum. Nor do we object to the introduction of English names where those names are currently established, as in the case of the leopard, mole, fox, eagle, &c., for such terms convey a distinct idea to the unlearned mind; but the ordinary spectator might as well learn the scientific name at once, as acquire such, to him, new and difficult appellations as the Cacomixle, the Ratlamutchi, the Buansuah, &c. &c. At any rate, if John Bull will insist on a complete English nomenclature, it may at least be made the means of giving him some notion of zoological principles, by making the names as nearly as possible an echo of the Latin binomial ones. Thus *Halmaturus elegans* might be rendered "the elegant Halmature;" *Talegalla australis*, "the Australian Talegalla;" *Elanus melanopterus*, "the black-winged Elanus," and so on. Whereas at present the names on the specimens and in the cata-

logue often tend to diffuse and perpetuate error, as where (in conformity to the mistaken arrangements of old authors) *Talegalla australis* is translated "New Holland Vulture," *Dicaeum* is rendered "Finch," *Nectarinia* and *Mniotilta*, "Creeper," *Brachyurus*, "Crow," and numerous similar instances.

The species in the Museum which appear to be undescribed by other authors are distinguished by specific names, now for the first time proposed. We need hardly point out the necessity of speedily attaching *specific characters* to these new names, either in the catalogue itself, or in some other publication; otherwise these names will acquire no authority, and may be unintentionally superseded by later authors.

With the above exceptions the catalogues are all that can be wished, though one or two improvements might be made in the labels of the specimens themselves. We should like to see the *authority* for the specific name inserted, as in the present state of science a mere binomial designation, without any clue to the author who gave it, is often vague and ambiguous; and though the authors' names are to be found in the catalogue, yet it would be more convenient to have them on the label also. Secondly, as each specimen is indicated by a separate letter in the catalogue, it would be very desirable that the same letter should be conspicuously marked on the label itself, so that the *identity* of the specimens (on which much of their value depends) may be effectually perpetuated, and the spectator may the more readily recognise them. A mark indicative of sex and age might also be added to the labels without materially trenching on their space.

*Voyage de la Bonite: Algæ.* By C. Montagne, D.M. 112 pp.

By the kindness of the author we have received the text of this interesting portion of the account now publishing of the botanical discoveries made during the voyage of the Bonite. The greater part of the new species have already been characterized in the 'Annales des Sciences Naturelles,' but we have here the full descriptions, accompanied in many instances with most valuable remarks. Of these perhaps the most interesting are those on the genus *Suhria*, which have in great measure been recorded in our journal in a communication made by Mr. Berkeley; and those on the tribe *Chordarieæ*, of which we think it may not be uninteresting to give a sketch.

The genus *Chordaria* has not hitherto been well described. The author therefore, after referring to all that has been published on the subject, proceeds to give the result of his own observations, having first however stated the structure of *Mesoglaea*, a genus which has lately been well illustrated by Meneghini. Speaking of this genus then he says: "The numerous filaments which form the axis of the fronds and branches are in general united, or, to speak more correctly, held together, in a looser manner than in *Chordaria*, by a gelatinous substance interposed between them, and which itself forms one of the elements of the frond. The consistence, however, which results

from this approximation is not uniform, for a number of intermediate states occur between certain species whose tissue is so loose in the centre that the filaments which are condensed towards the outer surface leave the centre almost tubular (*M. fistulosa*), and the new species described below, which presents almost a cartilaginous consistence. Be the consistence however what it may, the axillary or longitudinal filaments are tubular, articulated, cylindrical, or slightly strangulated at the points of articulation, transparent hyaline or of a pale greenish yellow, from the presence of a small quantity of granular matter in the articulations. They take an oblique direction towards the circumference, anastomosing occasionally with the neighbouring threads; not however, as Meneghini and Decaisne have well observed, and as the latter has shown in his figure of *Nemalion multifidum*, J. Ag., without sending forth at the same time, here and there towards the interior, far more delicate, dichotomous, articulated, and perfectly hyaline filaments, which help doubtless by their interlacing to double the consistence of the frond. The last articulation of the axillary thread, when arrived at the circumference, is elongated into a horizontal filament with much shorter articulations, strongly constricted at the dissepiments, but gradually increasing in breadth as they approach the surface, whence they have a more or less strongly pronounced clavate form. In the Brazilian species, these threads, which are very long, are perfectly cylindrical and not thickened above. Each of the articulations of which they are composed contains a green endochrome of various tints at different stages of growth or in different species, whose form is correlative with that of the articulation. Sometimes it is not a simple filament which terminates the extreme cells of the axillary tissue, but either it is dichotomous, or a certain number are united at the base, from whence also proceed the recurrent filaments. It is usually towards the inferior portion of the radiating filaments that the two kinds of organs are fixed which appear to serve equally towards the propagation of the species; sometimes however it is from the summit itself that they proceed, resembling in this other *Phycoideæ*. The one which are unanimously considered as true spores are composed of a simple, entire, undivided nucleus, consisting of green or brown granules inclosed in a hyaline perispore, which forms a transparent limb round the nucleus. These spores are, according to the particular species, spherical or obovoid; the other organs are regarded by the younger Agardh as metamorphosed radiating filaments, and called by him propagules. Meneghini, who has observed their coexistence with what he calls sporiferous utricles, considers them as a second form of fructification analogous to the siliculæform capsules of the genus *Ectocarpus*\*, to which in fact they

\* Kützing considers the specimens with podlike fruit as individuals having a second form of fructification. Mrs. Griffiths however, who has paid great attention to the genus, does not assent to this view, there being a peculiar habit in each of the pod-bearing species which makes it almost impossible to refer them as mere forms to any of the other species. The subject is however well worth attention, and can be determined only by those who can study the species *in situ*.—EDIT.

bear a very striking resemblance. The resemblance of these bodies to what Agardh calls antheridia is still more striking, as I am enabled to assert from specimens of *Polysiphonia fruticulosa* and *P. fastigiata*, on which they had been observed by Mrs. Griffiths, and which have been communicated by Mr. Berkeley. It is this resemblance, doubtless, which has led Meneghini to give the same name to the organs we are considering in the genus *Mesoglea*. Whatever be their function (I am inclined to consider them myself as gemmæ), they are placed in the genus under consideration either at the base of the radiating threads or at the extremity of a branch of greater or less length proceeding from this base. In comparing them to the siliquæ of *Ectocarpus* we have sufficiently noted their structure, which is well described in the work of Meneghini. As to their form, it varies within certain limits, for they are sometimes oval, ovalilanceolate, or very slender and elongato-lanceolate. In *M. Leveillei*, of which the younger Agardh makes his genus *Liebmannia*, but which, as it appears to us justly, Meneghini comprises in the genus *Mesoglea*, they have two or four horns at their summit; but these divisions of the granular mass are included in a common envelope. Sometimes they are concealed by the radiating filaments, sometimes they exceed them by half their length.

“ We now come to *Chordaria*. The structure is not exactly the same, though there is a great affinity between the two genera. The cells which form the axillary system of the frond, and which form the greater part of its diameter, are united end to end so as to compose tubular filaments, which are cylindrical, diaphanous, articulated, and which decrease in diameter as they approach the circumference. Exactly in the centre (for it is possible to isolate the one set of filaments from the other) these filaments are disposed longitudinally, following the axis of the frond; but the further they are from the centre the more their diameter decreases, and when they arrive at the circumference their frequent anastomoses have reduced them to a network of irregularly polyhedral cells, the more external of which give rise to the radiating tissue. The texture of which we have just sketched the description, but of which good figures alone can give a just notion, has the greatest analogy with that of certain *Florideæ*; it is such that in a transverse section it might be called cellular; and in fact towards the circumference, that is to say, between the axile tissue and the radiating filaments, it can scarcely be considered otherwise. The horizontal filaments spring then from the exterior cells of this kind of intermediate network, and if, instead of being free from any adherence, they were soldered together, there would be an almost perfect resemblance with other genera with a continuous frond. They are clavate, articulated and moniliform; their last articulation, which is also the largest, is sometimes spherical, sometimes cuneiform. This latter conformation arises from the circumstance, that at first the filaments are all of the same length; they are almost adherent one with the other at their apices, absolutely in the same way as the paraphyses of *Laminariæ*, to which they may well be compared, though these latter are simple and not septate. It is at the base of



the filaments in question that we see the spores which are produced at the tip of the same cell which produces the filaments. These in *Chordaria flagelliformis*, which has served as the type for the description of the genus, are elliptic, resembling in form that of melon-seeds. The border of the spores is transparent and of a greater or less breadth. We have never met with 'propagules.'

"We see then, by an approximation of the principal characters drawn from the two preceding descriptions, that the essential difference between *Chordaria* and *Mesoglaea* resides less in the cartilaginous consistence of the frond than in the intimate structure of the axis, which might be called cellular in the first and filamentous in the second. Nevertheless, this consistence, which depends on the closer texture of the centre of the frond, is more constant in *Chordaria*, and may be given as a secondary character. In *Mesoglaea* we know in fact the Brazilian species only which presents this cartilaginous consistence, which ceases when the radiating filaments have partly fallen, that the remainder of the frond, far from collapsing, preserves the cylindrical form proper to *Chordaria*, whence the name of *M. chordarioides* is well adapted to it\*."

This is a specimen of the manner in which the author illustrates his subject, almost every species affording an opportunity for something interesting, of greater or less length. We must content ourselves with the above rather copious extract, only indicating those species and genera which have not hitherto been described.

*Conferva spinigera*, from Monte Video.

*Herpochæta*, a new genus proposed for the reception of the filiform *Caulerpæ*.

*Sphacelaria brachygonia*, from St. Catharine's.

*Mesoglaea Brasiliensis*, from Rio de Janeiro, remarkable for its cartilaginous substance.

*Iridæa Cutleria* = *Halymenia Cutleria*, Mart. and Her.

The other new species have been characterized elsewhere, as stated at the beginning of this notice.

## PROCEEDINGS OF LEARNED SOCIETIES.

### ZOOLOGICAL SOCIETY.

May 23, 1843.—R. C. Griffith, Esq., in the Chair.

Mr. Cuming communicated the following paper by M. Récluz, being descriptions of various new species of Shells belonging to the genus *Nerita*, from his collection.

\* It is to be observed that these observations were written before the publication of Kützing's 'Phycologia,' who has given figures which illustrate admirably the foregoing observation. The only difference that I can perceive is, that he figures a system of smaller filaments interposed between the larger axillary filaments, and Kützing seems to consider the union of the filaments more intimate than is described by Dr. Montagne. Kützing has figured the recurrent filaments in *Mesoglaea*, though he has not pointed attention particularly to them, but in other genera he has exhibited and described this peculiar structure very distinctly.

NERITA POWISIANA. *Ner. testâ ovato-transversâ, ventricosâ, supernè depresso-planiusculâ, variè pictâ; spirâ brevissimâ, derosâ, auriculâ elevatâ, marginatâ; aperturâ ovatâ, dilatatâ, externè sub-rectâ; labio planissimo, anticè recto, acuto et sub lente ruguloso.*

Var.  $\alpha$ . *Testâ lutescente, nebulis pallidis vix purpurascensibus variegatâ.*

Var.  $\beta$ . *Testâ ut in var.  $\alpha$ , maculis nigerrimis characteriformibus, triseriatim cinctâ.*

Var.  $\gamma$ . *Testâ luteo-fuscescente, lineolis nigris undulatis, longitudinalibus, densè notatâ.*

*Hab.* Var.  $\alpha$  and  $\beta$ , New Ireland, in mountain-streams, by R. B. Hinds, Esq., Surgeon of H.M.S. Sulphur.

Long. 19 mill.; lat. 14 mill.; convex. 12 mill.

Species valdè mirabilis. Var.  $\gamma$ . *Hab.* —? Mr. Powis.

NERITA TURTONI. *Ner. testâ ventricosâ-ovatâ, luteo-rufâ seu rubicundâ, flammis nigrescentibus undatis, remotisque, sive angulato-flexuosis pictâ; anfractibus 4-5, convexis, supremis derosis: infimo supernè horizontaliter depresso; labio subconvexo, fusco-rubente, margine in medio tenuiter crenato, basi leviter emarginato; labro intus calloso-albo, ad marginem fusco rubente.*

*Hab.* —? Mr. Powis.

Long.  $15\frac{1}{2}$  mill.; lat. 13 ad 14 mill.

*Neritæ variegatæ*, Lesson (*Ner. pulchra*, Sowerby), valdè affinis.

NERITA NEBULATA. *Ner. testâ ovato-globosâ, tenuiter striatâ, luteo-fuscescente, lineis nigris squamæformibus parvulis nebulatâ; spirâ prominulâ, rotundatâ; labio angustato, subconvexo, margine retiusculo, crenulato, flavescente; labro semi-ovato, intus cærulescente, margine flavo.*

*Hab.* Immimaylan, in a mountain-stream.

Long. 10 mill.; lat. 11 mill.; convex. 8 mill.

NERITA MERTONIANA. *Ner. testâ ovato-globosâ, maculis pallidè lutescentibus zonisque articulatis nigro-purpurascensibus fimbriatis cinctâ; spirâ vix prominente, rotundatâ, apice eroso; aperturâ obliquâ, luteolâ; labio subconvexo, angusto, margine tenuè arcuato et crenulato.*

Var.  $\beta$ . *Testa major, lineolis intricatis picta.*

*Hab.* cum præcedente.

Long. 9 ad 10 mill.; lat. 11 ad  $11\frac{3}{4}$  mill.; convex.  $7\frac{3}{4}$  ad 8 mill.

Affinis *Neritæ Oualaniensis*, Lesson, sed major, solidior, minus rotundata et variegata: non var. robustior.

NERITA MICHAUDIANA, Récluz in Rév. Cuvérienne, Paris 1841.

Var.  $\beta$ . *Testa rotundata, suprâ medium spinis angustis brevibusque armata.*

*Hab.* cum typo ad "Bunang, province of Pangasinan, isle of Luzon, on small stones on the bank of a river." DD. Souleyet et Cuming inveniunt.

NERITA JOVIS. *Ner. testâ ventricosâ-ovatâ, nigrâ, lineolis angulato-flexuosis fulgurantibusve albis pictâ, punctatâque; anfractibus quinque convexis; spirâ conico-depressâ, nigro-violascente, albo*

*punctatá, acutá ; aperturá albo-virescente ; labio plano, margine in medió vix arcuato ac denticulato.*

*Hab.* —? Mr. Powis.

*Neritina lugubris*, Lamarck, valdè affinis, sed solidior, minor, colore denique propria.

**NERITA CUPRINA.** *Ner. testá ventricoso-oblongá, subepidermide cupreo-micante nigrá, lineolis angulato-flexuosis densissimè pictá ; anfractibus 4-5 ? convexis, supernè rotundatusculis ; apice deroso ; labio plano, lutescente, in margine vix arcuato et denticulato, basi subemarginato ; labro intùs albido-cærulescente, ad marginem luteo-viridescente.*

*Hab.* —? Mr. Powis.

Long. 12 mill. ; lat. 11 mill.

Affinis *Nerita Royssiana*, Récl., sed colore et epidermide notabili diversa.

**NERITA PFEIFFERIANA.** *Ner. testá ventricoso-ovatá, nigrá, albido-lutescente bizonatá ; zoná medianá spiram decurrente ; anfractibus quaternis, convexis, ad suturam minimè marginatis ; apice decorticato, obtusiusculo ; aperturá rotundatá ; labio compresso, concaviusculo, albido, in margine arcuatim ac obtusè denticulato ; denticulis obsoletis, cardinali productiusculo ; labro dilatato, tenui, nigro-cærulescente et luteo quadrfasciato.*

*Hab.* From New Ireland, in a mountain-stream, by R. B. Hinds, Esq.

Long. 8 mill. ; lat. 7 mill. ; convex. 4 mill.

Species elegans, rarissima. *Columella* extùs zoná angustá, e punctis moniliformibus seriatis cincta.

**NERITA APIATA.** *Ner. testá ventricoso-globosá, tenuissimá, rugosá, subepidermide olivaceá fusco-violascente, lituris transversis albidis pictá ; anfractibus quaternis supernè depresso-planulatis ; spirá prominulá, apice pulchrè croceo, hyalino ; aperturá dilatatá ; labio semilunari, nigrescente externè zonato, anticè albo, recto, integerrimo.*

*Hab.* Island of Negros ; in mountain-streams, on stones.

Long. 11 mill. ; lat.  $14\frac{1}{2}$  mill. ; convex.  $10\frac{1}{2}$  mill.

Affinis variet. *Nerita dubia*, sed columella basi non emarginata diversa est. *Columella* in centro parùm inflexa.

**NERITA DONOVANA.** *Ner. testá semiglobosá, tenuiter et densè striatá, viridescente, lineis obliquis purpureo-nigris, undatis, æquidistantibus ornatá ; anfractibus tribus convexis, supra medium spinis curvatis armatis ; apice deroso ; aperturá cærulescente, basi effusá angulatáque ; labio angusto, supernè calloso, basi concavo, margine subrecto, denticulato ; dente cardinali majori.*

Var.  $\beta$ . *Ovata, nitida, maculis viridibus et purpureis, densè intricata ; ultimo anfractu supernè adscendente ; spirá prominulá, convexá.*

*Hab.* Island of Guimaras, on stones in a small stream.

Long.  $12\frac{1}{2}$  mill. ; lat. 15 mill. ; convex. 10 mill.

Var.  $\beta$ . Long. 14 mill. ; lat. 15 mill. ; convex. 11 mill.

June 13, 1843.—Prof. Rymer Jones in the Chair.

“Descriptions of new species of Shells about to be figured in the ‘Conchologia Iconica,’” by Mr. Lovell Reeve, were read.

**CONUS VIDUA.** *Con. testá turbinatá, albd, fusco subtilissimè reticulatá, reticulis ruptis, subsparsis; fasciis binis nigerrimo-fuscis, maculis albis sparsis, irregulariter punctatis, cinctá; spirá concavo-depressá, coronatá, apice subobtusó.*

Conch. Icon., *Conus*, pl. 8. f. 45 *a* and *b*.

*Hab.* Island of Capul, Philippines (on the reefs); Cuming.

This curiously mottled Cone presents a somewhat different style of painting from the proximate species *C. Nicobaricus* and *nocturnus*.

**CONUS FURVUS.** *Con. testá elongato-turbinatá, angustá, lævi, spirá elatá; luteold, fasciis duabus, latis, furvo-fuscis, cingulatá; aperiturá lineari.*

Conch. Icon., *Conus*, pl. 13. f. 69.

*Hab.* Islands of Ticao and Masbate, Philippines (found in sandy mud at low water); Cuming.

I have to thank Mr. Adamson of Newcastle for sending me this new and interesting Cone, a few specimens of which have been collected by Mr. Cuming in the localities above noted.

**PECTUNCULUS BICOLOR.** *Pect. testá suborbiculari, umbones versus attenuatá, longitudinaliter sulcatá, sulcis numerosis, angustis; albidá, violaceo-nebulosá, maculis trigonis ferrugineo-rubidis irregulariter pictá.*

Conch. Icon., *Pectunculus*, pl. 5. f. 20.

*Hab.* Gulf of California.

Mr. Gray appears to have mistaken this shell (Zoology of Beechey's Voyage in the Blossom) for the *Pectunculus inæqualis*.

**PECTUNCULUS PALLIUM.** *Pect. testá obliquè ovatá, subquadratá, radiatim costatá, costis lævibus, prope marginem subobsoletis; luteold, maculis rubidis, quadratis, sparsis, vividè pictá.*

Conch. Icon., *Pectunculus*, pl. 5. f. 21.

*Hab.* Zanzibar.

This shell may be easily recognised by the dark ruddy spots which are sparingly scattered here and there upon the warm uniform ground which covers the surface. The cardinal portion of the shell is rather solid.

**PECTUNCULUS NODOSUS.** *Pect. testá suborbiculari, fulvo, furvo castaneove variegatá; radiatim costatá, costis nodosis; intus albidá, anticè fuscescente.*

Conch. Icon., *Pectunculus*, pl. 5. f. 21.

*Hab.* Ceylon.

The knobs on the ribs, by which this shell is chiefly characterized, are much more strongly developed on the posterior side of the shell; on the anterior side they are almost obsolete.

**PECTUNCULUS LINEATUS.** *Pect. testá orbiculari, convexá, subauriculatá; decussatim striatá, striis longitudinalibus fortioribus; albidá, posticè et medianè maculis castaneis irregulariter nebulosá, anticè*

*lineis longitudinalibus castaneis vividè pictâ; umbonibus centralibus.*

Conch. Icon., *Pectunculus*, pl. 5. f. 25.

*Hab.* West Indies.

The painting of this species is not much unlike that of the *Pectunculus pennaceus*; the anterior side of the shell, however, is white and very peculiarly lined.

**PECTUNCULUS OBLIQUUS.** *Pect. testâ transversâ, obliquè ovatâ; albido-rufescente, maculis cuspidiformibus spadiceis profusè pictâ; intus nigerrimo-fuscâ; umbonibus centralibus.*

Conch. Icon., *Pectunculus*, pl. 6. f. 33.

*Hab.* Swan River.

The whole of the inside of this shell, with the exception of the anterior margin and muscular impression, is of a very deep blackish brown.

**PECTUNCULUS TELLINÆFORMIS.** *Pect. testâ ovatâ, transversâ, subdepressâ, radiatim costatâ, costis subobsoletis; albidd, anticè et supernè carneo-fusco tinctâ; intus subfusca, posticè albicante; umbonibus vix obliquis.*

Conch. Icon., *Pectunculus*, pl. 6. f. 34.

*Hab.* Rio Janeiro.

This shell differs from the preceding in being more transverse and faintly ribbed; the interior is not so dark, nor does the outer surface exhibit the least indication of any spots or other dark marks.

**PECTUNCULUS TENUICOSTATUS.** *Pect. testâ orbiculari, subventricosâ, subtilissimè costatâ, costis quasi filis, numerosis, interstitiis epidermide lineariter insertâ; fuscescente, costis pallidioribus; umbonibus subcentralibus.*

Conch. Icon., *Pectunculus*, pl. 6. f. 35.

*Hab.* Australia.

The valves of this shell are entirely covered with beautiful thread-like ribs, and the interstices are filled with fine roots of epidermis, arranged in from three to four rows.

Mr. Gould then called attention to a new species of Kangaroo-rat, which he exhibited, and thus characterizes:—

**BETTONGIA CAMPESTRIS.** *Bett. vellere longo, molli; corpore suprâ fusco, albo-penicillato, subtùs sordidè albo; auribus mediocribus intùs pilis sordidè albis, subflavescentibus tinctis; tarsi longi, graciles, pilis pallidis, flavescenti-lavatis; caudâ longâ (capite corporeque ferè æquante) plerumque pilis brevibus, adpressis, pallidè rufo-flavescentibus vestitâ, subtùs et ad apicem pallidiore.*

	unc.	lin.
Longitudo ab apice rostri ad caudæ basin. . . . .	15	9
————— ad basin auris . . . . .	2	8
————— auris . . . . .	1	1
————— caudæ . . . . .	14	0
————— tarsi digitorumque . . . . .	4	10

*Hab.* South Australia.

In the texture and colouring of the fur this little animal greatly resembles the common European Hare. The under-fur is dense,

long and soft; grey next the skin, and sooty brown externally; but this last colour is confined to the tip of each hair, there being a considerable space between the grey and brown portions, which is of a very pale yellowish brown: interspersed with the under-fur (especially on the back) is an abundance of very long and harsher hairs, the visible portion of which is of a brownish white colour, except the extreme point of each hair, which is blackish. The sides of the body are of a pale dirty yellowish tint, and the under parts are dirty white. The feet and tail are of an uniform very pale yellowish brown. The ears are short and rounded, but with the apical portion slightly contracted in width; they are well-clothed with pale dirty yellowish hairs, except on the fore-part of the outer side, where there is an admixture of deep brown hairs.

The following "Notices of Fishes newly observed or discovered in Madeira during the years 1840, 1841, and 1842," by the Rev. R. T. Lowe, M.A., Corresponding Member of the Zoological Society, were communicated to the Meeting.

#### Family SCOMBRIDÆ.

##### Genus SERIOLA, Cuv. and Val.

*SERIOLA GRACILIS*. *Ser. elongata, fusiformis; capite cubico, lateribus declivibus planis, oculis magnis: pinna dorsali prima triangulari, secunda altiore; secundæ analisque (antice elevatis) radiis posterioribus subproductis, in pinnulas subsecedentibus; pectoralibus lanceolatis elongatis, capite longioribus; ventralibus mediocribus.*

1<sup>ma</sup> D. 9; 2<sup>da</sup> D. 3 + 20; A. 3 + 20; P. 24; V. 1 + 5; C.  $\frac{4+IX.}{4+VIII.}$ ;

M. B. 6. Squamæ lin. lat. 60.

A single individual of this species has occurred, said to have been thrown up in a gale. It measured six inches and three quarters in length. Its nearest ally is *S. bipinnulata* (Quoy et Gaim.), Jen. in Darw. Fish. p. 72. Like that species, it has no spine inclining forwards before the dorsal, nor any free spines before the anal fin; but in the more complete connection and regularity of the hinder rays of the second dorsal and of the anal fins, it possesses a degree more of the typical Serioline character than that species. Still it is not unlikely that a comparison of the two fishes may warrant, on some future occasion, their separation from *Seriola* into a genus, which may be called *Cubiceps*.

The lower jaw shuts within the upper, like a box-lid; forcibly reminding the observer of *Tetragonurus*, for a battered or bleached state of which fish this example might have been easily mistaken.

The colour was an uniform pale dull grey, with the fins and towards the back darker and brownish.

#### Fam. CORYPHÆNIDÆ.

*BRAMA LONGIPINNIS*. *B. corpore abbreviato alto: squamis postice caudam versus antrorsum aculeato-umbonatis; pinna dorsali analique antice longe falcato-productis.*

D. 4 + 31; A. 2 + 26; P. 20; V. 1 + 5; C.  $\frac{4+IX.}{4+VIII.}$ ; M. B. 7;

Sq. lin. lat. 41-45.

Though founded upon a single individual, this appears a truly distinct species in the above characters from *B. Raii*, Bl., of which it presents the general appearance, colour and habit. The example seen measured eighteen inches and a quarter in length, and was eight inches deep at the origin of the dorsal and anal fins. As settling, by its partially aculeate scales, the true position of *Taractes*, this fish has been a very valuable acquisition.

Gen. TARACTES, nob.

*Char. Gen.*—*Corpus* ovatum compressum (ad finem pinnæ dorsalis analisque abrupte in caudam contractum), squamis cycloideis retrorsum aculeato-umbonatis muricato-asperum. *Caput* squamosum; oculis magnis; rostro brevissimo simo; rictu magno subverticali; dentibus *Bramæ* similibus subscobinatis recurvis, externis majoribus; palatinis vomereque armatis. *Operculum* simplex inerme. *Præoperculum* basi eximie dentato s. subcalcarato; suboperculo interoperculoque denticulatis.

*Pinnæ* malacopterygiæ, s. omnes radiis mollibus. *Ventrales* subjugulares. *Pinna dorsalis analisque* unica conformis lata: *caudalis* simplex integra rotundata. *Membrana branchiostega* septemradiata.

*Squamæ* magnæ trapeziformes postice emarginatæ cycloideæ; umbone in aculeum recurvato-erectum producto.

TARACTES ASPER.

D. 5 + 28; A. 3 + 20; P. 17; V. 1 + 5; C.  $\frac{4 + \text{VIII.}}{3 + \text{VII.}}$ ; M. B. 7;

*Squamæ* corporis in serie longitudinali 43 fere.

The generic name imposed at its first discovery on this particularly interesting, though plain and sober-coloured little fish, expresses the difficulty experienced in settling its relations of affinity, which are indeed so obscure and complicated, that but for the subsequent discovery of *Brama longipinnis*, with its similarly, though contrariwise, hooked scales, its true position, next to *Brama*, with analogies to many other families (e. g. *Zenidæ*, *Caproidæ*, *Scombridæ*), must have remained in abeyance.

PTERACLIS PAPILO. *P. longitudine altitudinem plus quater multiplicatam æquante: pinna dorsali prima analique cæruleo-violaceis, lituris inter radios aureo-viridibus postice biseriatis; hac radio secundo, illa quarto validiore, ceteris capillaceis flexuosis.*

1<sup>ma</sup> D. 35; 2<sup>da</sup> D. 6; A. 35; P. 18; V. 6; C.  $\frac{3 + \text{I.} + \text{VIII.}}{3 + \text{I.} + \text{VII.}}$ .

Nothing can exceed the splendour of the deep violet-blue, with the gold and green iridescent dashes or short stripes between the rays of the first dorsal and the anal fins. It resembles the breast of certain Humming-birds, and contrasts singularly with the pure uniform silvery whiteness of the whole head and body. The second dorsal fin, though very small, is sufficiently distinct in this species, and possibly has been merely overlooked or mistaken in imperfectly preserved specimens of others for an accidentally detached portion of the first dorsal fin. The proportions, not only of the depth, but

of the head, eye, muzzle and thickness, differ notably from those assigned by MM. Cuvier and Valenciennes to their *P. oculata*, of which it wants besides the dorsal fin-spot. The ventral and caudal fins are also longer. It agrees in these and other points far better with *P. trichopterus*, *P. Carolinus*, or *P. guttatus* (*Coryphæna velifera*, Pallas) of these authors, but differs from them still more widely than it does from *P. oculata*, in the numbers of the fin-rays.

#### ASTRODERMA PLUMBEUM.

The Madeiran *Astroderma* recorded under the name of *A. coryphænoïdes*, Bon. (Proceed. Zool. Soc. 1840, p. 37; Trans. iii. p. 7), is probably a distinct and undescribed species. It differs from MM. Cuvier and Valenciennes' description of the Mediterranean fish, and from that by Risso of the same, under the name of *Diana semilunata*, in size, being only four instead of twelve or fifteen inches long; in proportions, the depth being contained three instead of not quite four times in the length, making it a deeper fish, and the length of the head equalling the depth; in having the eye exactly in, not partly before and altogether below the middle of the head, and the hinder nostril larger than the foremost; in the less height backwards of the dorsal and anal fins, and their nearer approach at their hinder ends to the root of the caudal fin. The pectoral fins are longer, and the ventral fins, instead of being very short, with the first spine strong and serrate, are half the length of the whole fish, with the first ray or spine feeble, weak, or slender, and perfectly even or entire; the other rays, especially the first, being produced into fine hair-like points. The scales are firmly fixed, not easily removeable. There is no trace of the two little oblique crests or ridges at the base of the caudal fin on each side the faint central keel, like those which the Mackerels have; and lastly, the pectoral and caudal fins, instead of a fine coral-red, are pale tawny or dirty yellowish white; the body being a dull silvery lead-colour, instead of silvery rose.

It were not safe, from inspection of a single individual of such small size, and in a genus hitherto consisting of a single species, to pronounce these characters of actual specific value; some, or perhaps all, may be due merely to age or sex. The name of *A. plumbeum* is therefore here proposed only provisionally for the Madeiran fish.

*Ausonia Cuvieri*, Risso, Hist. iii. 342. f. 28; Cuv. Règ. Anim. ii. 214. note.

*Luvarus imperialis*, (Raf.) Cuv. Règ. Anim. ii. 214; Cuv. et Val. ix. 412.

I shall take an early opportunity in 'The Fishes of Madeira' of furnishing a full account, with a figure from a fresh and perfect individual, of this little known, most rare, and interesting fish. The several discrepancies between my example, which is deposited in the Society's collection, and the former individuals on record, seem fairly attributable to the paucity of those before examined, or to imperfect means of observation. The Madeiran fish differs not more from each of those included in the above references than they do respectively from one another, whilst it presents an assemblage of characters only to be collected from them all.

This really fine and striking fish offers no ambiguities whatever



of affinity, the very fishermen regarding it as some kind of "Dourado" (*Coryphæna*), which it resembles, both in general aspect and in the form of the head and profile. Something about the mouth and profile reminds one also of the turbot, whilst in the shape of the body, and perhaps of the dorsal and the anal fins, it resembles the "Enxareo" (*Caranx luna*, Geoffr.). The colour of the fins recalls to mind the *Lampris*.

The length of this example was five-eighths of an inch less than three feet.

Fam. ZENIDÆ, nob.

ZEUS ROSEUS. *Z. roseus immaculatus inermis*: pinna antica anali nulla, dorsali haud filamentosa; pinnis ventralibus amplis triangulari-ovatis.

D. 8 + 27 v. 28; A. 1 v. 2 + 29; P. 14; V. 9; C.  $\frac{5+VI.}{5+V.}$  v.  $\frac{4+V.}{5+VI.}$ ; M. B. 7 v. 8.

Two examples of this very handsome and most distinct new species of Dory have occurred. There is no danger of confounding it with any other of the genus yet recorded, for the *Z. Childrenii* of Bowdich, so obscurely indicated in the 'Excursions in Madeira,' was most probably the Boar-fish (*Capros Aper*, Lac.).

*Sternoptyx diaphana* (Herm.), Cuv. R. An. ii. 316. t. xiii. f. 1.

The acquisition lately of an example of this most rare and curious of fishes has confirmed a suspicion I have long entertained, that the true position of its genus is near *Zeus*. It has also some relation to *Trachichthys*, but I think only in the way of analogy.

This little fish was taken in August at sea, between Madeira and St. Mary's, the southernmost of the Azores, about eighty miles to the south-east of the latter island, in a calm smooth sea. It is not a little remarkable, that after so long an interval, *Sternoptyx diaphana*, originally discovered by Hermann so long ago as 1774, in the West India islands, should have been rediscovered thus near the Azores; that is, in the locality in which the cognate *St. Olfersii*, Cuv. l. c. t. xiii. f. 2, has yet alone been found.

Fam. CAPROIDÆ, nob.

Gen. ANTIGONIA, nob.

Char. Gen.—*Corpus* compressum rhombiforme, altitudine longitudinem subæquante. *Os* parvum haud protractile; dentibus conicis minutis. *Caput* asperum; genis operculoque squamosis. *Præoperculum interoperculumque* limbo denticulato nudo. *Oculi* magni, circulatim cristato-carinati, cristis denticulatis. *Squamæ* asperæ, pectinato-ciliatæ.

*Pinna dorsalis* unica, continua, ad angulum superiorem corporis nascens, antice alta; *analis* parte anteriore spinosa a posteriore sinu distincta: spinis utriusque striatis, squamosis; *pinnæ ventrales* majusculæ, ad angulum inferiorem corporis sitæ. *Pinna caudalis* simplex, truncata. *Membrana branchiostega* septemradiata.

Obs.—Species adhuc unica, Maderensi-Atlantica, rarissima par-

vula rubescens Caproidea. Pinnarum spinæ validæ, striatæ, squamulis imbricatis vestitæ, membrana nuda. Capite armato s. præoperculo interoperculoque cristisque ossium omnibus denticulatis, dentibusque brevibus conicis scobinatis, squamisque asperis ciliatis, ad Percidas per *Enoplosum* Lac. dum tendit, a Chætodontibus (e. g. *Platax*, *Drepane*) Coryphænidisque (e. g. *Peprilus*, *Apolectus*), quibus forma aspectuque simillima, recedit. Iisdem characteribus, necnon cauda lineaque laterali simplicibus, spinisque ante pinnas verticales liberis nullis, Scombridis (e. g. *Blepharis*, *Gallichthys*, *Argyreiosis*, *Vomer*, *Hynnis*), forma similibus, magis ac magis distat. Pluribus quinetiam notis *Equulam* ac *Gerrem*, e. g. *Gerrem Plumieri* Cuv. et Val. t. 167, revocat in mentem. A *Capro* Lac. forma, ore vix protractili, pinnaque dorsali unica continua antice alta differt.

ANTIGONIA CAPROS.

D. 8 + 34; A. 3 + 33; P. 14; V. 1 + 5; C.  $\frac{4 + \overline{\text{I.} + \overline{\text{V.}}}}{3 + \text{I.} + \text{IV.}}$ ; M. B. 7.

A single individual only of this most curious and interesting little fish has yet appeared. It forms a most distinct genus, throwing considerable light on the affinities of several other genera, which, before its discovery, had been placed very much at random.

Fam. MUGILIDÆ.

*Mugil Cephalus*, L. Cuv. et Val. xi. t. 307.

I procured three or four examples of this species by dragging with a net at the mouth of the Machico river. They were all caught in perfectly fresh water, in a place which was quite cut off from all communication with the sea, except in the time of winter-floods or particularly high tides. The species was quite unknown to the fishermen.

*Mugil auratus*, Risso.

*M. chelo*, Syn. 184; nec aliorum.

*M. Maderensis*, Suppl. in Proceed. 1839, p. 82; Trans. iii. p. 8.

The usual exposure of the ends of the maxillary in the Madeiran fish prevented an earlier recognition of its proper name and synonymy. They are only occasionally, and, except in full-sized fishes, rarely,—not generally or characteristically, as must be inferred from MM. Cuvier and Valenciennes' account of the species,—“entièrement cachés,” although their figure represents them more correctly partially exposed.

Fam. GOBIDÆ.

*Blennius parvicornis* of my Suppl. (Proceed. 1839, p. 83; Trans. iii. p. 9), but not of MM. Cuvier and Valenciennes, proves to be a mere variety, or perhaps monstrous state, with a notched dorsal fin, of the common *Bl. palmicornis*, Cuv. and Val. It is *Bl. palmicornis*, var.  $\gamma$  *strigata*, nob. Another var. ( $\rho$ ) *sinuata*, nob.) of the same species has the dorsal fin merely faintly sinuate, instead of notched like var.  $\gamma$ , in the middle. As for the true *Bl. parvicornis* of Cuvier and Valenciennes, which, having the dorsal fin even\*, cannot be re-

\* “Sa dorsale est continue.” Cuv. et Val. xi. 258.

ferred correctly to either of these states of the species, I feel authorized, after examination of perhaps some hundred individuals of this common little fish, with a particular view towards the confirmation of the form in question as a species, to pronounce it a mere trivial and accidental aberration (so far at least as concerns the Madeiran individual alluded to by MM. Cuvier and Valenciennes) of the typical common state (var. a) of *Bl. palmicornis*.

PHOLIS TRIGLOIDES.

*Pholis lævis*, Syn. 185; Suppl. in Proceed. 1839, p. 83; in Trans. iii. 9.

This fish proves to be distinct specifically from the British *P. lævis*, Fl., of which I had considered it at first a mere variety. This correction has been recently confirmed, on a comparison of specimens, by my friend Mr. Jenyns, who finds the eyes in the Madeiran fish "more than twice the size of those of *P. lævis*, Fl., not to mention other differences." I am also so far satisfied as anything short of an inspection of their specimens can warrant, that *Bl. trigloides* of MM. Cuvier and Valenciennes, which even by their own showing\* is misplaced in their genus *Blennius*, is founded, at least in part†, on an example of this species, for which I therefore now propose the name of *Pholis trigloides*, it being a genuine member of the genus *Pholis* of Fleming.

PHOLIS BUFO. *P. fusco-nigrescens, versicolor, mox pallide cervina, nigro maculata et punctata, magna, pigra: pinnis pectoralibus nigro maculatis, maculis transverse fasciatis: capite magno, crasso, obtuso; oculis nec magnis, nec extantibus, intervallo occipitali lato subsulcato: dentibus anticis abrupte et longissime productis, arcuato-incurvis.*

D. 12 + 19 v. 18; A. 20 v. 21; P. 13; V. 3; C.  $\frac{2 + \overline{\text{I.} + \text{V.}}}{2 + \text{I.} + \text{IV.}}$ ; M. B. 6.

This ugly, heavy-looking fish attains the length of ten or twelve inches, and is at present certainly the giant of its genus, and even of the true Blennies. It is very rare, or rather local, and confined apparently to beaches covered with large rounded rocks or stones, amidst which a little fresh water finds its way into the sea. I have had from ten to twenty individuals, from two inches and a half in length upwards, all exhibiting the same characters.

Fam. LABRIDÆ.

Proceed. Zool. Soc. 1839, p. 84, *Erratum*. The two lowest paragraphs at the bottom of this page belong to the head "*Acantholabrus imbricatus*;" the specific character and fin-formula of which have been transposed, by an error in the printing, from their proper place immediately before the first of these two paragraphs, beginning "*Crenilabrus luscus*," to p. 86, where they will be found forming in Italics the second paragraph from the top.

\* "Il n'y a point de tentacule au sourcil." Cuv. et Val. xi. 228.

† See Suppl. in Proceed., p. 83; Trans. iii. p. 9.

## Fam. ESOCIDÆ.

## Gen. ECHIOSTOMA, nob.

*Char. Gen.*—*Corpus* elongatum anguilliforme nudum. *Caput* serpentiforme, oculis magnis, rostro brevissimo obtuso, rictu magno longe diducto, mandibulæ inferioris symphysi barbifero. *Dentes* conferti numerosi aciculares recurvi inæquales, quibusdam prælongis; intermaxillaribus vomere palatinis linguaque armatis. *Apertura branchialis* ampla. *Opercula* plana simplicia inermia. *Pinnæ pectorales* jugulares rudimentales pauci-radiatæ (s. quadri-radiatæ), prima superiore distincta (in filamentum longissime producta), tribus inferioribus brevibus membrana subcoalitis: *ventrales* abdominales (ad medium corporis sitæ octo-radiatæ): *dorsali anali* que parvis oppositis posticis, *caudali* parvo lunato-furcato rudimentali approximatis.

## ECHIOSTOMA BARBATUM.

D. 15; A. 18; P. 1 + 3; V. 8; C.  $\frac{5 + V.}{5 + VII.}$ .

*Stomias barbatus*, Cuv. R. An. ii. 283, 284?

This is very probably the fish briefly noticed by Cuvier under the above synonym. But it seems, at all events, sufficiently distinct generically from the *Esox* or *Stomias Boa* of Risso (Hist. iii. 440. f. 40), with which Cuvier associates it; but which, besides having other differences indicative of generic distinction, is figured by Risso as covered with large scales, like a *Microstoma* or *Chauliodus*. Nor can I find any trace of the Madeiran fish in Risso\*, or in any other work to which I have access. It may therefore be considered one of no less rarity than singularity of characters and aspect; linking the *Esocidæ* with the *Murænidæ*, and indeed partaking more of the habit, form and colouring of the latter tribe than of the former.

A single example only has been taken in a net close in shore, measuring thirteen inches and a quarter long. It was wholly devoid of silver spots but had two rather conspicuous rows of pale pore-like dots low down on the sides, and a most singular rose-coloured, pear-shaped spot, placed obliquely beneath and a little behind the eye, at the bottom of the cheek. This soon faded to white in spirits. The whole body was a uniform dark chocolate-brown, punctate with black dots disposed in bands or figures. The single beard is thick or broad and subcartilaginous, equalling in length the depth of the head. The opercles are of the usual strength and structure.

## Fam. SALMONIDÆ.

## Gen. AULOPUS, Cuv.

*Saurus Lacerta* (Risso), Syn. p. 188, is certainly an *Aulopus*; and notwithstanding the larger number (15–17) of its branchial rays, is also probably the *A. filamentosus* of Cuvier (Règ. An. xi. 315).

\* Cuvier speaks of his *Stomias barbatus* being equally with *Stomias Boa* a discovery of M. Risso's; but I can find no trace of the former fish in his 'Histoire,' or, as Cuvier cites it, the second edition of his 'Ichthyologie.'

The reference to Risso is in such case perfectly correct; but the name, of course, must sink into a synonym, the fish being generically quite distinct enough from *Saurus*, Cuv.

Gen. SAURUS, Cuv.

I possess the head of a third Madeiran Saurine fish, belonging truly to the genus *Saurus*, and not to *Aulopus*; but the body having been destroyed, I must decline for the present attempting either to identify or to define it. It was of a mottled pale and scarlet colour, varied with brown or dusky, and had a distinct dark spot above at the tip of the muzzle.

Gen. METOPIAS, nob.

I place here, as in some degree related to *Scopelus*, but merely provisionally, conceiving that further investigations may authorize its being formed into a new family, a most curious little fish, which I saw caught in a boat-scoop whilst swimming on the surface, about a league and a half from shore, on a hot calm day in September 1841. Although full-grown or adult, being in roe, it was only an inch and a half long, and was nearly altogether black.

With reference to its affinities and position in the Cuvierian system, let it be observed, that—

1st, it is decidedly Malacopterygious, and this without apparent affinity in other points to any known Acanthopterygious genus. If it recalls to mind in some respects *Pomatomus*, it altogether stands aloof in scales, dentition, single dorsal fin, small eyes, &c. from that genus. The fins resemble most those of a *Cyprinus*.

2ndly, the ventral fins are not abdominal, but thoracic, which at once opposes its insertion amongst *Cyprinidæ*, *Esocidæ*, *Salmonidæ*, and *Clupeidæ* of Cuvier. In *Aulopus*, Cuv., indeed, the ventral fins are subthoracic, and there are other points about *Metopias* indicating rather close alliance of some kind with *Scopelus*; but it has certainly no immediate natural affinity with the true *Salmonidæ*, or even with *Sauridæ*, either in scales, dentition, fins, or habit. It is also quite destitute of the artificial symbol of these families, having no trace of a second rudimentary or adipose dorsal fin.

3rdly, it differs *toto cælo* from *Gadidæ*; agreeing only with the rare *Mora Mediterranea*, Risso, in the thick cube-shaped head and short abrupt muzzle. The ventral fins, moreover, are thoracic, not jugular; and I could find no trace of a beard or barbule.

These considerations seem to point to the propriety of regarding *Metopias* as belonging to a new family or tribe of Thoracic Malacopterygians, ranging between *Salmonidæ* and *Gadidæ*; still it is very possible that a discovery of some yet unknown link with old-established groups may solve at once, as in the case of *Brama longipinnis* and *Taractes*, the problem of its true position. The following characters will serve meantime for its discrimination, whether they prove eventually of mere generic or still higher value.

Gen. METOPIAS.

*Pinnæ* malacopterygiæ; *ventrales* thoraciæ: *pinna dorsalis* unica;

adiposa nulla; *caudalis* bifida. *Squamæ* parvæ læves (cycloideæ). *Dentes* minuti uniseriati; palatinis linguaque vomereque inermibus.

*Caput* magnum subcubicum nudum, fronte abrupto declivi, rostro brevi lato emarginato, rictu oblique ascendente, mandibula inferiore longiore: oculi minuti. *Opercula* integra cum toto capite inermia.

*Corpus* antice crassum, postice compressum; cum capite clavæforme.

*Pinnæ* omnes amplæ, nudæ.

METOPIAS TYPHLOPS.

D. 4 + 14; A. 4 + 7; P. 15; V. 1 + 7; C.  $\frac{3 \text{ v. } 4 + \overline{\text{I.} + \text{IX.}}}{3 \text{ v. } 4 + \text{I.} + \text{VIII.}}$ .

*Piscis* admodum pusillus, nigricans, capite longitudinaliter exilissime striato. *Radii* quatuor primi dorsales et anales cum primo ventrali simplices, sed minime spinosi; ceteris furcatis vel ramosis.

Fam. CLUPEIDÆ.

CLUPEA LATICOSTA.—“*Arenque a casta larga.*” *C. edentula elliptica, lateribus latis planis, dorso abdomineque æqualiter convexis; operculis suborbitariisque obsolete striatis, illis intus gulaque nigris: squamis lunatis, linea laterali obsolete s. nulla; pinna dorsali centrali, anali subelongata, caudali lobis gracilibus angustis, pectoralibus operculo subremotis.*

D. 3 + 15; A. 18 + 2; P. 1 + 15; V. 1 + 7; C.  $\frac{4 \text{ v. } 5 + \overline{\text{I.} + \text{IX.}}}{5 + \text{I.} + \text{VIII.}}$ ;

M. B. 6 utrinque.

I had long since seen, and have often heard of this deep-sided, larger sort of Madeiran Herring, or “*Arenque*,” from the fishermen, but only recently obtained an opportunity of examining it, and of discovering it to be a new species, nearest to the Pilchard; but differing chiefly in its greater size, greater depth, approaching that of *C. Leachii*, Yarr., six, not eight-rayed branchial membrane, and in the production of the last two rays of the anal fin. Like the Pilchard, it has the dorsal fin in the centre of gravity, and the subopercle cut square at the bottom.

Fam. GADIDÆ.

*Merlucius vulgaris*, Cuv.

The remarks upon the Madeiran Hake (*Merlucius vulgaris*, Syn. p. 189) at pp. 37 and 38 of my Supplement (Proceed. Zool. Soc. 1840; Trans. iii. p. 15), and the idea of its distinctness as a species from the common British or Northern Hake, arose from tracing in the form of the dorsal and anal fins in the Madeiran fish, and in Salviani's figure of the Mediterranean Hake, a very appreciable difference from my friend Mr. Yarrell's representation of the British Hake at p. 177 of the second volume of the first edition of his 'Fishes.' Having requested his attention to the subject, I learn, however, from the corresponding chapter of his second edition, that

this difference is either inconstant or attributable to a fault in the former figure; and he has furnished a new engraving of the British Hake, which leaves no doubt of its identity with the Madeiran fish, according to my first determination in the 'Synopsis of the Fishes of Madeira.' No variation in the form of the fins, it may be added, has yet been observed in the Madeiran Hake.

*Mora Mediterranea*, Risso, Hist. iii. 224.

Fishing at a depth of three or four hundred fathoms off Magdalena, five leagues to the west of Funchal, I was fortunate enough last summer (1841) to obtain many examples of both sexes of this very rare, and, even in Madeira, almost unknown fish, which Cuvier has wholly omitted in the 'Règne Animal.' It forms a very distinct genus of *Gadidæ*; in shape and colours resembling *Phycis Mediterraneus*, but in the large thick subcubic head, abrupt short muzzle and large scales, recalling to mind a pale-coloured *Pomatomus telescopus*. At Magdalena this last-named fish is called "Pimentelle," whilst its common Funchal name, "Ribaldo," is assigned to *Mora Mediterranea*.

Gen. GADELLA, nob.

*Char. Gen.*—*Corpus* subellipticum, postice valde attenuatum compressum: capite nuchaque superne latis planis: rostro obtuso, rictu amplo largo, ore lato transverso, maxillis æqualibus dentibus subscobinatis, quibusdam magnis uncinatis distantibus interspersis, vomere palatinis linguaque lævibus inermibus: barbula nulla.

*Pinna dorsalis analisque* unica conformis continua æqualis a nucha vel ano usque ad pinnæ caudalis basin protensa, antice angustissima, postice latior: dorsali prima plane nulla. *Pinnæ pectorales* lanceolato-acuminatæ, tenues nec carnosæ: *ventrales* jugulares parvæ pluri-radiatæ, radiis primis duobus in filamenta productis. *Pinna caudalis* elongato-lanceolata.

*Obs.* Piscis pusillus, cinereo-fuscus, Motelliformis, oculis magnis, membrana branchiostega septem-radiata.

GADELLA GRACILIS.

D. fere 60; A. fere 60; P. 24; V. 7; C. XXV. fere; M. B. 7.

This new type approaches *Motella*, *Raniceps*, and *Brosmius*; differing from the two former in the entire absence of a nuchal groove, or of any rudiment of a first dorsal fin; and from them all in the absence of barbule, and in the shape and delicate (not fleshy) nature of the pectoral fins. A single example only has occurred, measuring four inches and one-eighth in length.

Fam. MACROURIDÆ, nob.

MACROURUS SERRATUS. *M. pallide cinereo-fuscus, scaber, squamis pectinato-striatis, inermibus, ecarinatis: capite rostroque brevibus, simplicibus (nec cælatis nec carinatis); oculis rotundatis; dentibus scobinatis: pinnæ dorsalis primæ altæ radio primo valido, antice spinoso-serrato; ventralium in filamentum productis.*

1<sup>ma</sup> D. 1 + 9; 2<sup>da</sup> D. 100 fere; A. 80–90; V. 1 + 7 v. 8; P. 19; M. B. 7.

Cuvier, in a note at p. 337 of the 'Règne Animal,' vol. ii, affirms, from "an immediate comparison," the identity of Risso's *Lepidoleprus cælorhynchus* of the Mediterranean with the *Macrourus rupestris* of Bloch, which is described and figured by that author with the first ray of the first dorsal fin distinctly serrated in front. Yet Dr. Richardson, in the Proceedings of the Zoological Society for 1839, p. 100, speaks of "examples of *cælorhynchus* from the Mediterranean and also from Madeira"—meaning, by these latter, my *Macrourus atlanticus*, Proceed. Zool. Soc. 1839, p. 88; Trans. iii. p. 15—"both in the Society's Museum, none" of which "have the first dorsal ray serrated."

Awaiting, therefore, further definitive information regarding the true *L. cælorhynchus* of Risso, in reference to this character, I am compelled to give a distinct name to this second Madeiran species of *Macrourus*, which has the dorsal spine serrated at its fore-edge, but which, by its shorter muzzle and somewhat smaller and rounder eyes, appears, waving the question as to the serrature or non-serrature of the dorsal spine in Risso's fish, to approach even nearer than *M. atlanticus* to his *L. cælorhynchus*.

A single example only has occurred, which was not seen till it had been partly dried.

MACROURUS LÆVIS. *M. pallidus, griseus, lucidus, levigatus s. exilissime areolato-scaber, inermis; squamis inconspicuis minutis: capite rostroque acuto abbreviatis, simplicibus (nec cælatis nec carinatis); oculis rotundatis; dentibus in maxilla inferiore validis, uniseriatis: pinnae dorsalis primæ radio primo inermi; ventralium simplici.*

1<sup>ma</sup> D. 1 + 9; 2<sup>da</sup> D. et A. ∞; P. 15; V. 1 + 7; M. B. 7.

This third Madeiran species of *Macrourus* is immediately distinguishable from the other two by its glossy, sleek or apparently naked appearance, caused by the fineness and minuteness of its areolæ or scales. It is also a more elongated fish. In the formation and proportions of the head, eyes and muzzle it nearly agrees with *M. serratus*, and it has also the cheeks plain and flat, without the strong sculptured subocular keel which gives so singular and trigloid an aspect to the head of *M. atlanticus*.

The only individual which has occurred was sixteen inches long.

Fam. OPHIDIIDÆ.

Gen. DIAPHASIA, nob. (*Les Fierasfers*, Cuvier.)

*Diaphasia acus.*

*Ophidium fierasfer*, Risso, iii. 212. No. 99.

*Les Fierasfers* (*Ophidium imberbe*, L.), Cuv. Règ. Anim. ii. 359.

The occurrence in Madeira of a single individual, imposes the necessity of proposing, in lieu of the barbarous vernacular appellation *Fierasfer*, a name founded on an obvious character, and accordant with the rules of scientific nomenclature.

Fam. DIODONTIDÆ.

*Diodon reticulatus*, L. Syn. p. 193.—*Erratum.* Expunge in the syno-



nymys, "Le Diodon orbe *Lácepède*"; and for "*Diodon rivulatus*," read *Diodon tigrinus*.

## Fam. SQUALIDÆ.

*Carcharias falcipinnis*, Proc. Zool. Soc. 1839, p. 90; Trans. iii. p. 18.

This proves, as it was suspected, to be the *Squalus ustus*, Dum.; that is, *Carcharias (Prionodon) melanopterus* (Q. et G.) of MM. Müller and Henle.

*Carcharias microps*, Proc. Zool. Soc. 1840, p. 38; Trans. iii. p. 18.

This again may perhaps be found to be identical with the imperfectly known *Squalus obscurus*, Lesueur (*Carcharias (Prionodon) obscurus*, Müll. et Henle), concerning which, however, the information hitherto afforded is too scanty to allow the immediate adoption of the name. *Carcharias microps* differs from *C. P. Sorrah*, Val., as described and figured by MM. Müller and Henle, in the equiserrate teeth, the longer and narrower pectoral fins, the smaller eyes and shorter muzzle. It differs again from *C. P. Henlei* (Val.), Müll. et Henle, in the long and black-tipped pectoral fins.

## Fam. CENTRINIDÆ.

CENTROPHORUS CALCEUS.—"*Sapata*."

*Acanthidium calceus*, Proc. Zool. Soc. 1839, p. 92; Trans. iii. p. 19.

Although I have not yet succeeded in obtaining the male of this Shark, I perfectly concur in MM. Müller and Henle's suggestion (Plag. 2<sup>ter</sup> Nachtr. p. 199), that it will probably prove to belong to their genus *Centrophorus*, with which I was unacquainted at the time of its former publication. It is however quite distinct from either of the species they describe.

The other little shark, *Acanthidium pusillum*, nob., with which at that time, in expectation of MM. Müller and Henle's work, I preferred associating it, though not without considerable scruple, to forming a new genus for a single species, is I think distinct specifically from *Spinax niger* (Buon.) of these authors (*Sq. Spinax*, L., *Acanthidium Spinax*, nob.), with which they\* have supposed it identical. It must retain also the name which I have given it; that of *Spinax*, which MM. Müller and Henle, after the Prince of Canino, have assigned to the same combination of characters, belonging, by the right of priority †, to the distinct generic group to which these authors have assigned the name already otherwise or in a wider sense employed by Risso, of *Acanthias*, and the type of which is the *Squalus Acanthias*, L.

## Fam. RAIIDÆ.

TORPEDO PICTA. *T. supra purpureo-fusca (sepiolina) maculis albidis reticulato-marmorata: corpore latiore quam longo, cauda abbreviata multo longiore; pinna caudali altiore quam longa; ventralibus amplis, dimidio caudæ longioribus; spiraculis septem dentatis.*

*Torpedo marmorata*, Syn. Mad. Fish. p. 195; nec Risso, nec aliorum.

The closer analysis which, since the publication of the Madeiran

\* 2<sup>ter</sup> Nachtr. p. 199.

† Cuv. Règ. Anim. ii. 391, 392.

fish under the name of *T. marmorata*, Risso, this genus has received from MM. Müller and Henle, authorizes the proposal of it as a distinct and seemingly new species. It agrees with *T. marmorata* in the shape and relative proportions of the body-disc, the tail and caudal fin; but the distance from the root of the ventral fins to their free hinder edge considerably exceeds the distance from their hinder edge to that of the caudal fin; the teeth of the spiracles are not less developed in full-grown fishes of a foot and a half in length than in younger examples; and lastly, the colours are liable to no variation, and are very different from those of any of the varieties of *T. marmorata* enumerated by MM. Müller and Henle. I regret I am unable at the present moment to compare the dentition with that of *T. panthera* (Ehr.), Müll. und Henle, Nachtr. p. 193.

*Torpedo hebetans*, Syn. p. 195 (*Raia hebetans*, Müll. und Henle, Nachtr. p. 194), in the remarkable notch on each side at the outer extremity of the front margins, most resembles *T. nobiliana* (Buon.), Müll. und Henle, p. 128. The disc of the body however was an inch broader than long, and the colours were too different in the only example (a male) which has yet occurred of the Madeiran fish to allow, without more evidence, its junction with this or any other Mediterranean species.

*Raia Maderensis*, Syn. p. 195. I am not quite prepared to acquiesce in MM. Müller and Henle's reference of this to *R. undulata* or *mosaica*, Auct. (See Müll. und Henle, p. 134, and Nachtr. p. 194.) The Madeiran fish is generally more or less completely rough beneath, and always coarsely shagreened *all over* on the upper surface. However, this discrepancy with their account of *R. undulata* might be due to the small size of their specimens; but there is also still some further disagreement with regard to the large prickles in the middle of the back; and the colours, which are constant in the Madeiran fish, agree only with their var. 3.

*Raia oxyrhynchus* (Will.), Suppl. Mad. Fish. p. 92 (see Müll. und Henle, 2<sup>ter</sup> Nachtr. p. 200) is truly the *R. oxyrhynchus*, Linn., of Müller and Henle, p. 148, as distinguished from the nearly allied *R. lintea* of Fries.

PTEROPLATEA HIRUNDO. *P. glabra, supra unicolor hepatina, rostro vix prominulo, pinnis pectoralibus margine anteriore utrinque convexo, dein apices versus concaviusculo, corpore (postice convexo) plus duplo latiore quam longo, cauda brevissima dimidio corporis brevior, subtus linea elevata carinata, supra simplici, apicem versus quadrangulati: tentaculis pone spiracula nullis.*

*Trygon altavela*, Suppl. in Proceed., p. 92; in Trans. iii. p. 20; omisso synon. Cf. Müll. und Henle, 2<sup>ter</sup> Nachtr. p. 200.

Judging from MM. Müller and Henle's account of the species of this genus, the Madeiran fish is not only distinct from the Mediterranean *περυπλατεΐα* of F. Columna, to which I formerly referred it, but from every other. It differs from *Pt. altavela*, Müll. und Henle, in the uniformity of colour of the body and tail above; in having the fore margin of the wings convex; in their greater width from point

to point; in the tail being simple, or without any trace of fin, raised line, or keel, above; and lastly in the absence of any kind of tentacle behind the spiracles. In the second and last of these characters it approaches much more nearly the American *Pt. maclura*, Müll. und Henle, but differs in smoothness when adult, in colour, greater width of body, and in the tail being sharp-edged or fin-carinate beneath. From the Indian *Pt. micrura*, Müll. und Henle, it is abundantly distinct.

## MISCELLANEOUS.

### POPULAR TRADITIONS RELATIVE TO THE CUCKOO.

[We know not what degree of relationship our readers may be disposed to admit between Natural History and the imaginations and traditions suggested to mankind in various ages and countries by natural objects. These will at least not be less amusing to the lover of Natural History than to the general reader; and may sometimes have a relation to supposed characters and qualities, and to the origin of those popular names which convey the same idea in a remarkable manner through various countries and languages.—R. T.]

To no bird is the gift of prophecy more commonly attributed than to the cuckoo, whose loud measured voice resounds in the woods just clad with fresh verdure.

The old German saying, “Wann der *gauch* *guket*,” denotes the beginning of the spring\*, just as, according to Hesiod, the song of the cuckoo announces the time of the spring rains. Two old poems describe the contention of Spring and Winter about the cuckoo, and the lament of the herdsmen for him: the Spring praises, slow Winter—*tarda hiems*—reproaches the bird; the herdsmen represent him as taken away or drowned: the line is remarkable:—

Tempus adest veris, cuculus modo rumpe soporem†.

He announces by his song the loveliest season of the year, but it is not stated in these poems that he predicts to man. The Anglo-Saxon Codex Exoniensis, 146, 27, lately published by Mr. Thorpe, ascribes likewise to this bird the announcing of the year:—

geacas gear budon;  
cuculi annum nuntiavere.

The popular belief still exists, that whoever hears the cry of the cuckoo for the first time in the spring, may ask him how many more years he has to live. In Switzerland the children cry “*Gugger*, wie lang lebi no?” In Lower Saxony,

“*Kukuk* vam häven  
Wo lange sall ik leven?”

and then they listen and count; as many times as the bird cries

\* Looking forward to the return of fine weather in spring, the Norfolk people say, “When the cuckoo has picked up the dirt.”—R. T.

† Both poems are ascribed to Bede in Dornavii Amphitheatrum.

after it is questioned, so many years has he who asks the question to live. In other places the saying is as follows:—

<i>Kukuk</i> , beckenknecht,	Cuckoo, baker-boy,
Sag mir recht,	Tell me true,
Wie viel jahr ich leben soll?	How many years shall I live?

The bird is said to be a bewitched baker- or miller-boy, and thus has pale or meal-coloured feathers. In a dear season he robbed poor folks of their dough, and when God blessed the dough in the oven, drew it out, plucked some off, and every time cried out as he did so, 'Gukuk!' (Look, look!) God therefore punished him, and turned him into a thievish bird, who continually repeats this cry. This legend, which is of great antiquity, and resembles that of the woodpecker, may at an earlier period have been otherwise told; and connected with it may be the notion that the cry of the cuckoo, if heard after St. John's day, betokens scarcity.

In Sweden he prophesies to unmarried lasses how many years they shall remain single.

*Gök, Gök*, sitt på quist, &c.

Cuckoo, cuckoo, that sits on a bough, &c.

If he cries oftener than ten times, they say that he sits upon a silly bough, and give no heed to his prophecies. Much depends upon the direction in which the cuckoo is first heard; if from the north (that is the unlucky side) you will have mourning during the year: from the east or west his cry portends good fortune.

In Gœthe's 'Frühlingssorakel' the prophetic bird announces to a pair of lovers their approaching marriage and the number of children.

It is remarkable enough that our poets of the thirteenth century do not mention the cuckoo as prophesying: the thing was doubtless commonly known, for we find in Renner, 11340,

Daz weiz der *gouch*, der im für wâr  
Hât gegutzet hundert jâr.

And we have a story related by the abbot Theobald of a certain novice, who, assuring himself of living twenty-two years longer, from having heard the cuckoo repeat its cry just so many times, concluded that it was needless for him to pass so long a period in mortification, and resolved to return and lead a jolly life for twenty years, thinking the remaining two quite enough for penitence\*.

From the regularity of the time of his appearance†, the cuckoo is

\* "Narravit nobis anno præterito (?1221) Theobaldus abbas Eberbancensis, quod quidam conversus, cum nescio quo tenderet, et avem quæ *cuculus* dicitur, a voce nomen habens, crebrius cantantem audiret, vices interruptionis numeravit, et viginti duas inveniens, easque quasi pro omine accipiens pro annis totidem vices easdem sibi computavit: 'Eja,' inquit, 'certe viginti duobus annis adhuc vivam; ut quid tanto tempore mortificem me in ordine? Redibo ad seculum, et seculo deditus viginti annis fruar deliciis ejus; duobus annis qui supersunt pœnitebo.'"—CÆSARIUS HEISTERBAC. 5. 17.

† [So Logan, in his beautiful lines on the Cuckoo:

Hast thou a star to guide thy path,  
Or mark the rolling year?]

probably the bird designated *zítvogel* in an old proverb, in accordance with the passage of Pliny, "Cantus alitis *temporarii* quem cuculum vocant." It is said that he never cries before the 3rd of April, and never after the festival of St. John. But he cannot cry before he has devoured a bird's egg. If you have money in your purse when he first cries, all will go well during the year; and if you were fasting, you will be hungry the whole year. When the cuckoo has eaten his fill of cherries three times, he ceases to sing.

It portends misfortune to the Servian *haiduken* when the *kukavitza* appears early and comes out of the black wood, but good luck when his cry comes from the green wood.

The froth in the meadows caused by the *Cicada spumaria* is called Cuckoo-spittle; *Germ.* Kukuksspeichel; *Swiss*, Guggerspeu; *Dan.* Giögespyt; otherwise Hexenspeichel, Witches-spit; *Norw.* Troldkiäringspye; thus connecting the bird with supernatural beings. The names of some plants confirm its mythic character: *Oxalis acetosella*, *Old German*, Gouches-ampfera; *Swiss*, Guggersauer; *Anglo-Saxon*, Geaces-sure; *Scotch*, Goukemeat; *Swed.* Gökmat; *Dan.* Giogemad, Giogesyre (it was believed that the bird liked to eat these): *Modern German*, Kubkuksbrot; *Fr.* Pain de Coucou, *Panis cuculi*. Cuckoo-flower, *Lychnis Flos-cuculi*, *Germ.* Kukkuksblume.

The Slavonians do not attribute anything bad or devilish to this bird, which they always represent as a female. *Zezhulice*, sitting on an oak, bewails the transitoriness of spring. The Servian *kukavitza* was a maiden who long bewailed her brother's death, until she was changed into the bird, "Sinja kukavitza" (the gray): so also in Russian songs it is a bird of mourning and melancholy; and Russian traditions speak of her as a young maiden changed by an enchantress.

Some mountains are named after the Cuckoo; and Caucasus is said to be among the number.

From J. Grimm's *Deutsche Mythologie*, vol. i. p. 640.

#### ORTYX VIRGINIANA IN NORFOLK.

As little appears known now as to what success attended the turning loose of some specimens of the *Ortyx virginiana* in Norfolk several years since, an extract from a letter addressed to me nineteen years ago by the Rev. John Burrell, F.L.S., Rector of Letheringsett, near Holt in Norfolk, may throw some light on that subject. I may premise that the above gentleman was a zealous naturalist of the old school and contemporary with Marsham, Sir J. E. Smith, Haworth, Lathbury, Skrimshire, Scales, &c. now no more, and member of the original Aurelian Society. Mr. Burrell established a natural-history correspondence amongst the cultivators of natural history in Norfolk and Norwich, by which each member was bound to transmit to him as the Focus or Registrar, on the first or second of each month, an account of captures, observations, *locus et tempus* in entomology, &c. for the past month, all of which letters he engaged to answer in a similar way on the thirteenth and fourteenth of the same month, and enter each and every one in a book provided for that purpose by himself, which book, if now in the possession of the family, would

be worth preserving as a literary curiosity and monument of his industry; as few men, perhaps no one, ever wrote *more* letters to his correspondents, who had so many public claims upon his time, family anxieties and bodily sufferings, as my late venerable and respected friend. The letter from which I quote is dated November 11th, 1825:—"I had yesterday a bird brought to my parlour which was shot here; it was given me as a new addition to the British Fauna; at first sight I thought it a quail, a bird I never saw. I examined it by Shaw's 'General Zoology,' and from some of the habits, which I have learnt from the sportsman since I received it, I am willing to accord in the nomenclature applied to it by the sportsman, the *Maryland Partridge* of Pennant's 'Arctic Zoology.' It is not, however, such a novelty as my neighbour conjectured; I have a specimen previously set up; it was brought to me last year, when I contented myself with a bird's-eye view, and joined other students in natural history in having hitherto confounded it with the quail. It is now quite a colonized creature, and numerous are the covies, which report says that the poachers cannot destroy, its manners are so watchful and shy of man. It was too much shot for preservation, and therefore I not once thought of sending it to Norwich. If your museum should deem it a desideratum, that is, if it has not a specimen, I have no doubt I can procure specimens for it, myself and other friends."

Whether the bird is scarce or not in the same neighbourhood now I cannot tell, having myself been absent nearly eighteen years from Norfolk.

Phil. Hall, Leeds, March 25, 1844.

HENRY DENNY.

#### DESCRIPTION OF A NEW SPECIES OF VOLUTA.

*VOLUTA RETICULATA.* *Vol. testâ elongato-ovatâ, lævigatâ, pallidè fulvâ, fusco vel spadiceo-fusco per totam superficiem subtilissimè trigono-reticulatâ, reticulâ bifasciatim confusâ; anfractibus flammis brevibus spadiceis longitudinalibus, prominentibus, prope suturas vivide pictis; apertura fauce spadiceo-fuscâ.* Long.  $3\frac{1}{2}$  in.; lat.  $1\frac{1}{2}$ .

*Hab.* Coast of New Holland, north of Swan River Settlement.

This beautiful new Volute somewhat resembles the *Voluta pallida* in form, and is of nearly the same ground tint of colour; here, however, the resemblance ceases, it being entirely covered with a fine brown net-work, with two broad bands formed by a rich amalgamation of the net-work. The most striking feature of the shell is in the upper part of the whorls being vividly ornamented with a close-set row of undulating flames of rich brown running down from the sutures, and the enamelled lining of the aperture is of the same uniform rich brown. Of the two specimens just imported in H.M.S. Beagle, one is in the collection of Thos. Norris, Esq., of Redvalves; the other in that of J. Dennison, Esq., of Woolton Hill. There is a bad specimen of this Volute in the British Museum, and another in the collection of William Metcalfe, Esq.—*Proc. Zool. Soc.* Nov. 28, 1843.

ON THE GENUS VENILIA.

To Richard Taylor, Esq.

Newcastle, 12th April, 1844.

DEAR SIR,—Having learnt from our friend Professor E. Forbes that the name of *Venilia*, given to a new genus of *Nudibranchiata* described by Mr. Hancock and myself in the ‘Annals of Natural History’ for March last, has been previously used for a genus of bivalve shells in Morton’s ‘Synopsis of the Chalk Fossils of the United States,’ we propose changing the name of our genus to *Proctonotus*, and shall feel obliged by your announcing the alteration in your next number.

I am, dear Sir, yours very truly,

JOSHUA ALDER.

METEOROLOGICAL OBSERVATIONS FOR MARCH 1844.

*Chiswick*.—March 1. Cloudy and fine: rain at night. 2. Overcast: squally, with heavy showers. 3. Cloudy and windy: clear and fine. 4. Constant heavy rain throughout. 5. Cloudy: clear, with sharp frost at night. 6. Clear and frosty: overcast: slight frost. 7. Cloudy and cold. 8. Very fine. 9. Cloudy and mild. 10. Heavy rain. 11. Boisterous. 12. Very clear: stormy showers. 13. Clear: cloudy. 14. Heavy rain. 15. Rain: fine. 16. Slight haze: fine. 17. Overcast: boisterous. 18. Clear and cold. 19. Cloudy. 20. Rain. 21. Clear and fine. 22. Cloudy: rain at night. 23. Fine. 24. Cloudy: boisterous. 25. Overcast. 26. Very fine. 27. Overcast: hazy. 28. Very fine. 29. Dense fog. 30. Dry haze. 31. Slight haze: clear and fine: foggy at night.—Mean temperature of the month  $0^{\circ}1$  below the average.

*Boston*.—March 1, 2. Fine: rain early A.M. 3. Fine. 4. Fine: rain P.M. 5. Cloudy. 6. Fine: rain and snow P.M. 7. Cloudy. 8. Fine: rain P.M. 9. Cloudy. 10. Rain. 11. Windy: stormy day: rain P.M. 12. Windy: stormy day: rain and snow P.M. 13. Fine. 14, 15. Cloudy: rain A.M. 16, 17. Cloudy. 18. Fine. 19. Cloudy. 20. Rain. 21. Fine. 22. Cloudy. 23. Cloudy: rain early A.M. 24. Rain. 25. Cloudy: rain P.M. 26, 27. Cloudy. 28, 29. Fine. 30. Foggy. 31. Cloudy.

*Sandwick Manse, Orkney*.—March 1. Thaw: cloudy. 2. Rain: clear frost. 3. Cloudy: clear frost. 4. Snow-showers. 5. Snow: drift-showers. 6. Snow-showers: cloudy. 7. Bright: cloudy. 8. Rain: damp. 9. Rain: showers. 10. Bright: clear. 11. Showers: snow-showers. 12, 13. Snow-showers. 14. Bright: damp. 15. Bright: clear frost. 16, 17. Bright: cloudy. 18. Bright: damp. 19. Showers: rain. 20. Bright: cloudy. 21. Cloudy: rain. 22. Showers: clear. 23. Clear. 24. Bright: clear. 25. Drops: clear. 26. Clear: cloudy. 27. Bright: clear: aurora. 28. Clear: cloudy. 29. Clear: aurora. 30. Fine. 31. Mist: aurora.

*Applegarth Manse, Dumfries-shire*.—March 1. Heavy showers P.M. 2. Very slight rain. 3. Heavy rain. 4. Fair. 5. Slight shower: snow. 6. Frost A.M.: fine. 7. Frost. 8. Frost: snow: rain P.M. 9. Sharp showers: rain. 10. Clear A.M.: rain P.M. 11. Showers of sleet. 12. Frost: snow. 13. Frost: fine. 14. Rain P.M. 15. Sleet. 16. Frost: fair. 17. Frost: fine. 18. Frost: rain P.M. 19. Showery: sleet. 20. Frost: fine. 21. Rain: hail. 22. Fine. 23. Rain and hail. 24. Heavy rain. 25, 26. Fine. 27. Very fine: rain P.M. 28. Fine: frost. 29. Fine spring day. 30. Fine: frost. 31. Fine.

Mean temperature of the month .....	38°·8
Mean temperature of March 1843 .....	40·7
Mean temperature of twenty years .....	38·9
Mean temperature of spring-water .....	45·0





# THE ANNALS

AND

## MAGAZINE OF NATURAL HISTORY.

No. 86. JUNE 1844.

XLVI.—*Descriptions of several new or imperfectly-defined Genera and Species of Birds.* By H. E. STRICKLAND, M.A.

[With Four Plates.]

THE details of zoology are now diffused over so wide a field of literature, that it is next to impossible to pronounce with certainty that any given specimen belongs to an undescribed species; and although confusion is often caused by the too hasty and careless definition under new names of species previously described, yet, on the other hand, science may be retarded by too great backwardness in making known new species and groups. With this feeling I now venture to describe a few out of many species of birds which have long remained unnamed in my cabinet; and though it is very possible that some of them may be already described in works to which I have not had access, yet having searched carefully through a large number of ornithological publications without meeting with any notice of these species, I am disposed to believe that the majority of them are really nondescript.

### FALCONIDÆ, ACCIPITRINÆ.

Genus *ISCHNOSCELES*, Strickland (*ισχνοσκελής*, exilia habens crura).

Rostrum asturinum, subexiguum, elevatum, compressum, cera longiuscula, culmine satis curvato, dextro hamato, commissura subrecta, vix sinuata, dextrum versus subito deflexa, mandibula debili, denticulo obtuso versus apicem instructa, gonyde vix ascendente. Nares ovatae, obliquae. Alae mediocres, caudae trientem attingentes, rotundatae, remigibus graduatis, 5<sup>a</sup> et 6<sup>a</sup> longissimis. Cauda elongata, rotundata. Tarsi gracillimi, acrotarsiis paratarsiisque scutatis, scutis laevigatis, subobsoletis. Digniti graciles, digitus medius elongatus, *externus interno multum brevior*. Ungues curvati, acuti, subtus complanati, externus longe minimus, alii subaequales.

Typus *Ischnosceles gracilis* (Falco gracilis, *Temm. Pl. Col.* 91).

The slenderness of the tarsi in this bird, and the remarkable proportions of the toes, seem to justify its generic separation from *Astur* and from *Accipiter*, where it has been hitherto classed. The external toe (exclusive of the claw) falls short of the extre-

mity of the second phalanx of the middle toe, and the end of the inner toe is parallel with the middle of the third phalanx, while in most other Raptorial birds the outer toe is longer than the inner.

### SYLVIIDÆ, SAXICOLINÆ.

#### PRATINCOLA PASTOR, Strickl.

Le Pâtre, *Levaill. Ois. Af.* pl. 180.

*P. ptilosi* omnino *Pratincola rubicola* (Linn.), nisi uropygio, abdomine, caudæque tectricibus omnibus (etiam in femina) pure albis, pectore intense rufo.

*Hab.* In Africa meridionali.

Several authors have mentioned the common stonechat of Europe (*Pratincola rubicola*) as occurring in South Africa, but I believe that all the specimens which have been so considered will be found to belong to the present nearly allied species. It was first indicated as a distinct species by Levaillant, but as later writers have persisted in uniting it with *P. rubicola*, it has never yet received a systematic name. The plumage is identical with that of *P. rubicola*, except that the rufous of the breast is more intense, and the belly and upper and lower tail-covers in both sexes are uniform pure white. The dimensions are moreover rather larger than in *P. rubicola*.

Total length  $5\frac{1}{4}$  inches; beak to gape  $7\frac{1}{2}$  lines, to front 5 lines; wing  $2\frac{3}{4}$  inches; medial rectrices 2 inches 4 lines, external 2 inches 2 lines; tarsus 11 lines.

### TURDIDÆ, PITTINÆ.

#### PITTA CUCULLATA, Hartlaub. [Plate XI.]

*P. summo* capite ferrugineo, loris, mento, gutture, genis, auricularibus, nuchaque nigerrimis, dorso, scapularibus, remigibus tertialibus, tectricibusque dorso proximis obscure viridibus, tectricibus majoribus externis obscure viridi-cæruleis, minoribus et uropygio vivide lazulinis, remigibus primariis nigris, 1<sup>a</sup> et 2<sup>a</sup> macula alba mediana in latere inferiore, quatuor sequentibus utrinque similiter notatis; remigibus secundariis nigris, apicem versus in latere exteriori viridi-cæruleis; caudæ tectricibus superioribus nigris, plumis uropygii lazulinis obtectis, reetricibus nigris, apicibus obscure cæruleis. Pectus, venter et hypochondria pallide viridia, nitore cærulescente; abdomen, crissum, tectricesque caudæ inferiores coccinea, rostrum fuscum, pedes pallidi.

I had described and figured the above bird under the impression that it was a new species, when I found that it was already described by M. Hartlaub of Bremen in the 'Revue Zoologique,' 1843, p. 65. As however the species is rare in collections, the present delineation will make it better known. It inhabits Malacca.



*Pitta cucullata*: *Heerde*

*prob. linn. Linn. inq.*



The crown is deep ferruginous; the chin, throat and sides of the head deep black, forming a collar on the nape. Back, scapulars, tertials, and covers next the body dark green; the outward greater covers dark greenish blue, the lesser covers and rump bright glossy azure; primaries black, the first and second with a medial white spot on the inner web, the four next with a white bar crossing both webs; secondaries black, broadly margined externally with greenish blue towards their extremities. Upper tail-covers black, concealed by the blue feathers of the rump; tail black, tipped with greenish blue. Breast, upper belly and sides pale sea-green with azure reflections; abdomen, vent and lower tail-covers crimson. Beak fuscous, legs and claws pale.

Total length 7 inches; beak to gape 1 inch, to front 9 lines; wing 4 inches 2 lines; medial rectrices 1 inch 6 lines, external 1 inch 4 lines; tarsus 1 inch 4 lines.

### TURDIDÆ, PYCNONOTINÆ.

#### CRINIGER ? ICTERICUS, Strickl.

*C. corpore supra olivaceo-viridi, remigibus fuscis, extus ferrugineo-flavido, intus stramineo-marginatis, reatricibus olivaceo-viridibus, intus stramineo-marginatis, loris, superciliis, genis, corporeque toto inferno læte flavis, rostro pedibusque cinerascens.*

This bird differs from the type of *Pycnonotus* only in the beak and rictal bristles being somewhat longer. As it possesses nuchal bristles I refer it for the present to *Criniger*, Temm., though that character is common to most of the true *Pycnonoti*. In fact, there seems no very good ground for separating these two genera at all. The present bird resembles Brisson's description of his *Merula olivacea indica* (*Turdus indicus*, Gmel.), but its dimensions are considerably less. I believe it to have been brought from the East Indies, but do not know the precise habitat.

Upper parts olive-green; quills fuscous, margined externally with ferruginous yellow and internally with straw-colour, as are the rectrices. Lores, circuit of eye, and whole lower parts bright yellow, with a slight olive tinge on the breast. Beak and legs cinereous.

Total length 7 inches; beak to gape  $9\frac{1}{2}$  lines, to front  $7\frac{1}{2}$ ; rictal bristles  $\frac{1}{2}$  an inch; wings  $3\frac{1}{2}$  inches; medial and lateral rectrices  $3\frac{1}{4}$  inches; tarsus 8 lines.

#### PYCNONOTUS FINLAYSONI, Strickl.

*Brachypus Finlaysoni, Horsf. MSS.*

*P. fronte, genis guttureque flavis (plumarum scapis flavissimis); pileo olivascente-cinereo; loris nigris, dorso, alis, caudaque obscure olivaceis, remigibus reatricibusque extus olivaceo-flavescentibus, reatricibus lateralibus strictissime flavido terminatis; pectore et ab-*

domine cinereo-olivaceis, ventre imo crisso et alarum tectricibus infernis læte flavis. Rostrum pedesque corneo-brunnei.

I am not aware that this bird has been yet described, but as it has received from Dr. Horsfield the MS. name of *Finlaysoni*, I think it right to adopt that appellation. It is a typical *Pycnonotus*; the form of the beak agrees with that of *P. capensis*, and the feathers of the rump are very long and downy. It is probably from some of the Malasian islands, but I am unacquainted with the precise habitat.

Front, cheeks and chin yellow, brightest down the middle of each feather; lores velvety black. Upper parts obscure olive, grayish on the crown, and yellowish on the wings and tail; three or four pairs of lateral rectrices narrowly tipped with pale yellowish. Below dirty olive; lower belly, tail-covers and lower wing-covers bright yellow. Beak and legs corneous.

Total length  $6\frac{3}{4}$  inches; beak to gape  $7\frac{1}{2}$  lines, to front  $6\frac{1}{2}$  lines; wing 3 inches 1 line; medial rectrices  $3\frac{1}{4}$  inches, external 2 inches 10 lines; tarsus 9 lines.

#### PYCNONOTUS CROCORRHOU, Strickl.

Yellow-vented Flycatcher, *Brown, Ill. Zool.* pl. 31. f. 1.

*Muscicapa hæmorrhousa*,  $\beta$ , *Gm.*

*Turdus hæmorrhous*, *Horsf. in Linn. Trans.* vol. xiii. p. 147.

*Ixos hæmorrhous*, *Vigors in Raffles's Life*, p. 661.

*P. capite subcristato, facie, mento, nigerrimis; dorso alisque fuscis, marginibus pennarum pallidioribus, caudæ tectricibus superioribus albis; cauda fusco-nigricante, tenuiter albedo terminata; regione parotica alba; partibus infernis cinerascende-albidis, crisso læte aurantio-croceo. Rostrum pedesque nigri.*

This bird, which has been long known, requires a new specific name, being quite distinct from the true *Pycnonotus hæmorrhous* (Gmel.) of Ceylon, in which the vent is crimson. If we regard the genus *Pycnonotus* of Kuhl to be typified by *Turdus capensis*, Linn., we must refer to it all the species of *Hæmatornis*, Swains., and the present bird among the number. It closely agrees in form with *Pycnonotus capensis*, Linn., but is at once distinguished by the vent being orange instead of yellow, and by other characters.

This bird inhabits Java. The head and chin are black; back and wings dusky, with paler margins; rump white; tail black-brown, narrowly tipped with whitish; ears white; lower parts dirty white; under tail-covers bright saffron-colour; beak and legs black.

Total length  $7\frac{3}{4}$  inches; beak to gape 10 lines, to front  $7\frac{1}{2}$  lines; wing  $3\frac{3}{4}$  inches; medial rectrices 3 inches 7 lines, external 3 inches 5 lines; tarsus 10 lines.

## PYCNONOTUS FLAVIRICTUS, Strickl.

*P. striga superciliari a naribus excurrente, alteraque suboculari albis, loris nigris, macula in mandibulæ basi mentoque flavis; capite corporeque toto supra obscure olivaceis, remigibus secundariis re-  
trixibusque basin versus flavido-olivascens limbatis, hisce strictis-  
sime albido terminatis; corpore inferno cinerascens-albido, flavido  
palescente strigato, crisso pallide flavo. Rostrum pedesque cor-  
neo-brunnei.*

I purchased this bird from a dealer, who informed me it was from Madras. It is a typical *Pycnonotus*, with the rump-feathers very downy, nearly allied to *P. goiavier*, Scop. (*Muscicapa psidii*, *Gmel.*, *Turdus analis*, *Horsf.*), but is distinguished by the gonyes being slightly curved upwards, by the yellow rictal spot, &c.

A white superciliary streak from the nostrils is separated from one below the eye by the black lores. The tip of the chin and a spot at the base of the lower mandible are yellow. Upper parts obscure olive; secondaries and rectrices margined with yellowish olive, the latter narrowly tipped with whitish. Lower parts dirty white; feathers margined laterally with very pale yellow, producing a streaked appearance. Vent and lower tail-covers pale yellow.

Total length  $7\frac{1}{2}$  inches; beak to gape  $\frac{5}{4}$  of an inch, to front 7 lines; wing 3 inches 5 lines; medial rectrices  $3\frac{1}{4}$  inches, external 3 inches 1 line; tarsus 11 lines.

## HYPSSIPETES PHILIPPENSIS, Strickl.

*H. pileo cinereo-fusco, dorso alisque fusco-olivaceis, remigibus fuscis extus fusco-olivaceo limbatis, re-  
trixibus fuscis; genis gulaque  
fusco-ferrugineis, scapis pennarum albidis, pectore et abdomine  
olivascens-albidis, crisso albido. Rostrum pedesque corneo-fusci.*

This species agrees with the type of *Hypsipetes*, except in the tail being slightly rounded. It was brought by Mr. Cuming from Manilla. The feathers of the crown and chin are pointed. Three or four nuchal bristles project half an inch beyond the plumage. Rump-feathers downy.

Crown cinereous brown. Upper parts dark olive; remiges and rectrices fuscous, the former margined with olive; cheeks and chin obscure ferruginous, the shafts of each feather whitish. Lower parts dirty white with an olive tinge; lower tail-covers whitish. Beak and legs corneous.

Total length  $8\frac{1}{4}$  inches; beak to gape  $11\frac{1}{2}$  lines, to front 10 lines, height 3 lines, breadth  $3\frac{1}{2}$  lines; wing 3 inches 8 lines; medial rectrices 3 inches 6 lines, external 3 inches 4 lines; tarsus  $8\frac{1}{2}$  lines.

## MUSCICAPIDÆ, TYRANNINÆ.

SUIRIRI? ICTEROPHRYS (Vieill.). [Plate XII.]

Suiriri obscuro y amarillo, *Azara*.Muscicapa icterophrys, *Vieill*.

S. fronte, pileo, nucha et dorso toto olivaceo-viridi, alis fuscis, tectricibus omnibus large, remigibus secundariis tertiarisque stricte, cinerascete albido terminatis, caudæ tectricibus supernis fusco-olivaceis, cauda subfurcata, fusco-atra, rectricibus externis extus albido marginatis; linea superciliari læte flava a naribus oriente; loris plumisque paroticis olivaceo-fuscis; corpore toto inferno læte flavo. Rostrum pedesque atrii.

Inhabits Buenos Ayres.

Of the numerous species of American birds which have been classed in the genera *Tyrannula* and *Elania*, and which exhibit much variety in the modifications of the beak, the present one has that organ the most elongate; indeed it approaches in form the beak of the *Syblicoline* genus *Myiodiotes*, though the straight culmen, the comparatively short black tarsi, covered with seven or eight short scuta, the slender toes and sharp claws, show the true place of the bird to be among the *Tyranninæ*. I had intended making this the type of a new genus, under the name of *Satrapa* (*quasi* a petty tyrant), but perceiving that M. D'Orbigny has included it in his genus *Suiriri*, I retain that generic name for the present. M. D'Orbigny admits that it differs in its smaller head, more slender beak and longer tarsi from the *Suiriri* of Azara, no. 179, which is the type of his genus; but not having examined the latter bird, I am fearful of creating a new genus without sufficient reason. M. D'Orbigny's *second* species of *Suiriri* belongs to Gould's genus *Pyrocephalus*, a very distinct form from the present bird.

Above olive-green, beneath bright yellow; wings dusky, the covers broadly, the secondaries and tertiaries narrowly, edged with grayish white. Tail very dark brown, outer rectrices margined externally with whitish. A bright yellow streak from the nostrils over the eye. Lores and ear-covers dusky olive. Beak and legs black.

Total length  $6\frac{1}{4}$  inches; beak to gape 8 lines, to front 6 lines, width  $2\frac{1}{2}$  lines, height 2 lines; wing  $3\frac{1}{4}$  lines; medial rectrices  $2\frac{1}{2}$  inches, external  $2\frac{3}{4}$  inches; tarsus 9 lines; middle toe and claw  $8\frac{1}{2}$  lines, hind ditto 6 lines; outer toe slightly longer than the inner.

EUSCARTHMUS CINEREUS, Strickl.

*E.* capite supra nigro, plumis medianis basin versus albis, dorso cinereo, in uropygio dilutiore, tectricibus minoribus cinereis, mediis et majoribus fusco-nigris, cinereo terminatis; remigibus fusco-





*prol. lach. Linn. imp.*

*Suiriri ? ictrophys. Vieill.*







*pro. Strick. Linn. imp.*

*Holoenemis flammatum Strickl.*

nigris, tertiariis cinereo limbatis; reatricibus fusco-nigris; gula pectoreque dilute cinereis, abdomine crissoque albidis. Rostrum pedesque atro-fusci.

Inhabits Chili.

Beak slightly broader than in *E. parulus* (Kittlitz), and proving the affinity of this genus to *Tyrannula*. Feathers of the crown rather lengthened, forming a crest.

Crown black, with a concealed white vertical spot. Upper parts gray, palest on the rump; middle and greater wing-covers dusky black, tipped with gray; remiges dusky, tertials margined with gray; tail dusky black; chin, throat and breast pale gray; belly and lower tail-covers nearly white; beak and legs blackish.

Total length 4 inches; beak to gape 6 lines, to front 4 lines; wing 2 inches 2 lines; medial rectrices 2 inches, external 1 inch 10 lines; tarsus 8 lines.

#### LANIIDÆ, FORMICARIINÆ\*.

Genus HOLOCNEMIS, Strickl. (ὄλος, integer, κνημῖς, ocrea.)

Rostrum elongatum, ad basin subdepressum, apicem versus subcompressum, mandibulis juxta apicem leviter emarginatis. Culmen rectus, dextro deflexo; commissura recta, ad apicem deflexa, gonyes elongata, subrecta, leviter ascendens. Vibrissæ nullæ. Nares ovatæ, nudæ, a plumis lori subremotæ. Alæ mediocres, rotundatæ, remige 4<sup>a</sup> vel 5<sup>a</sup> longissima, remige 1<sup>a</sup> dimidio brevior. Cauda subbrevis, rotundata. Tarsi elongati, acrotarsiis et paratarsiis integris. Digiti sublongi, graciles; externus phalange prima ad medium annexus.

The two birds which I propose to distinguish under the above generic name are distinguished from the genera *Formicivora*, Swains., and *Myrmeciza*, Gray, by the elongate beak, short tail, and entire acrotarsus; the latter character, as well as their greater length of tail, distinguishes them from *Urotomus*, Swains., and the greater freedom of the external toe separates them from *Pithys*, Vieill. Possibly the present genus may be referable to *Leptorhynchus*, Menetries; but as the latter name is preoccupied, *Holocnemis* may in that case take its place.

#### HOLOCNEMIS FLAMMATA, Strickl. [Plate XIII.]

*H.* corpore supra olivaceo-fusco, alis fuscis, tectricibus omnibus olivaceo limbatis, scapis et gutta subtriquetra apicali albis; remigibus olivaceo limbatis; cauda obscure fusca, reatricibus obtuse acuminatis, lateralibus albidis stricte terminatis; gula alba; genis et partibus infernis pallide olivaceis, litura in singulis plumis longi-

\* In this subfamily I include the genus *Thamnophilus*, as it cannot possibly be separated from the American Ant-thrushes in any natural arrangement.

tudinali acuminata (in pectoris plumis latissima), alba. Rostrum albidum, maxillæ basi fusca, pedes unguesque albi.

Habitat unknown, though doubtless American.

The middle toe and claw are about equal in length to the tarsus; hind toe shorter; outer toe slightly longer than the inner. Claws considerably developed, compressed, moderately curved.

Above olive-brown; wings fuscous, the covers edged with olive, and with the shafts and a subtriangular terminal spot white. Remiges fuscous, margined with olive; tail dark fuscous, the feathers obtusely pointed, the external ones slightly tipped with whitish. Throat white; cheeks and lower parts pale olive-brown, each feather with a pointed white streak, very broad on the breast and narrowest on the sides. Beak whitish, basal half of upper mandible brown; legs and claws very pale yellowish white.

Total length  $5\frac{1}{4}$  inches; beak to gape 1 inch 1 line, to front 10 lines, breadth  $3\frac{1}{2}$  lines, height 3 lines; wing 2 inches 10 lines; medial rectrices  $2\frac{1}{2}$  inches, external  $1\frac{3}{4}$  inch; tarsus 11 lines; middle toe and claw 11 lines, hind ditto 8 lines.

#### Holocnemis cinnamomea (Gm.).

*Turdus cinnamomeus*, Gm. *Pl. Enl.* 560. f. 2.

*H.* fronte, pileo, dorso toto caudaque tetricibus supernis rufo-ferrugineis, tetricibus alarum nigris, minoribus albo-, mediis majoribusque ochraceo-, terminatis, remigibus rectricibusque fuscis, extus fusco-ferrugineo marginatis; linea superciliari albo a naribus ad pectoris latera descendente et abdomine albo confluyente; loris, oculorum ambitu, genis, gula et pectore toto nigerrimis, hypochondriis crissoque ferrugineis. Rostrum pedesque cornei.

Taking *H. flammata* as the type of *Holocnemis*, the present bird is somewhat aberrant, the tail being rather longer and more rounded, the tarsi longer, the lateral toes equal, and the claws shorter and less curved. The style of plumage bears much resemblance to *Myrmeciza loricata* (Licht.), and to *Urotomus? formicivorus* (Gmel.)

The upper parts are deep ferruginous; wing-covers black, the lesser tipped with white, and the middle and greater with ochraceous, forming two bars; remiges and rectrices fuscous, margined with ferruginous. A narrow white line commences at the nostrils, and descending the side of the neck and breast blends into the white of the abdomen. The whole space inclosed by this white line is deep black. Sides and lower tail-covers ferruginous. Beak and legs corneous.

Total length  $5\frac{1}{2}$  inches; beak to gape 1 inch, to front 10 lines; breadth 3 lines, height  $2\frac{1}{2}$  lines; wing 2 inches 7 lines; medial rectrices  $2\frac{1}{4}$  inches, external  $1\frac{3}{4}$  inch; tarsus 1 inch; middle toe and claw  $\frac{3}{4}$  of an inch, hind ditto  $7\frac{1}{2}$  lines.

## MYRMECIZA MELANURA, Strickl.

*M. capite, nucha, dorso, alisque obscure ferrugineo-fuscis, uropygio obscuriore, cauda fusco-atra, loris fusco-cinerascentibus, gula albida, pectore et abdomine dilute fuscis, rufescente tinctis, crisso fuliginoso-atro. Maxilla pedesque fusci, mandibula albida.*

In the form of the beak and general proportions this species agrees with *M. leuconota*, Spix, Av. Braz. vol. ii. pl. 39. f. 2 (*Drymophila atra*, Swains.). The acrotarsia are divided into five scuta, the paratarsia entire. Habitat unknown.

Upper parts dull ferruginous brown, darker on the rump; tail dusky black; lores dusky cinereous; throat whitish; breast and belly pale rufous brown, sides darker; lower tail-covers sooty black; upper mandible and legs brown, lower mandible whitish.

Total length 7 inches; beak to gape 10 lines, to front 8 lines; wing 3 inches; medial rectrices 3 inches, external  $2\frac{1}{4}$  inches; tarsus 1 inch 1 line; middle toe and claw 1 inch, hind ditto 8 lines; outer ditto  $8\frac{1}{2}$  lines, inner ditto  $7\frac{1}{2}$  lines.

## LANIIDÆ? TIMALIINÆ.

In this group I would include the genera *Timalia*, *Brachypteryx*, *Malacopteron*, Eyton (*Trichostoma*, Blyth), *Macronus*, Jard., and several of the East Indian "*Myiothera*" of Temminck. We do not know enough of their habits to decide whether they are most allied to the *Formicariinæ* or to the *Malurinæ*; all that can be said of them is, that they form a natural group inhabiting the Malasian region, and that they appear to approach the *Laniidæ* in structure sufficiently to warrant their collocation for the present in that family. Mr. Eyton's genus *Malacopteron* exhibits this *Lanine* structure to the greatest degree, the beak being precisely that of a *Thamnophilus*, with the addition of strong rictal bristles.

I now proceed to describe an apparently new species,

## MALACOPTERON MACRODACTYLUM, Strickl.

*M. capite, nucha et dorso superiore rufo-brunneis, plumis fusco marginatis, uropygio alis, caudaque fusco-ferrugineis, hac obscuriore, loris albidis, genis fuscis, mento gulaque albis, plumis fuliginoso terminatis, abdomine obscure albido, hypochondriis et crisso dilute rufo-brunneis, rostro pedibusque fuscis, digito medio laterales multum superante.*

Agrees with Mr. Eyton's type-species, *M. magnum*, in the form of the beak, wings and tail, in the scale-like structure of the coronal feathers, and the loose downy plumage of the rump, but differs in the greater strength of the hind toe and the remarkable length of the middle one. The lateral toes are equal, and the bases of their claws are parallel with the distal end of the

second phalanx of the middle toe, their extremities reaching about two-thirds the length of its third phalanx. The claws are less curved than in *M. magnum*, that of the middle toe being nearly straight. My specimen was brought from Malacca.

The feathers of the crown and upper back are rufous brown, margined with dusky; rump, wings and tail ferruginous brown, the last darkest. Lores white; cheeks fuscous; chin and throat white, the feathers of the latter largely terminated with sooty black. Lower parts dirty white; sides and lower tail-covers pale rufous brown. Beak and legs horn-coloured.

Total length  $6\frac{1}{4}$  inches; beak to gape 1 inch, to front  $\frac{3}{4}$  of an inch, breadth 4 lines, height 3 lines; wing  $3\frac{1}{4}$  inches; medial rectrices  $2\frac{1}{2}$  inches, external 2 inches 4 lines; tarsus 1 inch 2 lines; middle toe and claw 1 inch 2 lines, hind ditto 10 lines, lateral ditto  $8\frac{1}{2}$  lines.

#### FRINGILLIDÆ, PLOCEINÆ.

##### SPERMOPHAGA MARGARITATA, Strickl. [Plate X.]

*S. fronte, capite summo, nucha, dorso, alisque obscure ferrugineis, unicoloribus; primariis intus fuscis; caudæ tectricibus supernis, rectricumque marginibus externis obscure vinaceo-rubris; rectricibus in reliqua parte nigris; loris, superciliis, genis, gutture, pectoreque vinaceo-rubris; partibus reliquis infernis nigerrimis, pectus versus et ad latera maculis magnis rotundis caryophyllaceis (binis in singulis pennis) punctatis. Rostrum nitide cyaneum, pedes (exsiccati) albid.*

This beautiful little bird was purchased at Cape Town, and was said to have been brought from Madagascar. The beak is less developed than in *Spermophaga hæmatina*, Vieill., and the first quill is barely one-third the length of the fourth, fifth and sixth (which are equal), but in other respects it accurately accords with the type of *Spermophaga*. The arrangements of its colours show its affinity to *S. guttata*, Vieill., and the peculiar blue colour of the beak is common to both, as well as to *S. hæmatina*, Vieill., the specific distinctness of which from *S. guttata* is at present undecided.

Mr. G. R. Gray has changed Mr. Swainson's name *Spermophaga* to *Spermospiza*, because the name *Spermophagus* is already used in entomology; but as I am by no means prepared to concede that mere *similarity* affords a sufficient ground for cancelling generic names, I have retained Mr. Swainson's appellation.

The whole upper parts of this bird are rich ferruginous brown, except the quills, which are dusky within; the upper tail-covers and outer margins of the rectrices dull vinous red, and their inner webs and apical portions black. The circuit of the eyes, cheeks,





*prohib. linn imp*

*Spermophaga margaritata: Strickl.*



throat and breast pale claret-red, rest of lower parts deep black, spotted next the breast and on the sides with large pearl-like spots the colour of peach-blossom, of which two are placed transversely and subterminally on each feather.

Total length  $4\frac{3}{4}$  inches; beak to gape  $5\frac{1}{2}$  lines, to front 5 lines; width  $2\frac{1}{2}$  lines, height 3 lines; wing 2 inches 1 line; medial rectrices 2 inches, external  $1\frac{3}{4}$  inch; tarsus  $7\frac{1}{2}$  lines; middle toe and claw 7 lines, external 5 lines, internal 4 lines, hind 5 lines.

## FRINGILLIDÆ, TANAGRINÆ.

## TACHYPHONUS SAUCIUS, Strickl.

*T. corpore toto atro-chalybeo, tectricibus alarum supernis minoribus juxta humerum albis, juxta carpum sanguineis, infernis omnibus albis. Rostrum nigrum, mandibula medio alba, pedes nigri.*

Allied to *Tachyphonus nigerrimus*, Gm., but differs in the smaller size, shorter beak, and sanguineous spot near the carpus. I presume it to inhabit Columbia or Central America.

Entirely black, with a purplish gloss, except the lesser wing-covers next the humerus, which are white and pass into bright orange-red as they approach the carpus. Lower wing-covers white. Beak black, middle of lower mandible whitish; legs black.

Total length  $5\frac{1}{2}$  inches; beak to gape 7 lines, to front 6 lines; wing  $2\frac{3}{4}$  inches; medial rectrices  $2\frac{3}{4}$  inches, external  $2\frac{1}{2}$  inches; tarsus 9 lines.

## TACHYPHONUS RUFICEPS, Strickl.

*T. fronte, mento summo, loris, oculorumque ambitu nigris, capite toto reliquo gulaque intense rufo-castaneis, corpore toto plumbeo-cinerascenti, alis caudaque obscurioribus. Rostrum nigro-cinereum, tomis albidis, pedes brunnei.*

The upper mandible is smaller than the lower, somewhat like that of an *Emberiza*, but the culmen is more arched. It agrees however sufficiently with the structure of *Tachyphonus quadricolor*, Vieill. (*T. auricapillus*, *Spix*) to warrant its collocation in the same genus. I am unacquainted with the habitat.

Front, lores, upper chin and circuit of eyes black; head, cheeks and throat deep chestnut-red; rest of plumage leaden gray, passing to fuscous on the wings and tail. Beak blackish, margins of mandibles whitish; legs brown.

Total length  $5\frac{1}{2}$  inches; beak to gape 7 lines, to front 6 lines; wings  $2\frac{1}{2}$  inches; medial rectrices  $2\frac{1}{2}$  inches, external  $2\frac{1}{4}$  inches; tarsus 10 lines.

## CALLISTE THALASSINA, Strickl.

*C. capite cyaneo, loris et oculorum ambitu nigris, mento summo*

genisque thalassino-*viridibus*, collo toto et gula nigris; dorso, scapularibus, caudæque tectricibus supernis cyaneis, nitore thalassino, tectricibus alarum minoribus intense cæruleis, mediis, majoribus, remigibusque secundariis nigris, viridi-thalassino marginatis; primariis, reatricibusque nigris cæruleo limbatis, pectore, abdomine crissoque albis, thalassino imbutis. Rostrum nigrum, pedes cinerei.

A typical *Calliste*, believed to be brought from Mexico. It is nearly allied to *Tanager nigroviridis*, Lafr., Mag. Zool. pl. 43, but that has more of yellow and green and less of blue in its plumage than the present bird.

Head pale azure; chin and cheeks vivid sea-green; lores and eyelids black; circuit of the neck black; back, scapulars and upper tail-covers pale blue, with a gloss of sea-green. Lesser wing-covers deep vivid blue; middle and greater covers and secondaries black, margined with sea-green; primaries and tail black, margined with blue; lower parts white, with a delicate gloss of sea-green and azure. Beak black, legs cinereous.

Total length  $4\frac{3}{4}$  inches; beak to gape 6 lines, to front 5 lines; wing 2 inches 7 lines; medial and external rectrices 2 inches; tarsus  $7\frac{1}{2}$  lines.

NEMOSIA FULVESCENS, Strickl.

*N. capite toto supra aurantio, loris gulaque flavis, corpore supra cinereo-olivascenti, remigibus reatricibusque obscurioribus, corpore inferno dilute fulvescenti, abdomine albedo. Rostrum cinereum, tomis albidis; pedes fusco-cinerei.*

Allied to, but sufficiently distinct from, *Nemosia ruficapilla*, Vieill., Gal. Ois. pl. 164.

Inhabits Brazil?

Head orange, passing into yellow on the lores and throat; upper parts grayish olive, darker on the wings and tail; lower parts pale fulvous or cream-colour, almost white on the belly. Beak cinereous, margins whitish. Legs dark cinereous.

Total length  $5\frac{3}{4}$  inches; beak to gape 6 lines, to front 5 lines; wing 2 inches 7 lines; medial rectrices 2 inches 7 lines, external 2 inches 5 lines; tarsus  $9\frac{1}{2}$  lines.

EMBERNAGRA LONGICAUDA, Strickl.

*E. linea a naribus ad oculos, horumque ambitu albis, corpore toto supra, alis, caudaque cuneata viridi-olivaceis, scapis in vertice nigris; loris, genis lateribusque colli olivaceo-cinereis, pectore dilute cinerascenti, gula abdomine, crissoque dilute fulvis, maxilla fusca, mandibula flavida, pedibus brunneis.*

Inhabits South America.

Closely allied to *Embernagra platensis*, Gmel. (*Emberiza pla-*

tensis, *Gmel.*, *Azara*, no. 90), but differs in the lower mandible being yellowish instead of orange, the white line over the eye, the longer and more cuneate tail, and the shorter tarsus and claws.

A white line from the nostrils surrounds the eye. Upper parts greenish olive, brightest on the wings and tail; shafts of the feathers on the crown black. Lores, cheeks and sides of neck olive-gray. Lower parts pale fulvous, tinged with gray on the breast. Upper mandible fuscous, lower yellowish; legs pale brown.

Total length  $8\frac{1}{4}$  inches; beak to gape 9 lines, to front 8 lines; wing 3 inches; medial rectrices 4 inches, external  $2\frac{1}{2}$  inches; tarsus 1 inch; middle toe and claw 11 lines, hind ditto  $8\frac{1}{2}$  lines.

ORTHO GONY S, Strickl. (*ὀρθὸς*, rectus, *γωνὺς*, gony s.)

Rostrum elongatum, compressiusculum, culmine obtuse carinato, a basi ad apicem curvato, commissura satis decurvata, tomiis paulo inflexis, maxilla vix emarginata, gonyde rectissima, nec ascendente. Nares ovatae subbasales, pilis raris frontalibus tectae. Alae mediocres, remigibus 2, 3, 4, subaequalibus, 1<sup>a</sup> paulo brevior. Cauda mediocris, rotundata. Tarsi subbreves, acrotarsiis scutellatis, paratarsiis integris; digiti mediocres, externus internum paulo superans, ungues satis curvati, acuti.

The general habit of this bird suggests the idea of a *Tanager* form, but it is distinguished from all the genera which I know by its elongate beak, much curved culmen, and perfectly straight gony s. The beak is somewhat like that of *Lamprotes*, but is not so high and compressed.

ORTHO GONY S VIRIDIS (Spix).

*Tanagra viridis*, *Spix*, *Av. Braz.* pl. 48. f. 2.

*O.* genis et corpore supra olivaceo-viridi unicolore, subtus laete flavo, pectore et hypochondriis olivaceo tinctis, rostro nigro, pedibus brunneis.

Inhabits Brazil.

Body wholly olive-green above, beneath yellow, tinged with olive on the breast and sides. Beak black; legs light brown.

Total length 8 inches; beak to gape 10 lines, to front 9 lines, breadth and height  $3\frac{1}{2}$  lines; wing  $3\frac{3}{4}$  inches; medial rectrices  $3\frac{1}{2}$  inches, external 3 inches 2 lines; tarsus 10 lines; middle toe and claw 10 lines, hind ditto 8 lines.

XLVII.—*Catalogue of Irish Entozoa, with observations.* By O'BRYEN BELLINGHAM, M.D., Fellow of and Professor of Botany to the Royal College of Surgeons in Ireland, Member of the Royal Zoological, Geological and Natural History Societies of Dublin, &c.

[Continued from p. 340.]

Genus 12. *DISTOMA*.

(Derived from *δῖς*, *bis*, and *στόμα*, *os*.)

Body soft, flattened, sometimes nearly or quite cylindrical, without articulations, provided with two more or less circular pores or orifices; one of which is anterior and terminal, the other ventral.

THE genus *Distoma* was established by Linnæus under the name of *Fasciola*; this was adopted by Müller and Gmelin: subsequently it was changed to *Planaria* by Goetze; but the term *Distoma*, proposed by Retzius, is now universally adopted. The genus *Distoma* contains a very large number of species, 162 being enumerated by Rudolphi in his 'Synopsis,' of which 39 are doubtful. They are more common in fish and birds than in any other class of animals, and they usually inhabit the alimentary canal.

The anterior pore in the genus *Distoma* is subservient to the process of nutrition; the digestive apparatus commences at it and soon divides into two canals, which pass backwards, running parallel to one another, near the centre of the body, towards the caudal extremity, where they terminate. The ventral pore is subservient to the process of generation; the organs of reproduction consist of ovaries, convoluted spermatie tubes, a receptacle (considered from analogy to be a uterus), and a penis. The ovaries are much branched, occupy the circumference of the body, uniting upon each side into two principal trunks, which communicate with one another, and terminate in a receptacle, from which a slender tube leads to the ventral orifice. The penis is often seen projecting a little in front of this orifice. There is said to be no anal orifice, but upon several occasions I have seen what appeared to be an orifice, terminating the caudal extremity.

The species of the genus *Distoma* being numerous, and often of minute size, are in many cases with difficulty distinguished from one another. They have been arranged by Rudolphi in two divisions: in one the head, neck, or body is armed with minute spines; in the second these parts are naked or unarmed. They are further subdivided as the body is flattened or cylindrical; and again, as the anterior or the ventral pore is the larger. The latter is perhaps an unfortunate character upon which to found specific distinctions, as the size of the pores varies when the animal is alive, and may have somewhat a different shape then from what it has

after the specimens have been preserved in spirits of wine for some time. Upon the whole, however, the relative size and shape of the pores appear to be almost the only characters by which many species can be distinguished from each other; and if it were understood that this character was to be taken from the animal which had been preserved in spirits (not from the recent animal), it would help to prevent confusion.

#### A. INERMIA.

##### a. *Plana vel depressa.*

##### *Poro ventrali majore.*

- |    |                               |   |
|----|-------------------------------|---|
| 1. | <i>Distoma hepaticum</i> * .. | Liver of sheep ( <i>Ovis Aries</i> ).   |
| 2. | ———— <i>tumidulum</i> ..      | Intestine of pipe-fish ( <i>Syngnathus Acus</i> ).  |
| 3. | ———— <i>oxycephalum</i> †     | { Small intestine of teal ( <i>Anas Crecca</i> ).<br>Small intestine of shoveller ( <i>Anas Clypeata</i> ). |
| 4. | ———— <i>fulvum</i> . . . .    |   |

\* The *Distoma hepaticum* has been longer known than any other species of the genus; under the name *Fasciola hepatica* it is mentioned by Pennant and Turton as a British species. It inhabits the biliary ducts of the sheep, in which it is not at all uncommon, and sometimes occurs in considerable numbers. It has been found also in the ox, the horse, goat, hare and stag; and is said to occur in the human subject, but I am not aware of any well-authenticated case in which it has been detected. It does not occur in healthy sheep; at least the liver of the animals in which it occurs have always a diseased appearance, are irregular and knotted upon the surface, and the biliary ducts are enlarged, sometimes to a considerable extent. It accompanies the disease known under the name of the *rot*, and will be always found in the liver of the animals which die of it.

† On two occasions I found numerous specimens of the *Distoma oxycephalum* in the small intestines of the common shoveller (*Anas Clypeata*); they are about 2 lines in length, colour white, body flattened (not exactly linear, as Rudolphi states), half a line in width, tapering gradually towards the posterior extremity, which is pellucid; the anterior extremity is very narrow; the anterior pore is extremely small, orbicular, and rather inferior than terminal; the ventral pore is very large in comparison, orbicular, and prominent with a tumid margin. The ovaries occupy each side of the body posterior to the ventral pore.

The specimens of *D. oxycephalum* from the teal resemble those last described, but the body is rather subcylindrical than flat; they are between 3 and 4 lines in length; the ventral pore is large, seated near the anterior pore, and the body has the greatest diameter at this part. The posterior extremity is obtuse, and appears to have a very short appendage projecting from it.

*Poro antico majore.*

5. *Distoma clavigerum* \*. Small intestine of frog (*Rana temporaria*).

*Poris æqualibus.*

- [6. *Distoma flexuosum* †. Small intestine of mole (*Talpa europæa*).]

*β. Teretiuscula.**Poro ventrali majore.*

7. *Distoma cylindraceum* ‡. Lungs of frog (*Rana temporaria*).  
 8. ——— *varicum* §. . . . Stomach of salmon (*Salmo Salar*).  
 9. ——— *gibbosum* ? . . Stomach of haddock (*Gadus Æglefinus*).

\* The *Distoma clavigerum* is rather a rare species; I have only met with it once, although I have examined a large number of the *Rana temporaria*. The animal when alive, and fully extended, measured upwards of 2 lines in length (Rudolphi says it does not exceed one line), when contracted about one line; and at the widest part (about the centre of the body) it is half a line in width; it is nearly equally attenuated at each extremity. After remaining in spirits of wine the dorsal surface became convex, and the animal acquired a somewhat elliptical shape, but was still a little wider anteriorly than posteriorly.

† The mole is not a native of this country, consequently the *Distoma flexuosum* is not an Irish entozoon; but as it must take its place among British species, I have allowed it to remain in this list.

‡ The *Distoma cylindraceum* is very common in the lungs of the frog; it is found about the base of these organs, and is sometimes accompanied by the *Ascaris nigrovenosa*. The body is thick, cylindrical, and of a dark colour in some places, owing to the transparency of the parietes, and the nature of the contents of the alimentary canal or ovaries; it becomes opaque when kept in spirits of wine. They live for a short time in cold water, and move sluggishly, contracting and enlarging the pores; sometimes, after remaining in water for a short time, they discharged a quantity of a dark-coloured fluid from the anterior pore; and on some occasions I have found them adhering by the anterior pore to the parts in which they are contained.

§ The *Distoma varicum* appears to be common in salmon from some localities and in some seasons, and rare in others; it inhabits the stomach and the intestinal canal near the stomach. Its length is about half a line, but this varies according to the motions of the animal; when fully extended it is nearly equally attenuated at each extremity: its colour is white, but the contents of the ovaries give the part of the body in which they are contained a reddish yellow tinge. The anterior pore is circular and small; the ventral pore very large, the whole width of the body, and its margin becomes prominent soon after the animal is placed in water.



10. *Distoma appendiculatum*\* { Stomach of sturgeon (*Acipenser Sturio*).  
Stomach of sand-eel (*Ammodytes Lancea*).
11. ——— *rufoviride*. Stomach of conger-eel (*Anguilla Conger*).
12. ——— *globulus*. . Small intestine of wild swan (*Cygnus ferus*).
13. ——— *reflexum*? † (Creplin). { Intestine of lump-sucker (*Cyclopterus Lumpus*).

*Poro antico majore.*

14. *Distoma excisum*. Stomach of mackerel (*Scomber Scomber*).

## B. ARMATA.

*Echinata.*

15. *Distoma trigonocephalum* ‡. { Small intestine of hedge-hog (*Eri-  
naceus europæus*).<sup>1</sup>

\* The *Distoma appendiculatum*, from the stomach of the sand-eel (*Ammodytes Lancea*), is about a line in length; colour white, except about the centre of the body, where it has a yellowish red tinge. The body is cylindrical, and varies in shape as the animal is fully extended, or as the caudal extremity is retracted; when this part is retracted the caudal extremity is wider than the anterior, but when fully protruded it is much more attenuated. In some of the specimens which I examined, the caudal extremity was fully retracted, in others fully protruded, and in some only partially retracted; hence they might easily be taken for distinct species. The pores are circular, seated near each other; the ventral the larger, and slightly prominent.

† The *Distoma* from the intestinal canal of the *Cyclopterus Lumpus* resembles the *D. reflexum* of Creplin; it is about three-quarters of a line in length; colour white; body cylindrical, nearly of the same diameter throughout. The anterior pore is small and circular; the ventral large and prominent, its orifice circular. The neck (or the space between the anterior and the ventral pore) is rather convex on the dorsal surface and concave upon the abdominal; it is narrow anteriorly, and becomes wider as it approaches the ventral pore. The ovaries appear to be full of ova.

‡ The *Distoma trigonocephalum*, which inhabits the small intestine near the stomach of the hedge-hog, is rather a rare species. It is about  $\frac{1}{2}$  a line in length, and of a dirty reddish colour after remaining in spirits of wine; body flattened, wider anteriorly than posteriorly, and curved. The anterior pore is somewhat elliptical, not looking forwards; the ventral pore is orbicular, and situated nearer the anterior than the posterior extremity of the body.

- |     |                              |   |
|-----|------------------------------|---|
|     |                              | Small intestine of swan ( <i>Cygnus Olor</i> ).   |
|     |                              | Rectum of wild swan ( <i>Cygnus feras</i> ).  |
|     |                              | Small intestine of golden-eye ( <i>Clangula chrysophthalmos</i> ).                          |
| 16. | <i>Distoma echinatum</i> *   | Rectum and cæca of widgeon ( <i>Mareca Penelope</i> ).                                      |
|     |                              | Small intestine and rectum of crested grebe and tippet grebe ( <i>Podiceps cristatus</i> ). |
| 17. | ———— <i>militare</i> . . . . | Rectum of curlew ( <i>Numenius arquata</i> ).   |
|     |                              | Small intestine of golden eye ( <i>Clangula chrysophthalmos</i> ).                          |
| 18. | ———— <i>spinulosum</i> †.    | Small intestine of black-headed gull ( <i>Larus ridibundus</i> ).                           |
|     |                              | Small intestine of curlew ( <i>Numenius arquata</i> ).                                      |

\* The *Distoma echinatum*, from the small intestine of the golden-eye (*Clangula chrysophthalmos*), is flattened, nearly 3 lines in length; colour dirty white, particularly about the situation of the ovaries, which occupy the sides of the body, and appear to contain numerous ova. Immediately on being placed in water they became convex on the dorsal surface, and concave upon the abdominal surface. The head is subreniform, armed with a ring of distinct spines; neck rather long, concave inferiorly; anterior pore very small and terminal, ventral large and prominent; both orbicular. In one specimen, a short and conical cirrhus projected a little anterior to the ventral pore.

The specimens of *Distoma echinatum* from the rectum of the wild swan which I have found, are in some cases 6 or 7 lines in length, in others not more than 2 lines; the majority belong to the latter; and there are none of an intermediate length, though both apparently belong to the same species. The body is more cylindrical than in the specimens from the golden-eye; the pores are distinct and circular, seated near each other, the ventral being the larger. The head is small and armed with spines; the neck is convex upon the dorsal, and concave upon the abdominal surface.

My specimens of *Distoma echinatum* from the rectum and cæca of the widgeon have a greater length and transverse diameter than those from which Rudolphi took his description; the head is also smaller in proportion to the body, and is armed with more numerous spines than are represented in Bremser's figure of this species.

† The *Distoma spinulosum*, from the golden-eye (*Clangula chrysophthalmos*), is little more than a line and a half in length; colour perfectly white; flat and linear before being immersed in spirits of wine, becoming rather cylindrical afterwards. The head is small, armed with minute spines; neck conical and long, about half the width of the body, and one-third of its length. The body is pretty

19. *Distoma scabrum*. . . . { Intestine of whiting-pollach (*Merlangus*  
*Pollachius*).
20. ——— *contortum* \* . . . Gills of sun-fish (*Orthogoriscus Mola*).
21. ——— *nigroflavum* † { Intestine of sun-fish (*Orthogoriscus*  
*Mola*).

*Species dubiæ.*

22. *Distoma*. . . { Small intestine of great black-backed gull (*Larus*  
*marinus*).
23. ——— . . . Small intestine of scoter (*Oidemia nigra*).
24. ——— †. Rectum and cæca of tame swan (*Cygnus Olor*).

nearly of the same diameter throughout; the anterior pore is very small, the ventral larger and prominent, the aperture circular; pores rather distant from one another:

\* In the month of July 1839, I found a large number of the *Distoma contortum* on the gills of a fine specimen of the sun-fish (*Orthogoriscus Mola*), which is now in the collection of the Natural History Society of Dublin. The longest measures 10 or 11 lines in length; colour white anteriorly, yellowish red posteriorly. The body is cylindrical, its greatest diameter being immediately behind the ventral pore, from which it gradually diminishes towards the caudal extremity. All the specimens soon became curved after being removed from the animal; indeed it is from this circumstance that Rudolphi gave the species its name. The anterior pore is small and circular; the ventral large and elliptical or circular; in some this organ is seated upon a peduncle fully the length of the neck. The neck measures nearly 3 lines in the longest specimens; it is convex upon the dorsal, and concave upon the ventral surface; it, as well as the head, is armed, particularly upon the convex surface, with a number of minute spines, which are not seen posterior to the ventral pore. The ova are very small, exceedingly numerous, and of a yellow colour; they appear to be the cause of the colour in the posterior division of the body.

† In the intestinal canal of the same sun-fish, I found several specimens of a *Distoma* which has the characters of the *Distoma nigroflavum* of Rudolphi, but I could not see the aculei upon the head or neck. The longest specimen measures an inch and a half; the majority are about three-quarters of an inch in length; colour in one part black, in another yellowish; head white. The ventral pore is pedunculated, the peduncle being sometimes as long as the neck (which gives this species a resemblance to the *Distoma furcatum*). The body is cylindrical, slender, nearly of the same diameter throughout; the integument flaccid.

‡ This *Distoma*, of which I found many specimens in the cæca and rectum of a swan (*Cygnus Olor*), is a very beautiful species, and does not appear to have been previously described. It approaches most closely to the *Distoma echinatum* of Rudolphi, but differs in several

25. *Distoma*. . . Rectum of tippet grebe (*Podiceps cristatus*).  
 26. ——— \* . . . Stomach of red gurnard (*Trigla Pini*).  
 27. ——— † { Intestine of haddock (*Gadus Aeglefinus*).  
                           { Intestine of whiting (*Merlangus vulgaris*).  
                           { Intestine of coal-fish (*Merlangus Carbonarius*).  
 28. ——— ‡ . . . Intestine of turbot (*Pleuronectes maximus*).

particulars from it. It is somewhat more than half an inch in length, and 2 lines in width at the widest part (immediately behind the ventral pore); it continues to be nearly of the same diameter, and then gradually diminishes towards the caudal extremity. The head is distinct and reniform, larger in proportion than that of the *Distoma echinatum*, edged with short spines placed at regular intervals. The neck and anterior part of the body are armed with very numerous minute spines, in which it also differs from the *D. echinatum*. After the animals had been immersed in spirits of wine, the neck became curved, the convexity upon the dorsal surface. The pores are orbicular; the anterior small, the ventral much larger; they are seated near each other.

\* This species, which I found in the stomach of the common red gurnard (*Trigla Pini*), does not appear to have been previously described. It belongs to the division in which the body is cylindrical, and to the subdivision in which the pores are of equal size. It measures about half a line in length; colour white at each extremity, yellowish red about the centre; both pores are orbicular, inferior, and seated near one another, the ventral being prominent. It lived for a short time in water after being removed from the animal. After remaining for a short time in spirits of wine, the pores were seen to be of equal size; but in this as in other species of *Distoma*, when the animal is alive it dilates and contracts the pores constantly, so that at one time the anterior pore is the larger, at another the ventral is the larger.

† This species of *Distoma*, which inhabits the intestinal canal of the haddock, the whiting and the coal-fish (*Merlangus Carbonarius*), belongs to the division in which the body is flat, and to the subdivision in which the pores are of unequal size, the anterior being the larger. The longest specimen measures 2 lines in length, the smallest 1 line; colour yellowish in centre, white in other parts; dorsal surface convex, ventral surface flat; more attenuated anteriorly than posteriorly, extremities obtuse. The anterior pore is orbicular, sometimes elliptical, always double the size of the ventral; ventral pore orbicular, situated in the anterior half of the body, but near the centre.

‡ This species does not appear to have been previously described; it belongs to the same division and subdivision as the preceding, the body being flat and the pores unequal. It is about a line in length, flattened and linear, of equal diameter in its whole length, not attenuated at the extremities. Both pores are orbicular; anterior more

29. *Distoma*.. Intestine of holibut (*Hippoglossus vulgaris*).  
 30. ——— \* . Intestine of sun-fish (*Orthogoriscus Mola*).  
 [31. ——— † . Œsophagus of common snake (*Natrix torquata*).]

than twice the size of the ventral ; ventral pore distant, seated near the centre of the body.

\* This species of *Distoma*, which I found in the intestines of the sun-fish (*Orthogoriscus Mola*), has not been previously described. It belongs to the division in which the body is cylindrical, and to the subdivision in which the pores are of unequal size. It measures from 4 to 5 lines in length ; colour a dirty yellow after remaining in spirits of wine ; body cylindrical ; greatest diameter near the ventral pore, diminishing gradually towards each extremity ; neck cylindrical ; both pores elliptical ; the long diameter of the anterior transverse, of the ventral pore longitudinal ; ventral pore larger than the anterior, and prominent.

This species of *Distoma* differs from the *D. contortum* (which inhabits the gills of the sun-fish) in being of a different colour and smaller size ; the ventral pore is not pedunculated as it is in the *D. contortum* and *D. nigroflavum* ; the body of the animal does not become curved after being placed in spirits of wine, and the head or neck is not armed with spines, in which it also differs from those two species.

† I have found many specimens of an undescribed species of *Distoma* in the œsophagus of the common snake (*Natrix torquata*), which is an inhabitant of England, but not of this country. This species is more tenacious of life than most other *Distomata*, as it lived for some time in a vessel of fresh water. It belongs to the division in which the body is cylindrical, and to the subdivision in which the pores are of equal size. It measures a line and a half in length when fully extended, when contracted about a line. The body is cylindrical, but when the animal is fully extended, it appears to be flattened, although, after it has been kept in spirits of wine for a short time, it becomes cylindrical. The colour of the body between the anterior and ventral pore is white, and two vessels are seen here passing backwards from the anterior pore ; the ovaries, which occupy the sides of the body, are of a reddish colour ; posteriorly the body is filled with a black substance, similar to what is seen in the *D. cylindraceum*, from which circumstance the species might perhaps be named *Distoma nigrovenosum* ; the greatest diameter of the body is about the ventral pore ; the caudal extremity is obtuse. When the animal is alive, the anterior pore is sometimes larger, sometimes smaller than the ventral ; its shape is also either orbicular or elliptical ; after its death, both pores become orbicular and of equal size ; the ventral pore is prominent. The distance between the pores also varies during the motions of the animal ; after it has lain in spirits of wine, they are seated close to one another.

32. *Distoma* \*. Small intestine of pochard (*Fuligula ferina*).

\* In the month of January 1839 I found a large number of an apparently undescribed species of *Distoma* in the small intestine of the pochard (*Fuligula ferina*); when recent they were subrotund, but (after having lain in water for twenty-four hours) they became nearly flat on being placed in spirits; colour reddish at first, afterwards dirty white; head subreniform, unarmed; neck (or that part between the pores) generally curved, the concavity upon the abdominal surface forming a channel at this place. Both extremities attenuated. Pores orbicular, seated near each other; anterior very small and terminal; ventral much larger, cup-shaped and prominent. Between the anterior and ventral pore, close to the ventral, a lemniscus is sometimes seen to project.

[To be continued.]

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 XLVIII.—*Additions to the Fauna of Ireland.* By WILLIAM THOMPSON, Pres. Nat. Hist. and Phil. Society of Belfast.

## MOLLUSCA.

## Class GASTEROPODA.

## Order NUDIBRANCHIATA.

*Doris repanda*, Alder and Hancock, Annals Nat. Hist. vol. ix. p. 32.

A specimen of this *Doris* was found between tide-marks at Roundstone, county Galway, in July 1840: R. Ball, E. Forbes, W. T.

*Doris aspera*, Ald. and Hanc., Ann. Nat. Hist. ix. 32. Very young examples of a *Doris*, and most probably (according to Mr. Alder) of this species, were obtained at Glandore bay, county of Cork, by Dr. George J. Allman in the month of August 1842. Mr. Alder himself procured specimens of *D. aspera* during an excursion in September last with Dr. Farran of Dublin to Malahide, on the coast of the county of Dublin\*.

*Goniodoris nodosa*, Mont. (sp.); *Doris nodosa*, Mont., Linn. Trans. vol. ix. p. 107. t. 7. f. 2. Twelve specimens of *G. nodosa* occurred on a plant of *Fucus vesiculosus* dredged in Killery bay, county of Galway, in July 1840: R. Ball, E. Forbes, G. C. Hyndman, W. T. Mr. Alder found the species to be plentiful at Malahide in September last.

*Polycera ocellata*, Ald. and Hanc., Ann. Nat. Hist. vol. ix. p. 33. Mr. Alder, by means of the dredge, took this species commonly and of all sizes in Dublin bay in August last, and subsequently obtained a specimen at Malahide.

*Polycera citrina*, Alder, Ann. Nat. Hist. vol. vi. p. 340. pl. 9. f. 7—9.

\* The new species of *Mollusca Nudibranchia* obtained on this occasion are described by Messrs. Alder and Hancock at p. 161 of the present volume.

- Mr. Alder dredged two or three specimens of this species in Dublin bay at the same time with the last.
- Polycera cristata*, Alder, Ann. Nat. Hist. vol. vi. p. 340. pl. 9. f. 10, 11. Obtained with the preceding two species:—common.
- Tritonia plebeia*, Johnst., Ann. Nat. Hist. vol. i. p. 115. pl. 3. f. 3, 4. A specimen was taken by dredging in Cork harbour, August 1843: R. Ball and E. Forbes.
- Tritonia arborescens*, Cuv. Several specimens of a small size were taken by Mr. Alder and Dr. Farran at Malahide. *Tritonia lactea*, Ann. Nat. Hist. vol. v. p. 88. pl. 2. f. 3, is considered by Mr. Alder a variety of *T. arborescens*.
- Melibæa coronata*, Johnst., Ann. Nat. Hist. vol. i. p. 117. pl. 3. f. 5—8. Obtained at Glandore bay, county Cork, in August 1842, by Dr. George J. Allman, and subsequently in Dublin bay by Mr. Alder, who is now of opinion that the *Melib. ornata*, Ann. Nat. Hist. vol. ix. p. 33, is a variety of *M. coronata*.
- Eolis coronata*, Forbes, Report Brit. Assoc. Meeting 1839, p. 647. Procured with the last at Glandore bay: found to be common at Malahide by Mr. Alder and Dr. Farran.
- Eolis pallida*, Ald. and Hanc., Ann. Nat. Hist. vol. ix. p. 35. A single example taken at Malahide with the preceding.

Order INFEROBRANCHIATA.

- Pleurobranchus membranaceus*, Mont. (sp.); *Lamellaria memb.*, Mont., Linn. Trans. vol. xi. p. 184. pl. 12. f. 3. Mr. John Humphreys of Cork has informed me that a specimen occurred to Mr. Beevor and himself when dredging in the harbour there last summer: “the animal was large, about 2 inches in length, and the shell a very good one”—the species had not before been met with by Mr. Humphreys.

Order TECTIBRANCHIATA.

- Bulla diaphana*, Turt., Conch. Dict. p. 22; *Diaphana pellucida*, Brown's Illust. 1st ed. ? Two specimens have been taken by Mr. Hyndman and myself when dredging in Strangford lough, and the species has been found by Mr. T. W. Warren at Portmarnock, on the Dublin coast.
- Bulla hyalina*, Turt., Loudon's Mag. of Nat. Hist. vol. vii. p. 353. Obtained at Portmarnock by Mr. Warren; and in shell-sand collected at Bundoran and Ballysodare on the western coast by Mrs. Hancock.
- Bulla pectinata*, Dillw.; *B. scabra*, Müll., Zool. Dan.; *B. angustata*, Phil.; *B. catenulifera*, *Scaphander catenata*, Leach. All these names, according to Mr. Alder, refer to the same species: it has been found at Portmarnock by Mr. Warren, and at Bundoran (co. Donegal) by Mrs. Hancock. Mr. Humphreys of Cork notices it under Leach's name as procured by him there in the stomach of a sole (*Solea vulgaris*).
- Bullea punctata*, Adams (sp.); Turt., Loudon's Mag. Nat. Hist. vol. vii. p. 353. Obtained from three localities on the western coast—Miltown Malbay (W. H. Harvey), Kilkee in the co. Clare, and Bun-

doran (Mrs. Hancock). Mr. Alder notes this as distinct from *B. catena*, Mont., with which some authors have considered it identical.

? *Auricula fusiformis*, Turt. (sp.); *Voluta fusif.*, Turt., Conch. Dict. p. 251. Mr. Alder, on examination of a shell from Portmarnock in Mr. Warren's collection agreeing with the description of *Voluta fusiformis*, was disposed to believe it worthy of specific rank: a similar shell was obtained at Bundoran by Mrs. Hancock.

#### Order PECTINIBRANCHIATA.

*Eulima distorta*, Desh. (sp.); *Melania distorta*, Philippi, Moll. Siciliæ, p. 158. tab. 9. f. 10. Dredged from a depth of 15 fathoms in Birterbuy bay, co. Galway, by Dr. Farran; Portmarnock, Mr. Warren. Mr. Alder is of opinion that the *E. polita* of Macgillivray's Aberdeenshire Mollusca may be this species.

*Parthenia*\* (Lowe) *indistincta*, Mont. (sp.); *Turbo indistincta*, Mont. † Found at Portmarnock by Mr. Hyndman (1835), and at Bundoran by Mrs. Hancock.

*Parthenia glabra*, Leach (sp.); *Alvania glabra*, Leach MSS. British Museum. Mr. Alder remarks—"A specimen I have from Portmarnock is the same as is marked *Alvania glabra*, Leach, in the British Museum, but it may be a worn variety of *Turritella ascaris*." It has been collected at the locality already named by Mr. Warren, and at Bundoran by Mrs. Hancock.

*Rissoa rufilabrum*, Leach (sp.); Alder in present vol. p. 325. Mr. Alder refers a *Rissoa* obtained at Portmarnock by Mr. Warren to this species.

*Odostomia spiralis*, Mont. (sp.). In shell-sand from Magilligan, county Londonderry, collected by Miss Moody; Portmarnock, Mr. Warren.

*Odostomia interstincta*, Mont. (sp.). Portmarnock, Mr. Warren.

*Odostomia cylindrica*, Alder in present vol. p. 327. A single example of this new species has been obtained in shell-sand collected at Bundoran by Mrs. Hancock.

*Odostomia obliqua*, Alder in present vol. p. 327. Two specimens obtained with the last.

*Fusus Barvicensis*, Johnst., Edin. Phil. Journ. vol. xiii. p. 221. A specimen is in the collection of Irish shells of the late John Templeton, Esq., presented by his family to the Belfast Museum: it was probably found in the north.

*Pleurotoma Boothii*, Smith (sp.), Wern. Mem. viii. part 1. A specimen has been obtained at Portmarnock by Mr. Warren.

*Pleurotoma Trevellyanum*, Turt., Loudon's Mag. Nat. Hist. vol. viii. As last.

\* In Part 2 of the excellent 'Enumeratio Molluscorum Siciliæ' of Philippi, his genus *Pyrgiscus* and *Parthenia* of Lowe are referred to *Chemnitzia* of D'Orbigny as the prior name.

† Dr. Fleming's *Turritella indistincta* is different from that of Montagu, and identical with the *Turr. fulvocincta* described in the fifth volume of the 'Annals.'



*Planaxis? lineata*, Da Costa (sp.); *Buccinum lineatum*. A specimen was found in a fishing-boat at Bray, near Dublin, by Mr. Warren, and several specimens have been collected on the beach at Bundoran by Mrs. Hancock. Professor E. Forbes remarks that the species should probably be a *Nassa*, especially if truly native.

*Velutina otis*, Turton. Procured at Miltown Malbay by Mr. W. H. Harvey, and in Clifden bay, county Galway, a dead specimen was obtained by dredging, in July 1840: R. Ball, E. Forbes, G. C. Hyndman, W. T.

### Class ACEPHALA.

#### Order BRACHIOPODA.

*Terebratula aurita*, Flem., Phil. Zool.; *T. caput-serpentis*, Lam. The Ordnance Museum, Phoenix Park, Dublin, contains a specimen labelled as obtained at "Whitehead bay, county Antrim, November 1839:" it was I believe taken alive by dredging.

*Terebratula psittacea*, Turt. (sp.), Conch. Dict. p. 5. A specimen of this *Terebratula*, labelled "Dublin bay," was observed by Mr. Alder and myself in the museum of the Royal Dublin Society in August last. Turton mentions a single specimen of "*Anomia terebratula*" being "dredged up alive in Dublin bay, and placed in the museum of the Dublin Society," but we could not ascertain whether the shell now preserved was that alluded to by Turton. "*Anomia psittacea*" was noticed by him only as an English species.

#### Order LAMELLIBRANCHIATA.

*Pecten nebulosus*, Brown's Illust. In Dr. Farran's collection are specimens of this *Pecten*, purchased of a dealer who stated that he procured them from Lough Foyle, county Londonderry: this evidence, as Dr. Farran remarks, is insufficient; but it seems to me desirable to notice the circumstance, as the species, which inhabits the western coast of Scotland, may probably occur on the neighbouring coast of Ireland. I have seen fine specimens from Lough Fyne, Argyleshire. *Pecten glaber*, Penn. and Mont., believed to be identical with this, has been obtained by Mr. Humphreys at Cork (Ann. Nat. Hist. vol. v. p. 12).

*Lima tenera*, Turton, Zool. Journ. vol. ii. The Ordnance Museum contains upon a card a fresh-looking specimen of this shell, and one of *Lima fragilis* labelled with the latter name as dredged from 7 fathoms in Belfast bay. *L. tenera* has long been known to me as found, by Dr. Wm. McGee, in a recent deposit of mud in Belfast bay, close to the town.

*Arca Noë*, Linn. Fine and perfect specimens of the true *Arca Noë* (according to Mr. Alder) are in Mr. Warren's collection: they were procured on the coast of Cork by Mr. Townsend.

*Amphidesma tenuis*, Turt., Brit. Biv. p. 53; *Ligula tenuis*, Mont., Test. Brit. p. 572. t. 17. f. 7. I have received specimens of this well-marked species from Larne lough, county of Antrim.

*Lepton squamosum*, Turt., Brit. Biv.; *Solen squamosum*, Mont. A

single valve of this shell was dredged in Cork harbour in August last: Prof. E. Forbes, Mr. R. Ball.

*Montacuta substriata*, Mont. (sp.); *Ligula substriata*, Mont. Found on the purple heart-urchin (*Spatangus purpureus*), dredged from 25 fathoms at the entrance of Belfast bay by Mr. Hyndman in May 1842.

*Gastrochæna pholadia*, Mont. (sp.), Turt. Brit. Biv.; *G. hians*, Flem.; *Mya pholadia*, Mont.; *Mya dubia*, Penn. South islands of Arran, off Galway bay, and Youghal, county Cork, Mr. R. Ball.

*Pholas papyraceus*, Turt., Brit. Biv. p. 2. tab. 1. f. 1—4; *Pholas lamellatus*, ibid. p. 4. tab. 1. f. 5, 6. Two specimens of this shell in the Ordnance Museum are labelled "Portrush," north of Ireland. In the fifth volume of the 'Annals,' p. 14, this species was noticed as Irish with some doubt. Mr. W. H. Harvey now writes to me that "the specimen there alluded to as found in a fishing-boat at Dublin was procured by Mr. Wm. Todhunter, who believes it to have been dredged on a shelly bank between Howth and Lambay. It certainly was imbedded in a sandy conglomerate of shells, &c., which is commonly dredged in this place—the Torbay habitat, if I remember right, is hard red-sandstone, and totally different." It is remarked, in reference to the former note—"All the boats of a certain class in this port (Dublin) are called 'Torbay' boats, as they originally came from that place."

*Pholas striatus*, Linn., Mont. Test. Brit. p. 26; *P. conoides*, Parsons, Flem. Brit. Anim. p. 457. January 7, 1842, I was favoured with the following communication by Mr. Warren of Dublin:—"I send for your examination a *Pholas* which is new to me, and should like to know if it has been obtained before in Ireland. It was found with others in a piece of water-logged mahogany near Killala, in the county of Sligo, by Richard Glennon, jun." With the letter were a single valve and a perfect specimen, which corresponded well with the descriptions of Montagu and Fleming: the specimens were 4 lines in length and  $7\frac{1}{2}$  in breadth; the plate at the hinge "sub-oval," as described by Montagu.

In January 1844 I was further informed by Mr. Warren, that he had received a specimen of this *Pholas* from Mr. Gaggot, who found several on the coast of Clare. The occurrence of the species in the first instance was I believe noticed in the 'Dublin Penny Magazine.'

*Pholas parvus*, Mont. Was procured many years ago off the Long Strand, Belfast bay, by Dr. J. L. Drummond; subsequently by the Ordnance collectors at Whitehouse Point in the same bay.

#### MOLLUSCA TUNICATA.

*Ascidia mentula*, Müll., Zool. Dan. vol. i. p. 6. t. 8. f. 1—4. (*Phallusia*, Savigny). Belfast bay; Roundstone bay, co. Galway, adhering to a stone between tide-marks, W. T. &c.

*Ascidia conchilega*, Müll., Zool. Dan. vol. i. p. 42. t. 34. f. 4—6. Coasts of Antrim and Down, W. T.

- Ascidia canina*, Müll., Zool. Dan. vol. ii. p. 19. t. 55. f. 1—6. (*Phal-lusia*, Sav.) Strangford lough; Clew bay (co. Mayo), W. T. &c.  
*Ascidia communis*, Forbes MSS. Clew bay, E. Forbes, &c.  
*Amaroucium proliferum*, Edw., Ascid. Compos. p. 67. pl. 1. f. 3, and pl. 3. f. 2. Belfast bay, W. T.  
*Leptoclinum gelatinosum*, Edw., Asc. Comp. p. 83. pl. 8. f. 1. On the roots of *Laminariæ* in Belfast bay, W. T.  
*Leptoclinum maculosum*, Edw., Asc. Comp. p. 81. pl. 8. f. 2. On the roots of *Laminariæ* in Belfast bay and north of Ireland generally—our most common *Leptoclinum*, W. T.  
*Leptoclinum asperum*, Edw., Asc. Comp. p. 82. pl. 8. f. 3. With last.  
*Leptoclinum durum*, Edw., Asc. Comp. p. 82. pl. 8. f. 4. Dredged in Strangford lough, Mr. Hyndman and W. T.  
*Botryllus gemmeus*, Sav., Edw. Asc. Comp. p. 89. pl. 6. f. 5. Adhering to *Fuci* dredged in Belfast bay by Edmund Getty, Esq.  
*Botryllus bivittatus*, Edw., Asc. Comp. p. 92. pl. 6. f. 7.\* With last.

#### CRUSTACEA.

- Alauna rostrata*, Goodsir, Edin. Phil. Journ. vol. xxxiv. p. 130. pl. 4? (Jan. 1843). Taken at Newcastle, county Down, August 1836, W. T.  
*Cuma trispinosa*, Goodsir, Edin. Phil. Journ. vol. xxxiv. p. 129. pl. 3. f. 1. ? Portaferry, Strangford lough, summer of 1838, Robert Patterson.  
*Proto pedatum*, Müll. (sp.), Zool. Dan.; *Leptomera pedata*, Edw., Hist. Crust. vol. iii. p. 109. Among *Algæ* dredged at Bangor, county Down, 1834, Mr. Hyndman and W. T.  
*Arcturus longicornis*, Sowerby (sp.), Brit. Misc. pl. 10. Specimens from Belfast bay are in the Ordnance Museum, and from Dublin bay in the Museum of the Royal Dublin Society.  
*Spheroma rugicauda*, Leach, Linn. Trans. vol. xi. p. 369? Coast of Down, W. T.  
*Cirolana Cranchii*, Leach. Obtained in Belfast bay by the Ordnance collectors and by Mr. Hyndman, who brought me several specimens taken by him on the common skate (*Raia Batis*). Specimens from Dublin bay are in the museum of the Royal Dublin Society.  
*C. Cranchii* has been sent me from Portpatrick, Scotland.  
*Cecrops Latreillii*, Leach. Examples of this species found on a sun-fish (*Orthogoriscus Mola*) at Kinsale, county Cork, in August last by Dr. Geo. J. Allman, have been kindly sent to me by that gentleman.  
*Lerneonema monillaris*, Edw., Hist. Crust. vol. iii. p. 525. pl. 41. f. 5. This species has been favoured me by Mr. R. Ball, who procured specimens adhering to the sprat (*Clupea Sprattus*) at Youghal.

\* In concluding the Mollusca, two species may be referred to as noticed in a Report on the Invertebrata of Ireland, published in the Transactions of the British Association for 1843. They are *Peracle Flemingii*, Forbes (*Fusus retroversus*, Flem.), and *Amphipeplea glutinosa*.

- Mr. Ball remarks that when alive it is of a beautiful green colour, and generally adheres to the cornea of the fish's eye: one of those sent to me is fixed to the body of the sprat close to the dorsal fin.
- Nymphum gracile*, Leach, Zool. Misc. vol. i. p. 45. pl. 19. f. 1.  
Shores of Antrim and Down, W. T.
- Orythia coccinea*, Johnst., Mag. Zool. and Bot. vol. i. p. 378. pl. 13.  
Portaferry, Strangford lough, 1837: Mr. Hyndman and W. T.  
See Edw. Hist. Crus. vol. iii. p. 536.
- Pychnogonum littorale*, Strom. (sp.), Edw. Hist. Crust. vol. iii. p. 537.
- Pychnogonum balanarum*, Fabr. This common species was incidentally omitted in former "Additions to the Fauna of Ireland." *Pyc. balanarum* must on our coast be content with a smaller victim than a whale, and condescends to suck the juices of an *Actinia*. In January 1834, several of these parasites, from a very minute to a middle size, were found upon the *Actinia mesembryanthemum* at Bangor\* by Mr. Hyndman and myself: on the shore near Dublin, the *Pychnogonum* has likewise been taken on *Actinia* by Dr. Bellingham. Specimens from Ballantrae, Ayrshire, and Whitehaven, Cumberland, are in my collection: among oysters brought from the latter place to Belfast, I have found them particularly numerous.

## CIRRHIPEDA.

- Anatifa dentata*, Lam. A specimen of this *Anatifa* from Magilligan, county Londonderry, is in Mr. Hyndman's collection. It presents every character of *A. lævis*, Lam., except in the dorsal valve being slightly dentate—a character insufficient in my opinion to constitute a specific difference.
- Pollicipes cornucopiae*, Leach; *Lepas pollicipes*, Gmel. Mr. Warren of Dublin informs me that he once saw fresh specimens brought to Mr. Glennon's shop, and which were stated by the person in whose possession they were to have been found in the taking down of a lock for repairs at Ringsend, Dublin.
- Balanus scoticus*, Brown's Illus. pl. 7. f. 22. This species or variety is found on *Pecten maximus* in the north, and on the Dublin coast by Dr. Farran, who remarks that he has obtained it only on this shell.
- Balanus punctatus*, Mont. Found at Carrickfergus; common on the island of Ireland's Eye, Dublin coast (W. T.), and at Youghal (R. Ball).
- Balanus candidus*, Leach, Brown's Illus. pl. 6. f. 8–10†. Specimens of this fine *Balanus* taken off the northern coast of Dublin, or between Carlingford and the Isle of Man, are in the collections of Mr. Warren, Dr. Farran, and Mr. R. Ball of Dublin. The largest specimen is three inches in height (not reckoning valves) and nearly as much in diameter. The species varies greatly in form,

\* The Bangor noted throughout this paper is on the coast of Down.

† See correction of *L. scoticus* and *L. candidus* in description of plate 32.

being sometimes much elongated, and of similar breadth from base to top, but is generally subpyramidal. Dr. Farran states that it is always adherent to *Modiolus vulgaris*; and is brought up in the trawl-nets used in taking flat-fish.

ANNELIDA.

*Erpobdella tessulata*, Müll. (sp.); *Nepheleis tess.*, Brightwell, Ann. Nat. Hist. vol. ix. p. 13. pl. 1. f. 15-17. In a letter from the Rev. Benj. J. Clarke, dated Tuam, Nov. 22, 1843, it is remarked—"I have a living *Nepheleis tessulata* with the young adhering; I took it in a river here last July with others of the same species, and as this one contained ova, I kept it until the young were born. They have not increased in size for the last two months, and have been clinging to the unfortunate mother for three months." In a subsequent letter it was mentioned that "the parent died in March (after having been kept in a bottle of water for nine months), and left her numerous progeny adhering in a cluster to the side of the glass. They did not leave her body until the hour of her death: they have increased very little in size in the last four months."

*Piscicola geometra*, Linn. (sp.) Lough Eaghish, county Monaghan, and Lough Neagh, Mr. Hyndman. Mr. Templeton has described and figured a new species from the latter locality in Loudon's 'Magazine of Natural History,' vol. ix. p. 236. f. 28, and named it *P. Percæ*. The specimens observed by Mr. Hyndman are the true *P. geometra* as distinguished from *P. Percæ*.

*Clepsina hyalina*, Müll. (sp.), Brightwell, Ann. Nat. Hist. vol. ix. p. 15. pl. 1. f. 20. Ballydrain lake, &c. near Belfast, W. T. Leamington, Warwickshire, W. T.

"*Lumbricus lineatus*, Müll., Johnst. Mag. Nat. Hist. vol. viii. p. 259. f. 36. Coast of Down, W. T." Dr. Johnston,—to whom a large collection of Irish Annelides was submitted for being named and described; the localities noted were attached to the specimens.

*Cirratulus medusa*, Johnst., Mag. Zool. and Bot. vol. ii. p. 71. pl. 3. f. 7-12. Found under stones on the beach at Clew bay, co. Mayo, July 1840, W. T.; dredged in Dalkey sound, Dublin bay, R. Ball and E. Forbes.

*Trophonia Goodsiri*, Johnst., Ann. Nat. Hist. vol. iv. p. 371. pl. 11. f. 1-10. Dredged in Strangford lough, near Portaferry, July 1838, W. T. The specimens from which the original description was drawn up, were taken in June 1839 at the Orkneys by Messrs. Forbes and Goodsir: Donaghadee, Dr. Drummond. The Irish specimens are much smaller than those described by Dr. Johnston, but the bristles on every part of the body are considerably longer in proportion to the size of the animal than in those from Orkney; they are finely iridescent, like the bristles of the *Aphrodita aculeata*.

"*Terebella cirrhata*, Mont., Linn. Trans. vol. xii. p. 342. pl. 12. f. 1. Coast of Down, W. T." Dr. J.

*Sabella reniformis*, Turt. (sp.); *Tubularia penicillus*, Müll., Zool. Dan. vol. iii. t. 89. f. 1, 2. In a pool among the rocks at the entrance to Strangford lough, Mr. Hyndman and W. T.

"*Sabella penicillus*, Linn.; *Amphitrite ventilabrum*, var. 2; Turt., Penn. &c. Coast of Down, W. T.; Bangor, Mr. R. Patterson." Dr. J.

"*Sabella carnea*, Johnst. MSS. This species was noticed by Montagu, 'Test. Brit.' p. 544, but not named; I have a beautiful figure of it, made some years ago; it is not uncommon in Berwick bay, Belfast bay, Strangford lough, open coast of Down, W. T. &c." Dr. J.

"*Sabella tubularia*, Mont. (sp.); Berkeley, Zool. Journ. vol. v. p. 426. *Serpula tubul.*, Mont., Johnst., Loudon's Mag. Nat. Hist. vol. vii. p. 126. f. 23; Brown's Illus. pl. 2. f. 9, 10. Strangford lough, Mr. Hyndman and W. T." Dr. J.

"*Serpula vermicularis*, Linn. (not Mont.). *Tubus verm.*, Ellis, Corall. pl. 38. f. 2. *Serp. verm.*, Brown's Illus. pl. 2. f. 2, 3, and *Vermilia triquetra*, pl. 2. f. 1. Strangford lough, Mr. Hyndman and W. T." Dr. J.

Templeton gives "*S. vermicularis*, Linn." in his catalogue, Mag. Nat. Hist. vol. ix. p. 233; but as the species so named by Linnæus and that by Montagu are different, it is thought proper to notice both here. The following synonyms relate to the latter species.

"*Serpula intricata*, Linn.; *S. vermicularis*, Müll., Zool. Dan. vol. iii. p. 9. t. 86. f. 9. (animal); Mont. Test. Brit. p. 509. *S. Mulleri*, Berkeley, Mag. Nat. Hist. vol. vii. p. 421." Dr. J. *Serp. vermicularis*, Mont., is noticed in Capt. Brown's 'Irish Testacea' as found on the Dublin coast and in Lough Strangford.

*Serpula serrulata*, Flem., Edin. Ency. vol. vii. p. 67. pl. 204. f. 8. *S. tricuspidata*, Sowerby. In a letter from Mr. John Humphreys of Cork, this species is mentioned under the latter name as "detected by G. B. Sowerby on *Pinna* sent him from Cork harbour."

*Serpula vitrea*, Fabr.? Adherent to a stone brought up from deep water, on which were also *Crania personata* and *Caryophyllia Smithii*: Youghal, R. Ball\*.

"*Syllis armillaris*, Müll. (sp.); *Nereis arm.*, Müll., Wurm. p. 150. t. 9. f. 1-5. Coast of Down, W. T." Dr. J.

"*Phylodoce lamelligera*, Johnst., Ann. Nat. Hist. vol. iv. p. 225. pl. 7. f. 1-3. Coast of Down; Belfast Bay, W. T. Strangford lough, Mr. Hyndman and W. T. Bangor, Dr. Drummond.

"*Obs.*—Except in being of much smaller size, the specimen from the last-named locality corresponds well with Blainville's figure of *P. Paretti*. The more I examine the subject, the more I be-

\* *Vermilia armata*, Flem. Edin. Phil. Journ. vol. xii. p. 243: Strangford lough, W. T.,—*Serpula contortus*, Brown's MSS. Illus. pl. 2: Dublin coast, Mr. Warren,—are brought by Dr. Johnst. under *Serpula triquetra*, Linn.

come satisfied that *Phyl. laminosa*\*, *P. lamelligera* and *P. Paretti* are one and the same species; the differences pointed out between them depending, first, on age; secondly, on the description having in some instances been made from living specimens, and in others from specimens preserved in spirits." Dr. J.

"*Phyllodoce viridis*, Johnst., Ann. Nat. Hist. vol. iv. p. 228. pl. 6. f. 11-15; *Ph. clavigera*, Aud. and Edw. Coast of Down, W. T." Dr. J.

"*Nephtys margaritacea*, Johnst., Loudon's Mag. Nat. Hist. vol. viii. p. 341. f. 33. Bangor, Dr. Drummond." Dr. J.

? "*Camponia cruciformis*, Johnst., Loud. Mag. Nat. Hist. vol. viii. p. 179. f. 18. Bangor, Dr. Drummond." Dr. J.

#### FORAMINIFERA.

*Spirolina carinatala*, Mont. (sp.); *Nautilus carin.*, Mont. In shell-sand from Bundoran, co. Donegal, collected by Mrs. Hancock.

*Renoidea rotundata*, Brown's Illus. pl. 1. f. 14, 15. With last.

———— *oblonga*, Brown's Illus. pl. 1. f. 16, 17. With last.

———— *glabra*, Brown's Illus. pl. 1. f. 20, 21. In shell-sand collected at Portmarnock, and sent me by Mr. Warren.

*Nodosaria recta*, Maton and Rack. (sp.), Mont.; *Nautilus recta*. Bundoran, Mrs. Hancock.

#### ENTOZOA.

"*Botriocephalus auriculatus*, Rud., Syn. p. 479. Found in the smooth dog-fish, *Mustelus laevis*." Communicated by Dr. J. L. Drummond.

"*Botriocephalus crassiceps*, Rud. Found in the hake, *Merluccius vulgaris*." Dr. D.

"*Distoma anguilla*, Müll., Zool. Dan. t. 91. Found in the intestines of the conger-eel, *Anguilla Conger*." Dr. D.

"*Ascaris simplex*, Rud. Found in the stomach of the porpoise, *Phocæna communis*." Dr. D.

"*Ascaris rigida*, Rud. Found in the stomach of the fishing-frog, *Lophius piscatorius*." Dr. D.

"*Ascaris crenata*, Zed., Rud. Found in the starling, *Sturnus vulgaris*." Dr. D.

#### ECHINODERMATA.

*Cucumaria pentactes*, Müll. (sp.), Forbes's Brit. Echin. p. 213. In the fifth vol. of the 'Annals,' p. 247, I noticed the *Holothuria pen-*

\* "*Phyllodoce laminosa*, Sav.—Aud. and Edw. Litt. de la France, vol. ii. p. 222. pl. 5 A. f. 1-8. Portpatrick, Capt. Fayrer, R.N. The specimen was fifteen inches long, although a considerable piece of the posterior end was wanting, and consisted of 230 segments or thereabouts. The body was of a rich bluish-purple colour on both surfaces with pearly reflections; the lamellæ over the feet were dusky olive. In other respects, the correspondence between it and the description of the species in the work above cited was very exact."—Dr. Johnston's remarks on a specimen from Scotland submitted to his examination.

*tactes* of the 'Zoologia Danica' with doubt, from an examination of an injured specimen. I can now announce the species with certainty, Dr. Drummond having procured an example of it when dredging at Bangor in June 1839.

ACALEPHA.

- "*Cydippe pileus*, Linn. (sp.) Irish Sea." Communicated by Professor E. Forbes.
- "*Melicertum campanulatum*, Ehrenb. Ballycastle; Portrush, near Giant's Causeway." E. F.
- "*Aurelia aurita*, Linn. (sp.) North, west, and east coasts." E. F. A species so called has been before noticed as Irish, but as more than one has passed under the name, the true species according to Prof. Forbes is here repeated.
- "*Aurelia bilobata*, Forbes MSS. Portrush." E. F.
- "*Cyanea Lamarckii*, Péron. County Galway coast, July 1840." R. Ball, W. Thompson, E. F.

ZOOPHYTA.

- Thuiaria Thuia*, Linn. (sp.) Miss Ball's collection contains a specimen presented by Mrs. Acheson Lyle as from Portrush, near the Giant's Causeway: on further inquiry being kindly made by this lady, it was ascertained with certainty that a few specimens had been picked up on the coast of Londonderry, between Moville and Greencastle, by Mr. Sawers.
- Zoanthus Couchii*, Johnst. MSS. A specimen of this is in Mr. R. Ball's collection, adherent to a stone dredged many years ago off the southern coast.
- Lepralia verrucosa*, Esper (sp.); *Lep. Johnstoni*, Bean MSS. Dublin coast, Miss Ball, 1837\*.

AMORPHOZOA.

- Grantia lacunosa*, Bean, Johnst. British Sponges, p. 176. pl. 20. f. 2, 3. Strangford lough, near Portaferry, July 1838, W. T. Dredged from a depth of eight to ten fathoms at Donaghadee, May 1843, Dr. Drummond.

\* *Pedicellina echinata*, Sars., is noticed by Mr. Hassall in the 'Annals,' vol. vii. p. 365, as found in Dublin bay. I had some years before that time seen specimens from our north and south coasts; from Courtmasherry harbour (co. Cork), where they were found by Mr. Geo. J. Allman "at low spring tides attached to *Sertulariæ*, &c. in a little rocky fissure scarcely uncovered even at the lowest tides;" and from about the entrance of Belfast bay, where they were dredged from a moderate depth on different occasions by Mr. Hyndman and Mr. Patterson. In May last, Dr. Drummond dredged likewise from a moderate depth, a group of the *Pedicellina* adherent to a stone at Donaghadee, county Down.



XLIX.—*Researches on the Latex and its Movements.*

By Prof. H. MOHL\*.

THE author comments upon the variety of opinions that have been entertained concerning the latex, and considering the great importance of the subject in relation to vegetable physiology, and the entire incompatibility of M. Schultz's theory with all previous notions, he felt that it was necessary to make a careful examination of the facts on which that author had founded his theory. In the present paper he refers only to the last two works of Schultz, 'Mémoire sur la circulation et sur les vaisseaux laticifères dans les plantes,' a prize essay which was crowned by the Paris Academy of Sciences in 1839; and 'Ueber die Cyklose des Lebenssaftes' in the 'Nova Acta Acad. Nat. Curiosorum,' 1841. He intimates that he shall probably consider the anatomical relations of the laticiferous vessels on a future occasion.

1. *Organization of the Latex.*

According to M. Schultz, the milky juices consist of a coagulable liquid in which float a number of globules. The globules are chiefly composed of fatty or waxy matters; the small globules of wax, and the larger of membranous sacs inclosing fatty substance. The liquid (plasma) coagulates when exposed to the air, a substance which he calls elatine (chiefly composed of caoutchouc), separating from it as fibrine does from coagulating blood. The globules do not participate in the coagulation; they present true vesicles containing a nucleus, and do not entirely dissolve in alcohol or æther, but shrivel up, and the fatty substance is then dissolved out.

Prof. Mohl states that he has obtained results which make M. Schultz's theory of the organization of the latex appear erroneous.

By placing a small quantity of latex between two slips of glass and sliding these over one another, it may easily be seen that the globules are composed of a softish, very viscid matter, that pressure unites them, and that there is no trace of an enveloping membrane; they may be collected and drawn out in a stringy mass, beneath the microscope, with the point of a fine needle. When a thin layer of latex is dried on glass, the liquid in which the globules float is changed into a transparent crust, which may be dissolved in water so as to re-establish the original condition of the sap. This dried serum forms a brittle mass, which, like a thin layer of gum, breaks with sharp angles, while the globules

\* From the *Botanische Zeitung*, 1843, p. 553.

We are indebted to the kindness of Mr. Henfrey for the communication of this abstract.—EDS.

retain their original form and condition. When this dried mass is exposed to the air for about twenty-four hours, particularly if placed in the sun, the elastic substance of which the globules are composed contracts in the cavities of the serum, presenting the appearance of vesicular membranes containing nuclei; but the solution of the serum in water clearly proves this to be an illusion.

From the above, it evidently results that caoutchouc is neither contained in the serum nor does it inclose the globules when dried, since the serum dissolves easily in water and dries into a brittle crust, which cannot be a membrane of caoutchouc, as M. Schultz called it. From the physical structure of the globules, it is hardly to be doubted that they contain caoutchouc, though probably it is often combined with other substances. When a layer of dried latex is macerated in alcohol the globules are not dissolved, but when the dried serum is redissolved in water it contains numerous little brownish flocks (coagulated albumen?). When dried latex is macerated in æther, the dried serum is found to contain, not globules, but open cavities filled with air; no trace of viscous matter remaining, but the crust of serum very brittle.

Æther only determines a coagulation of the latex, inasmuch as it liquefies the globules, and at its evaporation leaves them in the form of a membrane. Alcohol acts differently; it mixes with the latex and separates white membranes from it. By means of the microscope, these membranes are seen to be formed out of a substance separated from the serum, having a granular appearance, lax cohesion, and absolutely devoid of viscosity; they inclose a number of unaltered globules. Prof. Mohl suggests that this substance may be albumen.

From the foregoing it will be seen that the globules are destitute of any trace of organization, and can no more be compared with blood-corpuscles than can any other drops of resin, oil, &c. met with in vegetable fluids. The caoutchouc of the latex cannot be compared with the fibrine of the blood, since it is not met with, as that is, in solution in the serum, and does not transform this latter into a plasma; it is met with, on the contrary, in a complete state of development under the form of globules.

## 2. *Movement of the Latex.*

The mutual attraction and repulsion of the globules and the walls of the vessels, the *autosyncrasie* and *autodiocrasie* of M. Schultz, our author sets down as pure creations of fancy. He says that it is nothing more than ordinary molecular motion, and takes place equally in fresh latex and that which has been diluted with water or dried and redissolved.

The movement in the form of a current is, according to M.

Schultz, independent of external influences; Prof. Mohl states that the latex in its natural condition is in a state of absolute repose. By bringing portions of uninjured plants of *Chelidonium* beneath the microscope, he found that while the connexion between the leaf under examination and the rest of the plant was unbroken, a current could generally be perceived which lasted for about half a minute and then gradually ceased; he satisfied himself that this was produced by the torsion and compression of the vessels of the neighbouring parts. When the petiole was cut across, a very rapid current took place towards the wound, which continued until the coagulation of the extravasated latex closed the wounded vessels. On cutting a little further up, the current was set up again. In the leaves of *Tragopogon mutabilis*, where the principal nerves take a rectilinear direction, the current could be made to flow from the summit to the base, or from the base to the summit of the leaf, according as the apex or the petiole of the leaf was cut off. The slightest pressure, also, affected the direction of the current.

The author denies also that the rotation in the cells of *Tradescantia*, &c. takes place in delicate vessels situated on the walls of the cells, as indicated by M. Schultz; since no such vessels can be traced, and the size and position of the currents are frequently seen to change in a manner which the idea of the contraction and dilatation of such vessels is insufficient to explain.

### 3. Of the *Latex as the Vital Juice.*

M. Schultz compares the latex to the blood of animals, not only as regards its internal organization and its movements, but as regards its physiological value, declaring it to be the nutrient fluid of plants.

Prof. Mohl says, that if he has succeeded in proving "that the latex does not possess the internal organization which M. Schultz attributes to it; that it differs in no particular, as far as regards its globules, from other vegetable juices which contain substances insoluble in water, such as oils, resin, or starch; that M. Schultz's theory of the coagulation is based upon false observation, and that the latex in uninjured plants exhibits no movement"—he might abstain from further detail, convinced that all unprejudiced observers would arrive at the same conclusions: if these observations are confirmed by others, it will necessarily be seen that those very points on which M. Schultz founded his theory, and which alone have determined him in establishing his doctrine, are founded on illusions.

In addition to erroneous observation, however, M. Schultz's theory is supported by the application of an analogy which he has established between plants and animals. He concludes, that

as the blood presents a visible organization, the nutrient fluid of plants must also. And why? asks Prof. Mohl: there is no reason which should force such a conclusion on us; on the contrary, the presence of granules could scarcely have any relation to the nutrient power of the vegetable juice. The anatomical conditions of the plant would present every difficulty to their movement; and if, with M. Schultz, we perforate the walls of cells to give passage to vessels which no one has seen, we may establish whatever physiological laws we please, and any kind of deductions from them.

The *elatine* is not the true organic constituent of the latex which represents vegetable fibrine. This comparison has been shown above to be founded on errors of observation; but it will be seen to be still more contrary to nature, if we consider the chemical relations of fibrine and caoutchouc. While animal bodies are almost entirely composed of fibrine, or chemical combinations nearly identical with it, the great mass of the substance of vegetables is formed of matters which equally present the greatest chemical affinity to each other, which frequently pass from one into the other, and may be artificially transformed; and all these differ extremely from caoutchouc, since the latter contains no oxygen. How is it possible, asks the author, to consider the almost insoluble caoutchouc as the principal agent in the nutrition of plants? It is contrary to all the most recent observations in vegetable physiology. The latex is found in the smallest proportion in the youngest parts, where formation and nutrition are most active, and where it would be most necessary; while caoutchouc, from its chemical composition, cannot be included in the series of neutral combinations through which we have a right to admit a direct passage from sugar to ligneous fibre. M. Schultz is also unable satisfactorily to explain the fact that the milky juices are mostly poisonous.

Prof. Mohl concludes by stating that he is absolutely ignorant of the physiological value of the latex. We have no positive facts on which to base any certain theory; but one thing, he says, is settled, which is, that the theory of M. Schultz must be regarded as an entirely unsuccessful attempt to resolve the enigma, and that the term vital juice must be rejected.

L.—Notes on the Synonymy of the Genus *Apion*, with Descriptions of Five new Species, &c.. By JOHN WALTON, Esq.

SOME time back I made an attempt to correct the synonymy and to determine the species of the interesting little British *Curculionites* arranged under the generic title *Apion*\*. I have since

\* See Ent. Mag. vol. v. p. 8. and p. 254.

examined the whole group, and having additional materials for forming just conclusions on various points connected with them, I have thought a new list with such observations as have occurred might be acceptable to entomologists. In connexion with the synonyms it is necessary to observe, that the names of Marsham are quoted in the following pages on the authority of the Rev. Mr. Kirby, whilst those of the last-mentioned author are given from my own examination of the original specimens contained in the Kirbian collection. For the names and synonyms of M. Schönherr and Dr. Germar I have the authority of those two authors except where otherwise stated; an interchange of specimens has, however, in many cases enabled me to form an independent opinion.

Mr. Kirby and other subsequent writers state that the clava of the antenna of the insects of this genus has only three joints, when in fact it consists of four; when mounted in Canada balsam, covered with thin glass, and viewed as an opaque object, by means of a Lieberkuhn, with a power of 160 linear, the clava will be distinctly seen to be quadriarticulate, the apical joint being minute, so that the antenna is composed of twelve articulations. I have examined the rostrum of many species of this genus, and it appears that it has on the under side two deep antennal grooves, converging from the points of insertion of the antennæ, and uniting beneath the eyes; these grooves are divided towards the base by a narrow ridge, and their use is to receive and protect the basal joints of the antennæ. None of the British species described with the antennæ basal have the points of insertion strictly at the base, but all have them at a greater or less distance from it, and have the antennal grooves very deep and of the form of a V; in the first three species in which the rostrum is subulate, the antennal grooves are united beneath at the base, and form a broad, very deep, elongate furrow, which extends through the whole of the under side of the head.

Besides the works quoted in my first communication, I shall here have occasion to refer to the following:—

- Herbst.* Natursystem aller bekannten in- und ausländischen Insecten, &c., von C. G. Jablonsky, Berlin, vii. 1797. 8vo.
- Kirb.* Kirby on Herbst's genus *Apion* in the Transactions of the Linnæan Society, vol. ix. 1808; vol. x. 1811.
- Germ.* Magazin der Entomologie, von E. F. Germar, vol. ii. 1817; and (App.) vol. iii. 1818.
- Germ.* Germar in Entomologische Zeitung, Stettin, No. 1, Januar 1842, and No. 5, Mai 1842.
- Steph.* Systematic Catalogue of British Insects, by J. F. Stephens. 8vo. 1829.

1. *Apion Craccæ*, Linn., Herbst, Kirb., Gyll., Germ., Steph., Schönh.

*Curc. Craccæ*, Mus. Linn., Marsh.

*Ap.* (♂) *ruficorne*, Herbst, Kirb., Germ., Steph.

About the middle of October last I met with this species at Shirley Common near Croydon, in great abundance upon the oak and ash trees, but I have never found it upon the *Vicia Cracca*. Mr. Waterhouse however informs me that he has reared several specimens from the pods of that plant.

2. *A. Pomonæ*, Fab., Gyll., Germ., Steph., Schönh.

*Curc. cærulescens*, Marsh.

— ( $\beta$ . var.) *glaber*, Marsh.

*Ap. cærulescens*, Kirb.

In the first week of August last I collected a number of seed-pods of the *Vicia sepium* near Ryde in the Isle of Wight, and some time after, upon opening the paper in which they were inclosed, I found several specimens of *Apion Pomonæ* had made their escape from them; in other pods there were small perforations, as if made with a pin, and in these I found the living insect. Mr. Waterhouse and myself have beaten the present species out of the juniper bushes at Birch Wood in considerable abundance in the month of May.

3. *A. subulatum*, Kirb., Germ., Gyll., Steph., Schönh.

— (♂ var.  $\beta$ .), Kirb. MSS. et Mus.

— *Marshami* (♀), Steph. (♂), Schönh.

— (♂) *platalea*, Curt. not Germ.

I have again examined the two insects in the cabinet of Mr. Stephens under the name of *Apion Marshami*; they have the rostrum attenuated before the antennæ, neither *filiform*, nor *gibbous* beneath: they are certainly two female varieties of this species. The description of *Apion Marshami* by Schönherr was drawn from a specimen sent to that author by Mr. Waterhouse, which being now in the last-mentioned entomologist's possession, I have had an opportunity of examining and comparing it with others: it is undoubtedly the male of *Apion subulatum*. I may here mention that I have in my possession a species of *Apion* (the *Ap. opeticum* of Märkel) sent me by Dr. Germar, which he had supposed was the *Ap. Marshami* of Schönherr; it is certainly very nearly related to *Ap. subulatum*, but is however readily distinguished by the form of the rostrum, which is stouter at the base, distinctly gibbous beneath, and filiform in front of the antennæ. I possess specimens of *Apion platalea* sent me by Dr. Germar, which I find have no affinity to our *Ap. subulatum*, and are of a species not hitherto found in this country.

I have never met with *Ap. subulatum* in abundance, but have

occasionally found it in Yorkshire, the Isle of Wight, and other places, in the months of August and September, invariably on the *Lathyrus pratensis*: near Bletchingly, in September, both sexes were found rather plentifully by Mr. Wollaston.

4. *A. Limonii*, Kirb., Germ., Steph., Schönh.

The Rev. Mr. Kirby first met with this insect in the sea-marshes at Holme, next the sea, in Norfolk, in the months of July and August, upon the leaves of *Statice Limonium*. I obtained from this plant several hundreds of this splendid species on the 9th of August 1841 at the same locality; the oldest plants, with decaying leaves, produced by far the greater number of specimens.

5. *A. marchicum*, Herbst (1797), Germ., Gyll., Schönh.

— *Spartii*, Kirb. (1808), Germ., Steph., Schönh.

— (var.) *Rumicis*, Kirb., Germ., Steph.

— *violaceum*, Gyll. vol. iii.

*Curc.* (♀) *aterrimus*, Linn. (Mus. Linn.), Kirb. (Linn. Trans.).

I have frequently captured this species in considerable numbers, first in Yorkshire on the *Teucrium Scorodonia*, and afterwards on Hampstead Heath, in the month of August, from the *Rumex Acetosella*: having never found it in the south on the *Teucrium*, I was induced to examine my northern specimens with greater care, but cannot discover any specific difference. *Apion marchicum* takes a wide range of variation, both in form, size and colouring.

In a series in my possession of about 200 examples there are specimens less than a line in length, and others equal to a line and a half, with intermediate sizes; some have the elytra of a rich purplish copper colour, in others they are bright green, violet, dark blue, obscurely æneous, and black; the breadth of the head varies in both sexes, which is common to many other species of this genus; the thorax is generally subcylindrical, with the sides nearly straight, and having but little tendency to the globose form which usually characterizes the *Apion affine*; the upper surface is more or less convex, occasionally somewhat depressed, remotely punctured, with the impressed point before the scutellum sometimes obsolete; the elytra vary in form, being frequently short-obovate and sometimes long-obovate, and more or less convex: individuals may be selected from a long series where these modifications of form gradually merge into each other, and which, in my opinion, can only be regarded as varieties of a normal form. Germar, Gyllenhal and Schönherr have adopted the name *marchicum* for this species on the authority of M. Schüppel. The *Apion Spartii* and *Apion Rumicis* of Kirby, according to Germar and Schönherr (to whom I sent specimens),

are identical with *Apion marchicum* of Herbst. *Apion Rumicis* of Kirby's MS. and collection is decidedly a purplish-copper-coloured variety of his *Apion Spartii*. The authentic British specimens from which Schönherr described his *Apion Spartii* have been kindly lent me by Mr. Waterhouse for examination, and these I find also to be specifically identical with Kirby's *Apion Spartii*. In the Linnæan cabinet there is an insect with the name *Curc. aterrimus* attached to the pin; this insect I have repeatedly examined, and have always arrived at the same conclusion, that it is the *Apion marchicum* of Germ., Gyll., and Schönh. Mr. Kirby has little doubt that the specimen alluded to is the original *Curculio aterrimus* of Linnæus; but it is remarkable that the latter author should have always described the insect as "totus ater," for it has the elytra of a dark green colour: this circumstance has caused me to hesitate to adopt the old specific name *aterrimus*.

6. *A. affine*, Kirb., Germ., Steph., Schönh.

The affinity between this species and the foregoing (*Apion marchicum*) is extremely close; individuals are found of the same size, with the form and sculpture of the thorax so much resembling the preceding, as to induce Gyllenhal to consider the two species as scarcely distinct from each other. I cannot but regard *Apion affine* as a good species: it differs from *Apion marchicum* in being generally of a larger size, and varieties never occur so small as those of the latter species; the thorax inclines more to a globose form, with the punctures closer, larger and deeper; the elytra are proportionably wider and more convex, with less disposition to vary from the natural form than in *Apion marchicum*.

*Apion affine* appears to be a rare insect in the south of England, and was wanting in most of the London cabinets before I supplied them. I found this species in great abundance in only one locality—a hedge-bank in Yorkshire, at the latter end of June and the beginning of July, on various plants, but with none of *Apion marchicum* occurring; nor have I ever found any of *Apion affine* in company with *Apion marchicum*, in any of the different localities in the north and south of England.

7. *A. humile*, Germ. (1817), Gyll., Steph., Schönh.

— *brevirostre*, Kirb., Gyll. (vol. iii.) not Herbst.

— *curtirostre*, Germ., Steph.

— (var.) *sedi*, Gyll. (vol. iv.) not Germ.\*

— *plebeium*, Steph.

Mr. Kirby adopted the name *Apion brevirostre* of Herbst upon the authority of Major Gyllenhal, with the impression however that it was not the same, as it did not agree with Herbst's de-

\* Schönh. Syn. Ins. vol. v. p. 441.



scription. I possess foreign specimens of the true *Apion brevirostre* of Herbst sent me by Dr. Germar, and these are very distinct from the present species.

8. *A. minimum*, Herbst, Gyll., Germ., Schönh., Steph. Man.  
 — *velox*, Kirb., Germ., Steph. Ill.  
 — *foraminosum*, Schönh.

Dr. Germar has sent me German specimens under the last of the above names, with a remark that they do not differ from *Apion minimum*: in this opinion I perfectly agree.

Mr. Smith found this rare species in Turner's Wood, Hampstead, upon the *willows* in the month of May. Mr. S. Stevens and myself have also taken it somewhat plentifully in the same locality.

9. *A. simile*, Kirb., Germ., Steph., Schönh.  
 — *superciliosum*, Gyll. (vol. iv.), Schönh.

Specimens of both sexes of the *Apion simile* were sent by me to Schönherr, and returned by that author with the name *simile* but with a note of doubt. The insect from which Schönherr drew up his description of *Apion simile* was sent to him by Mr. Waterhouse, and was correctly referred to the *Ap. simile* of Kirby. An opportunity of examining the original typical specimens from which both Schönherr and Kirby made their descriptions has quite satisfied me on this point; according to Germar, *Ap. simile* of Kirby is identical with the *Ap. superciliosum* of Gyllenhal and the *Ap. triste* of Germar\*.

This species has been found at Birch and Coombe Woods, at Shirley Common near Croydon, Yorkshire, and in other places, the latter end of June and the beginning of July, always on the birch-tree (*Betula alba*).

10. *A. tenue*, Kirb., Germ., Steph., Schönh.

I found this insect plentifully in the Charlton sand-pits on the *Trifolium officinale* in the months of June and July; Mr. S. Stevens has taken it by sweeping, at Mickleham, Gravesend, Arundel, and other places, in the months of April, May, June, August and September.

11. *A. seniculus*, Kirb., Germ., Gyll., Steph., Schönh.  
 — *tenuis*, Gyll. (vol. iii.), Germ.  
 — (♀) *pusillum*, Mus. Steph. not Germ.  
 — (♂ ♀) *pubescens*, Schönh.

Not having had an opportunity of examining the Kirbian collection, Mr. Waterhouse formerly supposed the present species was the true *Apion pubescens* of Kirby, and in forwarding it un-

\* Ent. Zeit. Stettin 1842, p. 5.

der that name to M. Schönherr, has given rise to an error in the work of that author, M. Schönherr having in fact drawn up his description under the head "*Ap. pubescens*, Kirby\*," from Mr. Waterhouse's specimens; and these I find upon examination were the *Apion seniculus* of Kirby, a nearly allied but certainly distinct species. The *Apion elongatum* of Germar is quoted by Schönherr as synonymous with the *Ap. seniculus* of Kirby. I have now in my possession a specimen of the *Ap. elongatum* from Germar, and am quite satisfied that it is a distinct species. I have found *Apion seniculus* very plentifully near Knaresborough, in Yorkshire, by sweeping in fields of grass during the months of May and June; it is less common near London.

12. *A. pubescens*, Kirb., Steph.

— *civicum*, Germ.

— *Salicis* (Chevr. in Litt.), Schönh.

The description given under the name of *Ap. pubescens* by Schönherr† was taken from specimens forwarded to that author by Mr. Waterhouse, which, unfortunately, were not the *pubescens* of the original describer of the species; they were undoubtedly the *Apion seniculus* of Kirby: of the true *Apion pubescens* I sent six examples, including the sexes, to Schönherr, who observed that they were new to his collection, but were the species he had described as *Ap. pubescens* of Kirby!

I likewise forwarded several examples of *Ap. pubescens* to Dr. Germar, who stated that they are without doubt specifically identical with his *Ap. civicum*. I possess an insect sent me by Chevrolat of Paris, under the name of *Apion Salicis* of Chevrolat and Schönherr, which is, very distinctly, a true *Ap. pubescens* of Kirby.

I captured *Ap. pubescens* in great numbers on the east side of Hastings on the 4th of August, upon willows growing in hedges, and also in Yorkshire amongst grass. Mr. S. Stevens has taken it at Birch Wood, Arundel, and Hammersmith, in the months of August and September.

13. *A. Curtisii* (Kirb. MSS.), Curtis‡.

Specimens of the true *Ap. Curtisii* which I sent to Schönherr were regarded by that author as the *Ap. civicum* of his work and of Gyllenhal. The insect described under the last-mentioned name by Gyllenhal had been received from Schüppel as the *Ap. civicum* of Germar, and judging from the description in the 'Insecta Suecica' (vol. iv. p. 544), I am inclined to believe that *Ap. civicum* of Gyllenhal is synonymous with the *Ap. pu-*

\* Schönh. Syn. Ins. vol. v. p. 383.

† *Ibid.*

‡ Ann. Nat. Hist. vol. v. p. 281.

*bescens* of Kirby, and therefore distinct from the present species. That the two are distinct I have further evidence, for Dr. Germar, to whom I sent specimens of *Ap. Curtisii*, and whose attention I particularly directed to the points of difficulty, informed me that it was a new species and not in his collection. The *Apion seniculus*, *Curtisii* and *pubescens* are nearly allied. *Ap. pubescens* is distinguished from *Ap. Curtisii* by its *broad convex* form, its *more* pubescent body, and in being *less* glossy; the head is *broader*, and has a *concavity* between the eyes; the rostrum is less glossy, and is slightly pubescent; the antenna has the third and fourth joints longer.

*Ap. seniculus* differs from *Ap. Curtisii* in being larger and proportionably longer, in having the body distinctly clothed with whitish hairs, the head narrower in proportion, and the rostrum, in both sexes, much longer, but more strikingly so in the female: the elytra are oblong-ovate.

*Ap. Curtisii* has been taken on the sea-coast near Little Hampton amongst grass, in the month of August, by Mr. S. Stevens; and also by myself, in profusion, near Arundel, in the same month.

14. *A. violaceum*, Kirb., Gyll., Steph., Schönh.

This species, which is widely distributed, is found upon the common dock (*Rumex obtusifolius*) in many parts of England during the spring and autumnal months.

15. *A. Hydrolapathi*, Marsh., Kirb., Gyll., Germ., Steph., Schönh.

This species is closely allied to the preceding, and is rather difficult to distinguish; but the head is evidently *broader*; the rostrum shorter, and *thicker* at the base; the thorax instead of an impressed point has a *longitudinal* furrow.

This, like the last species, is found in various parts of England. I have taken it both on the common dock and the great water-dock (*Rumex Hydrolapathum*) in the months of June and September.

16. *A. frumentarium*, Linn., Payk. (1792), Gyll., Schönh.  
— *hematodes*, Kirb., Germ., Steph.

In the nomenclature of this species I have followed the Swedish entomologists, because that species which we call the *Ap. frumentarium* of Linnæus is not a native of Sweden; there is no specimen in the Linnæan cabinet, and the description is too short in the 'Fauna Suecica' to decide the question; the term "longirostris" is also used by Linnæus to define *Curc. Pruni*, placed by him in the same section; the *Curc. frumentarium* of Fabricius, the next oldest writer, is equally if not more difficult to determine; according to Gyllenhal (who had better opportunities of judging

than Kirby), the present insect is the *Curc. frumentarius* of Paykull; for these reasons I have ventured to change the name.

I obtained many specimens of this species near High Harrogate and at Scarborough in Yorkshire, in the months of July and August, from the *Teucrium Scorodonia*, in company with *Ap. marchicum* and *Ap. rubens*. On Hampstead Heath abundantly upon the *Rumex Acetosella*, also in company with *Ap. marchicum*, but I never observed it in the south upon the first plant.

17. *A. rubens* (Ingall MSS.), Steph. Man.

This species is immediately distinguished from all its congeners by its *narrow* form, more *pubescent* body, and by the head being comparatively *very short*.

Found very sparingly in Yorkshire on the *Teucrium Scorodonia*, but somewhat plentifully at Shirley Common near Croydon on the *Rumex Acetosella* in October; and in sand-pits at Hampstead Heath, Weybridge, and Wimbledon Common, by S. Stevens.

18. *A. sanguineum*, DeGeer, Gyll., Schönh.

Oblong-obovate, dull rufo-testaceous; pubescent: head *rather short*, coarsely punctured, somewhat rugose between the eyes, the punctures larger and deeper than on the thorax; eyes black, rather prominent: rostrum in the male shorter and thicker than in the female, rather opaque, distinctly punctulated to the apex, nearly *straight*; in the female long, cylindrical, glabrous and shining, with scattered minute punctures, the tip piceous; *subporrect*: antennæ inserted a little behind the middle: thorax oblong; anteriorly slightly constricted and margined, more narrowed in front than behind, dilated in the middle, thickly and very minutely punctured, with a short impressed line at the base before the scutellum: elytra long-oval, moderately convex, crenate-striate, the interstices narrow, elevated, finely strigose: legs obscure rufo-testaceous, with the apex of the claws black. (Length  $1\frac{1}{2}$ — $1\frac{3}{4}$  line.)

This insect may be known from all the red species principally by having the rostrum nearly *straight*, and much *longer* in the female than in the male; a specimen was sent to Schönherr of the present species by Mr. Waterhouse, and returned with the name of *Ap. sanguineum*.

It is apparently a very rare or a very local species; I never met with it, but am indebted to Mr. Waterhouse for my specimens. Mr. S. Stevens has examples from the collection of Mr. Griesbach, which were taken, he believes, at Coombe Wood.

19. *A. cruentatum*, Walton.

— *sanguineum*, Mus. Steph.

Long-obovate, testaceous, slightly pubescent: head rather long,

*coarsely rugose-punctate*; eyes very prominent, black: rostrum short, curved, *very stout*, punctulated and shining, the apex black: thorax subcylindrical, dilated at the middle, rather deeply constricted and margined anteriorly, narrowed posteriorly, convex above, *thickly* and *coarsely* punctured: elytra obovate, *very convex*, deeply punctate-sulcate, the interstices narrow and elevated, scarcely as broad as the sulci: legs rather stout; the tibiæ and claws at their apices piceous. (Length  $1\frac{1}{2}$ — $1\frac{3}{4}$  line.)

There is a great resemblance between the present species and *Ap. frumentarium*, but this is a larger and more robust insect, with the rostrum distinctly thicker; the punctures on the head and thorax are larger and deeper, and the legs stouter.

This species is unknown to Germar and Schönherr; it is apparently rather rare; I possess specimens taken in Yorkshire, and others from a grass field in September on the west side of Turner's Wood, Hampstead: I never found it in company with *Ap. frumentarium*.

20. *A. miniatum*, Schönh.

— *frumentarium*, Herbst, Marsh., Kirb., Germ., Steph.

Found in many places throughout England on the common dock (*Rumex obtusifolius*) in July.

21. *A. Onopordi*, Kirb., Germ., Gyll., Steph., Schönh.

— (var.) *rugicolle*, Steph.

— *penetrans*, Steph. non Germ.

I have never seen an indigenous specimen of *Ap. penetrans* of Germar (recorded as British); my foreign examples from Germar have the habit of *Ap. Onopordi*, but they are nevertheless very distinct from it: the thorax is *less convex*, and the punctures much *smaller*; the elytra are *elongate*, very *obscure* blue-black, and *pubescent*.

Common in Yorkshire and in many other places on thistles (*Onopordum Acanthium*).

22. *A. radiolus*, Marsh., Kirb., Gyll., Steph., Schönh.

*Curc. aterrimus*, Marsh., Gyll. vol. iii.

*A.* (var.) *oxurum*, Kirb., Germ.

— (♀) *nigrescens*, Steph.

— *validum*, Germ., Schönh.

The foreign specimens of *Ap. validum* sent me by Schönherr and Germar are clearly identical with *Ap. radiolus* of Marsham.

Very abundant in Yorkshire and the south of England on mallows (*Malva sylvestris*) in June.

23. *A. confluens*, Kirby, Steph.

— *stolidum*, Gyll., Schönh.

For remarks on this species I must refer to the following (*Apion stolidum* of Germ.).

Mr. S. Stevens has found this species on very dry banks, but rarely; Brighton and Arundel in August, Birch Wood in July.

24. *A. stolidum*, Germ., Steph. Man.

— *confluens*, Gyll., Schönh.

*Apion stolidum* of Germar and *Apion confluens* of Kirby (but not of Gyllenhal and Schönherr) are in fact extremely alike; varieties occur, which in the form of the elytra are difficult to distinguish; nevertheless I think they ought to be given as distinct species; the former may be distinguished from the latter by its shorter elytra and thorax. I sent several specimens with short elytra to Germar, under the name of *Apion confluens* of Kirby, and also two larger insects with the elytra elongate, named in doubt *Ap. stolidum*? of Germar: the former with short elytra he informed me were the true *Ap. stolidum* of Germar, and the latter the *Ap. stolidum* of Schönherr, but previously unknown to him. The two large insects with elongate elytra I have since ascertained, by an examination of the typical specimen, belong to the *Ap. confluens* of Kirby: beyond this it will be clearly seen that Germar's description and figure of *Ap. stolidum* must refer to the species having short elytra. Gyllenhal and Schönherr have reversed the names of the two species, and it is rather remarkable that these authors should have overlooked the important words "coleoptris oblongo-ovatis" in Kirby's description, using the terms "elytris ovatis" as characteristic of *Ap. confluens*, whilst "elytris oblongo-ovatis" forms part of their description of *Ap. stolidum*. I may add, that Mr. Waterhouse sent to M. Schönherr two large specimens with the elytra oblong-ovate, and two smaller insects with the elytra short-ovate; the former were returned as *Ap. stolidum*, and the latter as *Ap. confluens*.

Mr. Samuel Stevens has found this species rather plentifully in July and August near Hammersmith Bridge, but, as he informs me, not in company with *Ap. confluens*. I met with a great number of this species by sweeping in a pasture opposite Juniper Hall, near Mickleham, on the 11th of June.

25. *A. lævigatum*, Kirb., Germ., Steph.

— *brunnipes*, Schönh.

The male of this species is entirely black: the female has the elytra of a rich violet-colour.

Mr. S. Stevens found a male of this very rare and beautiful species at Birch Wood; I afterwards fortunately obtained from the same locality several specimens of both sexes, the latter end of August and the beginning of September.

26. *A. æneum*, Fab., Herbst, Marsh., Kirb., Gyll., Germ., Steph., Schönh.

*Curc.* (var.  $\beta$ .) *chalceus*, Marsh.

Common on mallows (*Malva sylvestris*) in June.

27. *A. Carduorum*, Kirb. (1808), Germ., Steph.

*Curc. Sorbi*, Marsh.

*A. gibbirostre*, Gyll. (1813), Schönh.

— (var.) *tumidum*, Steph.

This insect has, near the base of the rostrum, two concavo-convex plates or cups (one on each side), surrounding the outer edges of two deep foveæ, and the antennæ are inserted in the concavities beneath; the edges of the plates in front have a deep excision to receive the antennæ when extended forward; the foveæ and the antennal grooves behind are separated by a prominent narrow ridge or carina which terminates beneath between the eyes: I have observed under the rostrum of *Apion æneum*, and in other species also, two deep foveæ which are externally dilated, and have the usual deep antennal grooves behind.

Frequently found upon thistles (*Carduus*) the latter end of July and the beginning of August.

28. *A. rufirostre*, Fab., Herbst, Marsh., Kirb., Germ., Gyll., Steph., Schönh.

— (♀) *malvarum*, Kirb., Germ.

*Curc. Trifolii*, Marsh. not Linn.

Found abundantly on the mallow (*Malva sylvestris*) in Yorkshire and within the metropolitan district, the latter end of June and the beginning of July.

29. *A. Malvæ*, Fab., Marsh., Kirb., Germ., Steph., Schönh.

Very plentiful on mallows (*Malva sylvestris*) at Birch and Coombe Woods, Comhurst near Croydon, and at Gravesend, in June and July.

30. *A. vernale*, Fab., Herbst, Kirb., Gyll., Germ., Steph., Schönh.

*Curc. concinnus*, Marsh.

I found this insect on the south side of Windmill Hill, Gravesend, on the common stinging-nettle (*Urtica dioica*) in May, and Mr. S. Stevens met with it in the same locality in October, and also at Southend in June; it appears to be very local and uncommon. Deal - July

31. *A. pallipes*, Kirb., Gyll., Germ., Steph., Schönh.

— *geniculatum*, Germ.

This species is very sparingly clothed with scattered whitish hairs, and all the *coxæ* are black; the trochanters and *tarsi* piceous or pitchy black; the antennæ with the basal joints generally piceous, and the club always dusky black. Germar has sent me a foreign specimen of his *Ap. geniculatum*, which he says is the *pallipes* of Kirby: no doubt can exist as to the correctness of this opinion.

This insect is apparently rare in the south of England: it was taken at Arundel in August, and at Dorking in June, by Mr. S. Stevens; and by myself at Knaresborough, in Yorkshire, plentifully in June and September, amongst grass and on banks under hedges.

32. *A. Germari*, Walton.

Ovate or long-ovate; *aneous* black; *thickly* clothed with a fine cinereous pubescence: head very short, subquadrate, punctulated, with an obsolete channel between the eyes; eyes moderately prominent, *ciliated*: rostrum in the male short, stout, and *thickly* covered with whitish hairs; longer in the female, rather slender, attenuated before the antennæ, smooth, glabrous, and shining: the antennæ inserted near the base beneath, entirely dull testaceous: thorax subcylindrical, thickly and finely punctured, the punctures confluent, with a dorsal line before the base more or less distinct: elytra *ovate, very convex*, punctate-striate, the interstices slightly elevated, evidently *punctured, very pubescent*, with a whitish *spot* on each side of the scutellum, and a broad denuded transverse *fascia* on the middle of the back: legs slender, *yellow*; the coxæ black; all the *trochanters*, with the joints of the legs, the *tarsi* and claws, at their apices, *rufo-testaceous*. Length 1—1 $\frac{1}{4}$  line.

The affinity between this and the preceding species is certainly very close, but I am convinced it is sufficiently distinct; it is a smaller insect, and differs in having a shorter form, a more convex body, the legs more slender, and in being considerably more pubescent, especially in recent specimens: the elytra having the white spots at the base, the denuded fascia on the back, the punctured interstices, yellow legs, the pale trochanters and tarsi, are all good distinctive characters.

I have the pleasure of naming this new species as a testimony of respect to one of the most learned and distinguished entomologists in Europe.

It is unknown to Schönherr and to Germar, to each of whom I sent specimens under the above name.

I found this species very abundant on *Mercurialis annua* in the middle of September and October near the Tivoli Gardens, Margate.

33. *A. flavimanum*, Schönh. 1833.

— *picicorne* (Waterh. MSS.), Steph. Man. 1839.

The anterior tibiæ of this species are generally more or less dusky testaceous or piceous, sometimes *entirely black*; the antennæ have the joints rufo-testaceous, piceous or black, the club always dull *black*.







Some years since Mr. Waterhouse first discovered this insect near Dorking. I found it at Mickleham rather plentifully the beginning of October 1837, on herbage under the hedges, in the park behind the church; at Gravesend in June, Mr. S. Stevens: it appears to be confined to chalky districts.

34. *A. atomarium*, Kirb., Gyll., Germ., Steph. Man., Schönh.  
— *pusillum*, Germ.

This is the most minute species of the genus found in England; it was originally described by Mr. Kirby from a Swedish specimen sent him by Major Gyllenhal, and for many years it was unknown as a British insect until Mr. Waterhouse found it near Dorking. In a note from Germar relative to this species, he informs me that the "*Ap. atomarium* of Kirby is, without doubt, identical with the *Ap. pusillum* of Germar."

Taken in abundance at Birch Wood on the wild thyme (*Thymus Serpyllum*) in September by Mr. S. Stevens, Mr. Smith and myself, and occasionally in other places on the same plant.

35. *A. vicinum*, Kirb., Germ., Steph., Schönh.  
— *Loti*, Gyll.  
— *incrassatum*, Germ.

Very rare in the south of England, but I found it in Yorkshire in profusion on the black thorn (*Prunus spinosa*), growing on a hedge-bank by the side of a ditch full of rushes in a marshy situation.

36. *A. Hookeri*, Kirb., Germ., Gyll., Steph., Schönh.

I have frequently taken this insect in abundance in Yorkshire by sweeping in clover-fields (*Trifolium pratense*), particularly in a field near Low Harrowgate, in June and September; and plentifully near Southampton in June; one example was found at Gravesend in June, and another at Shirley Common in September, by Mr. S. Stevens. *very common &c. — plentiful.*

[To be continued.]

LI.—On the British species of Grammonema and Eunotia.

By JOHN RALFS, Esq., M.R.C.S., Penzance\*.

[With a Plate.]

GRAMMONEMA, Ag.

Filaments gelatinous, elongated, flexible, not fragile; frustules rectangular, plane, not striated, scarcely siliceous.

In appearance this genus comes very near to *Fragilaria*, with which it is united by most writers, but its habit is so very differ-

\* Read before the Botanical Society of Edinburgh, February 8th, 1844.  
*Ann. & Mag. N. Hist.* Vol. xiii. 2 H

ent that I am inclined with Agardh to keep them distinct. In *Fragilaria* the filaments are very fragile, breaking in pieces at the slightest touch; the species do not adhere well to paper; the frustules are siliceous and glass-like, and may be subjected to a red heat without any other alteration than the destruction of the colouring matter, and at each end are two more or less evident pellucid puncta.

In *Grammonema* there is scarcely any silica, in which important character it differs from most of the *Diatomaceæ*; the filaments are not fragile and are highly mucous, adhering firmly to paper or glass, and when dried appearing like a mere stain; the application of nitric acid or a red heat destroys their form, and I can perceive no puncta at the ends of the frustules.

The filaments are elongated, ribbon-like, and composed of numerous frustules which are longer than broad.

1. *G. Jurgensii*, Ag. Filaments attenuated, yellowish-brown; frustules three to eight times longer than broad, slightly separated at the angles. Ag. Consp. Diatom. p. 63. *Fragilaria Jurgensii*, Ktz. Synop. Diatom. in Linnæa 1833, p. 587. *Fragilaria aurea*, Carm. in Hook. Br. Fl. vol. ii. p. 403! Harv. Br. Alg. p. 198. *Conferva striatula*, Jurgens, Dec. 19, no. 6! (not *Conf. striatula*, Dec. 11, no. 7.).

β. *diatomoides*. Filaments turning green when dried. *Fragilaria diatomoides*, Grev. in Hook. Br. Fl. p. 403; Harv. Br. Alg. p. 198; Wyatt, Alg. Damn. no. 233!

On marine algæ: spring.

α. Appin, Capt. Carmichael; Antrim, Mr. D. Moore; Land's End and Penzance.

β. Kilkee, Mr. Harvey; Torquay, Mrs. Griffiths; Mount's Bay.

In a mass both are dark brown, but much paler if separated in the water. In α the colour is but little altered in drying, but in β it becomes green.

Filaments elongated, giving a feathery appearance to the plant to which they are attached, very mucous, flexible, gradually attenuated; frustules under the microscope nearly colourless, three to eight times longer than broad, plane, slightly attenuated at both ends, and hence disconnected at their angles, and as the ends are also often somewhat rounded, the margins of the filament have a crenate appearance.

Mr. Harvey, to whose liberality I am indebted for specimens of many of Capt. Carmichael's plants, has given me a portion of a specimen of '*Fragilaria aurea*' gathered by Carmichael himself; and also Irish specimens both of that plant and of '*Fragilaria diatomoides*' of Greville. These I have attentively examined, as well as specimens gathered at Torquay and Penzance, and I

regret that I cannot detect any character to distinguish '*Frag. aurea*' from '*Frag. diatomoides*,' except that the latter in drying changes to a green colour.

The following extracts from their letters will show that my opinion has been confirmed by the observations of Mrs. Griffiths and Mr. Harvey, who at my request compared these plants.

Mrs. Griffiths writes, "I have examined your specimens of '*Fragilaria aurea*' very carefully, and compared them with '*Fragilaria diatomoides*' from Torquay, gathered at different times, and can find nothing to distinguish one from the other."

Mr. Harvey observes, "I fear you are right about '*Frag. aurea*' if colour be not in itself a specific character."

Mr. Berkeley has enabled me to compare our plant with the '*Conferva striatula*' of Jurgens' Algæ, and thus to assure myself that it is completely identical with Jurgens', which is doubtless the '*Grammonema Jurgensii*' of Agardh.

PLATE XIV. fig.5. *Grammonema Jurgensii*: b, single frustule; c, lateral view.

#### EUNOTIA, Ehr.

Frustules free, simple or binate, quadrangular, with two puncta at each end; the front is flat or concave, and the dorsum convex; the lateral surfaces are flat.

Some species placed by Ehrenberg in this genus have cymbiform frustules and belong to Agardh's genus *Cymbella*, under which they will be described.

In *Eunotia* the frustules resemble those of some species of *Fragilaria*, from which the present genus differs only in not having its frustules united into a filament.

Viewed laterally the frustules are lunate. The lateral surfaces are flat, and do not enter into the front view, which is quadrangular with two puncta at each end. Longitudinally the front is flat or concave and the dorsum convex; the convex surface is generally raised in transverse ridges, and the number of these ridges, as seen in a lateral view, when they appear like teeth, distinguishes the species.

Professor Bailey suspects that "the number of these teeth is liable to variation, and that the number of species has in consequence been made too great\*."

1. *Eu. monodon* (Ehr.?). Lateral view concave on one margin, convex on the other and constricted near the ends; striæ none or very obscure. Bailey, Amer. Bacil. in American Journal of Science and Arts, vol. xlii, no. 1. pl. 2. f. 28.

In freshwater pools. Piltown Common near Uckfield, Sussex, Mr. Jenner; Penzance.

\* See American Journal of Science and Arts, vol. xlii. No. 1.

The frustules are very minute, but vary greatly in length, being in some specimens only twice as long as broad, and in others six or seven times longer than broad.

The front view has its ends slightly rounded and its puncta very obscure. In the lateral view the shorter frustules are more turgid on the back, and more constricted near the ends. Although the frustule seems in general to have no striæ, I believe that this apparent deficiency is owing to the minute size of the specimens which have come under my notice, as I have occasionally observed very faint lateral striæ.

A frustule of this species, though very much smaller, has great resemblance to a solitary frustule of *Fragilaria pectinalis*; but in this plant the concavity of one margin is generally greater, and the constriction near the ends of the frustule more considerable; the front view, too, is narrower in proportion to the lateral; still it may eventually prove to be only the commencement of that plant.

In the 'American Bacillaria' there is no description of this species, but as Bailey's figure represents a larger plant, with distinct lateral striæ, it is probably taken from a more mature specimen.

PLATE XIV. fig. 1. *Eunotia monodon*: *a*, front view; *b*, front view of frustules deprived of their colouring matter; *c*, lateral views.

2. *Eu. diodon*, Ehr. Lateral view striated, with the convex margin bidentate. Ehr. Infus. p. 192. t. 21. f. 23; Pritch. Infus. p. 214; Bailey, *l. c.* pl. 2. f. 29.

In freshwater pools, very rare. Penzance, *J. R.*; Piltown Common near Uckfield, Sussex, *Mr. Jenner*.

Front view about twice as long as broad, with two distinct puncta at each end, and the terminations of the lateral striæ evident along the lateral margins. Lateral view much narrower; the margin on one side flat or slightly concave, on the other convex with two rounded elevations and a constriction near each end; the lateral striæ are very distinct. The transverse ridges on the dorsum appear much more considerable in the shorter than in the longer frustules.

The figure in the 'American Bacillaria' represents a larger plant than the specimens I have seen, but agrees with them in other respects.

This species differs from *Eunotia tetraodon* in the number of ridges on the dorsum, which is less rounded, and in having the lateral surface much narrower than the front, and one of its margins flat or slightly concave.

PLATE XIV. fig. 2. *Eunotia diodon*: *a*, front view; *b*, lateral view.

3. *Eu. triodon*? Ehr. Frustules with three ridges on the dorsum. Ehr. Infus. p. 192. t. 21. f. 24; Pritch. Infus. p. 214. f. 164?; Bailey, *l. c.* pl. 2. f. 30.

In Cold Bath Spring near Tunbridge Wells, *Mr. Jenner*.

Frustules very minute, with two indistinct puncta at each end. The lateral view is slightly concave on one side, and on the other convex with three dentations; striæ wanting or indistinct.

The form of this species greatly resembles a single frustule of *Fragilaria pectinalis*  $\beta^*$ , but is smaller; the protuberances also are larger in proportion to the size of the plant.

The figure in the 'American Bacillaria' is much larger and has distinct lateral striæ, and was probably taken from an older specimen.

PLATE XIV. fig. 3. *Eunotia triodon*: a, front view; b, lateral view.

4. *Eu. tetraodon*, Ehr. Frustules with four ridges on the dorsum; lateral striæ distinct. Ehr. Infus. p. 192. t. 21. f. 25; Pritch. Infus. p. 214; Bailey, *l. c.* pl. 2. f. 31.

In boggy pools, rare. Dolgelley and Penzance, *J. R.*; Weston Bogs near Southampton, *Mr. Jenner*.

This is a large species: in the front view the puncta are distinct; in the lateral view one margin is very concave, and the other very convex with four large, rounded elevations, and a constriction near each end. The strongly marked striæ slightly converge towards the concave margin.

PLATE XIV. fig. 4. *Eunotia tetraodon*: a, front view; b, dorsum; c, lateral view.

LII.—*Description of a new Genus of Gobioid Fish*. By JOHN RICHARDSON, M.D., F.R.S. &c.

To Richard Taylor, Esq.

MY DEAR SIR,

Haslar Hospital, 17th April, 1844.

I SEND you the generic characters of a gobioid fish discovered by Sir James Clark Ross at Kerguelen's Land, on his recent antarctic voyage. The genus will occupy a place in the system near *Callionymus* and *Trichonotus*, and affords a connecting link between the Gurnards and Gobies.

I remain, dear Sir, yours faithfully,

JOHN RICHARDSON.

CHANNICHTHYS, *Richardson*.

*Caput* magnum, cranio scabro, subtetragono; facie horizontali, depressiuscula, ante oculos longa, lateraliterque per parietes oris membranaceos aucta.

*Faux* laxissima, horizontalis, terminalis; rictu superne ab ossibus

\* This may be the *Fragilaria trionodis*, Ehr., a species I am unacquainted with except by name.

intermaxillaribus (satis mobilibus, nec tamen propter pedicellorum brevitate protractilibus) factò.

*Os maxillare* gracile paulo in *f* curvatum, angulum tantum oris attingens, nec sub aciem ossis præorbitalis recidens.

*Dentes* in ambitu oris stipati, breves curvati. Vomer et palatum edentati. Ossa pharyngis denticulata.

*Oculi* largiusculi, laterales.

*Aperturæ* ejusque paris *narium* invicem remotæ: anteriores minores in apice extremo rostri positæ.

*Os præorbitale* oblique flabelliforme, rostro brevius: ossa suborbitalia sequentia minima, *Gena* magna, nuda, inarmata.

*Ossa operculi* parva una cum membrana connectenti circumeuntique operculum modicum, triangulare conficientia. Os operculare proprium tripartitum, parte postica in apicibus quinque subspinosis divisa.

*Apertura branchialis* amplissima intra ramos maxillæ inferioris procedens. Membrana branchiostega lata, radiis sex gracilibus sustentata. Arcus branchiarum quatuor liberi et lamina una operculo adnata.

*Corpus* teres modo *Triglorum* in caudam gracilem sensim attenuatum, ventre tumido.

*Cutis* lævis, squamæ veræ nullæ. *Linea lateralis* versus finem ejus diffracta, ad basin pinnæ caudæ desinens, per totum cursum suum scutellis scabris armata. Scutelli pauci in linea media lateris sparsi.

*Pinnæ* ventrales ante pectorales positæ. Pinnæ verticales pinnas *Trigli* simulant. Pinnæ dorsales duæ: prior quarum alta, triangularis: radii pinnæ secundæ setacei, simpliciusculi. Radii pinnæ ani omnes articulati cum apicibus modo *Trachinorum* de membrana extantibus. Pinnæ pectorales majusculæ, rotundatæ, non pedicellatæ, radiis omnibus divisæ.

*Papilla* genitalis simplex, parva. Vesica aeris nulla. Ventriculus ovalis cum ramo brevi ascendenti. Intestinum convolutionem unam faciens dein rectum ad anum tendens. Cæca pylorica dua brevia.

*Channichthys rhinocerotus*, Rich. Species unica adhuc cognita. Statura sesquipedalis.

Rad. :—B. 6; D. 8|—35; A. 31; C. 11♀; P. 21; V. 1|5.

LIII.—*Description of a Genus of Chinese Fish.* By JOHN RICHARDSON, M.D., F.R.S. &c.

Familia THERAPONINÆ.

Genus HAPALOGENYS, Richardson.

*Ch. Gen.*—*Corpus* altum, compressum, dorso acuto, squamis asperis undique tectum. *Linea lateralis* arcuata, continua.

*Caput* undique squamosum, regionibus arcis narium, labiis, oris posterioribus maxillarum, ac plicis inflexis membranæ branchiostegæ



exceptis. *Labium inferius*, ad mentum papillis teneris brevissimis dense villosum, inter quas in apice menti pori duo exigui et in ramo utroque maxillæ inferioris pori tres majores numerandi sunt. Fovea centralis sub mento nulla.

*Praoperculum* arcuatum, serratum. *Operculum* denticulis duobus vix inter squamas conspicuis armatum.

*Dentes* villosi, stipati, in serie extima supra et infra obesiores, nec tamen altiores: dentes canini nulli. *Palatum* læve, plicatum. *Pinna dorsi* ad basin fere bipartita, cum spina antica recumbenti. *Membrana branchiostega* radiis sex sustentata.

*Spec.* 1. *H. nitens*, Richardson, Zool. of Beagle, Fish. pl. 43. f. 1, 2.

2. *H. analis*, idem. pl. 43. f. 3.

This genus is founded upon specimens of two species brought from Canton by John Reeves, Esq., F.R.S., and presented by him to the British Museum. Mr. Reeves had coloured drawings made from the recent fish, copies of which exist in a volume of unpublished figures collected by General Hardwicke, also in the British Museum, and representations of both species are given in the 'Zoology of the Voyage of H.M.S. Sulphur' (plate 43).

*Hapalogenys* agrees with the Sciaenoid genus *Lobotes* in the number of the gill-rays and tolerably closely in external aspect, but it may be distinguished by the rounded preoperculum and the arrangement of the pores on the chin. In the harshness of its finely toothed scales it differs from the true *Sciaenidæ*, and it can scarcely be separated from the group to which *Datnia* and *Nandus* belong. The presence or absence of vomerine and palatine teeth, when employed rigidly as a distinctive character of the Percoid and Sciaenoid families, tends to separate genera agreeing closely in other parts of their structure. Cuvier himself has disregarded it in the arrangement of certain Percoids having fewer than seven gill-rays; and it may be as well to go somewhat farther, and to bring *Serranus* and its subgenera *Plectropoma*, *Mesoprion* and *Diacope*, or the entire family of *Serranidæ*, into a closer neighbourhood with *Hæmulon*, *Pristipoma* and *Diagramma*, instead of separating them by the interposition of the very dissimilar tribes of Trigloids and Cottoids. For the same reason, a group of Percoids having less than seven gill-rays, which includes *Therapon*, *Helotes*, *Dules*, *Datnia*, *Nandus* and some other genera, should be approximated to *Scolopsides*, *Lobotes* and *Hapalogenys*, all having a single dorsal and six gill-rays. To this group I have given the family name of *Theraponinæ*. *Anoplus*, a genus recently published in the 'Fauna Japonica,' resembles *Hapalogenys* in the strength of its dorsal and anal spines and in general form, but it has still more of the Sparoid aspect than the latter. It has vomerine teeth, is destitute of pores on the jaw, and its scales are less rigid than those of *Hapalogenys*.

The designation of *Hapalogenys*\* was contrived to express the velvety softness of the chin and lower lip, which is made more conspicuous by contrast with the rigidly rough scales that cover the rest of the head. A greater development of the fine tender papillæ of the under lip produces the beards of *Pogonias*—a genus having seven gill-rays and no recumbent spine before the dorsal. The *Pogonias nigripinnis* however of the 'Fauna Japonica' has only six gill-rays, a recumbent spine, three pores on each limb of the lower jaw, and in fact stands in the same relation to *Hapalogenys* that *Pogonias* does to *Micropogon*, the relative development of the beards being the chief difference. The *Coius polota* of Buchanan-Hamilton and *Coius binotatus* of Gray are similar forms, but an actual examination of specimens is required to determine whether they ought to be referred, as in the 'Flora Japonica,' to *Anoplus* or to *Hapalogenys*.

The general form of *Hapalogenys* and its recumbent pre-dorsal spine show some analogy to the *Squamipennes*, and bring it near to *Scorpiis*, but the vertical fins are not so fully enveloped in scales, and the dentition removes it far from the *Chatodontidæ*.

LIV.—*On a Monstrosity of the Pistil in Primula vulgaris.* By CHARLES C. BABINGTON, M.A., F.L.S., F.G.S. &c.†

THE curious monstrosity represented by the annexed rude sketch has just been sent to me by Mr. J. H. Walton of St. Bees College in Cumberland. It occupies the place of the pistil, and may be described as follows:—Within the base of the corolla is situated a small fleshy cup, from the centre of which springs a cylindrical stem capped with another shallow fleshy cup with a wavy margin. An exposed conical placenta, covered with peltate ovules, is seated in the centre of the latter cup. Thus in place of the ovary is a cup-shaped body; and the capitate stigma is replaced by a naked fleshy ovary. Flowers of the usual form and structure were found upon the same root with two flowers possessing this curious organ. The other parts of the monstrous flower were not altered, the stamens retaining their ordinary position. It seems probable that this singular organ consists of two whorls of carpellary leaves instead of one, as is usual in *Primula*, and that the plant was not able to develop the inner whorl sufficiently to allow it to close over the ovules.



\* From ἀπαλός, *mollis*, et γένυς, *mentum*.

† Read before the Botanical Society of Edinburgh, April 11, 1844.

LV.—On the difference between the Robertsonian Saxifrages of Ireland and those of the Pyrenees. By CHARLES C. BABINGTON, M.A., F.L.S., F.G.S. &c.\*

[With a Plate.]

HAVING recently had occasion to re-examine the Irish Saxifrages referable to Haworth's genus *Robertsonia*, I have been greatly struck by the uniform difference which exists between each of them and the corresponding plant of the Pyrenees. In a paper contained in the 'Annals of Natural History' (vol. viii. p. 321), I have already shown that the typical *Sax. umbrosa* (the Pyrenean plant) differs considerably from that found in Ireland, but was not then aware that precisely the same differences exist between the *Sax. hirsuta* and *Sax. Geum* of those two countries.

The differences to which I refer are found in the form of the margin of the leaves, which may be correctly denominated "crenate" in the Pyrenean plants, but to which the terms "acutely crenate," "serrate," or "dentate," must be applied when the Irish specimens are described. The outlines of leaves which accompany this paper will show what is intended far better than can be done by any description. They have been carefully drawn from the leaves of specimens in my own herbarium, and belong to the three above-mentioned species; Pl. IV. fig. 1—7 representing the leaves of *Sax. umbrosa*, fig. 8—10 those of *Sax. Geum*, and fig. 11—13 those of *Sax. hirsuta*. Of these, fig. 1, 8, and 11 are from Pyrenean specimens, and all the others, except fig. 2 and 3, from those found in Ireland.

#### *Saxifraga umbrosa.*

Plate IV. fig. 1. (from a specimen marked "*S. umbrosa*, Linn. In M. Bulour prope thermas Eausbonnes, Pyr. occid. 1831." Endress.) is the typical form of this species, in which the margin is truly crenate, and does not appear to be a native of Ireland; but fig. 3, which is undoubtedly the same variety, is taken from a plant possessing strong claims to be considered indigenous in the West Riding of Yorkshire, where I have seen it in profusion in Hezleden Gill, a wild and retired glen near the mountain named Pen y Gent; and the Rev. John Howson has found it in Lynn Gill, which is situated on the opposite side of the Penine chain of hills, and at a distance of about  $4\frac{1}{2}$  miles from Hezleden Gill (Phytologist, p. 845). Another Pyrenean specimen, from "Cascades du Lys, montagne d'Esquierry," being No. 27 of

\* Read before the Botanical Society of Edinburgh, 9th May, 1844.

Duchartre's 'Fl. Pyrenéenne,' is precisely similar to the above. This form is my *S. umbrosa a. crenata*.

Plate IV. fig. 4. (the var. *a.* of Mackay, from his cultivated Irish specimens,) is considered by my friend Mr. J. T. Mackay as the typical form of the species, and, "identical with the London Pride of the gardens" and the Pyrenean plant, has the margin crenate-serrate. A specimen, fig. 2 ("*S. umbrosa*, L. Hab. in montibus præsertim altissim. copiose.—*Peñaflor*, 11 Jul.—*Pico de Arvas*, 14 Aug." "Durieu Pl. Selectæ Hispano-Lusitanicæ. Sec. 1. Asturiæ. Anno 1835 collectæ." No. 330.), is the same variety found in the north of Spain. They are denominated by me var. *β. crenato-serrata*.

Plate IV. fig. 5. is the var. *β.* of Mackay, var. *γ. punctata*, Bab., and *Sax. punctata* of Haworth and Reichenbach. Gathered at Killarney, Ireland, in 1841.

Plate IV. fig. 6 and 7. represent Mackay's var. *γ. serratifolia*, my var. *δ. serratifolia*, and the *Sax. serratifolia* of Mackay (formerly) and Reichenbach.

#### *Saxifraga Geum.*

Plate IV. fig. 8. is the plant of the Pyrenees; it is taken from a specimen marked "*S. Geum*, L. Au Pas de Roland prope Itatou. Pyr. occid. 1831." Endress. Here the leaves are crenate, or even occasionally have the crenatures so much flattened as to become almost retuse. I believe that nothing like this has been seen wild in Ireland.

Plate IV. fig. 9. is the Irish *Sax. Geum* from Connor Hill near Dingle, county Kerry, 1841; and fig. 10 is a plant with remarkable leaves from Turk Waterfall near Killarney. Here the leaves are crenate-dentate (fig. 9), or dentate (fig. 10), thus presenting the same difference from the Pyrenean plant which was seen in *Sax. umbrosa*.

#### *Saxifraga hirsuta.*

Plate IV. fig. 11. with a crenate margin, and fig. 12 and 13 with a dentate margin, represent the corresponding forms of *Sax. hirsuta*. The first (fig. 11) is from the "Pyrenees," and was obtained from the herbarium of Dr. Leo of Metz: the others are Irish. Fig. 12 from the Gap of Dunloe, Killarney, 1841, the original Irish station. Fig. 13 from Connor Hill, county Kerry, 1841.

March 5, 1844; St. John's College, Cambridge.

## BIBLIOGRAPHICAL NOTICES.

*Annales des Sciences Naturelles.* Third Series.

January 1844.—This is the first number of a new series of the ‘*Annales*,’ and a most admirable commencement it is. The first paper in the zoological department is a report made to the Academy of Sciences, by M. Milne-Edwards, on the memoirs of M. de Quatrefages, relating to the organization of the invertebrate animals of the western coast of France. The introductory observations of the reporter on the state and true aims of zoology should be read and borne in mind by every British naturalist; they are conceived in the highest spirit of natural-history philosophy, and do great honour to Milne-Edwards. The account of M. de Quatrefages’ researches which follows is most interesting, and shows how much may be done by looking at home for work, and doing that work well. There is a most gratifying announcement at the end,—that the Institute have resolved to send M. de Quatrefages to pursue his inquiries on the Mediterranean coast of France. Our museums at home should take a lesson from this, and have their missionaries at work among the treasures which abound on our own shores; *observing* as well as *collecting*.—Researches on the parts of the skeleton of Man and the Vertebrata (2nd memoir), by M. Breschet. This part treats of the anomalies of the malar bone, and is illustrated by two plates.—On the jaw of a fossil Giraffe discovered at Issoudun, in France, by M. Duvernoy. The jaw described was found in December 1842, and is the type of a new species which was about a sixth less than the existing giraffe. The author names it *Camelopardalis Biturigum*. A tooth of a giraffe has also occurred in the *molasse* of Switzerland; and the existence in India of no less than three species of this remarkable genus during the tertiary period has been shown by Captain Cautley and Dr. Falconer, the specimens of which are in the great collection those naturalists presented to the British Museum, the greatest contribution to our knowledge of fossil Vertebrata found during the tertiary epoch ever made.—An extract from Mr. Newport’s memoir on the nervous and circulatory system of Myriapoda, from the ‘*Philosophical Transactions*,’ a paper on which the editor of the ‘*Annales*’ remarks, “that it is crowded with precious observations.”

*Botany*.—The first paper in this department is a translation of Prof. Mohl’s researches on the Latex and its movements. An abstract of this most interesting memoir is given at page 441 of the present Number.—On two new genera of fluviatile Algæ, by M. Brébisson. These are *Hormospora*, belonging to the *Nostocineæ*, and *Coleochate*, belonging to the *Chatophoroideæ* (with plates).—Fragmenta Phytographica, by M. Miquel. *Ficus*, *Cussonia*, *Jussiaea*, *Marcgravia*, *Casearia* and *Macrobium* are commented on in this paper.—Commencement of a paper on the organization and mode of fructification of Mushrooms of the tribe of *Nidulariæ*, by MM. L.-R. and Ch. Tulasné (with plates).

## PROCEEDINGS OF LEARNED SOCIETIES.

## ZOOLOGICAL SOCIETY.

July 11, 1843.—Lovell Reeve, Esq., in the Chair.

“Descriptions of new species of *Nucula*, from the collections of Sir Edward Belcher, C.B., and Hugh Cuming, Esq.,” by Mr. Hinds, were read.

**NUCULA CUMINGII.** *Nuc. testá ellipticá, tenui, epidermide virente indutá, anticè abbreviatá, subrostratá, posticè elongatá, rotundatá; margine ventrali acuto, anticè submarginato, dorsali postico, prominulo; cardine anticè dentibus 6, posticè 19–20. Long. 11; lat. 4; alt. 7½ lin.*

*Hab.* The Asiatic analogue of *N. obliqua*, and is widely diffused over the seas of the Indian Archipelago. It has been obtained at New Guinea; Straits of Macassar; Bolinao, San Nicholas, Sual and Bassey in the Philippines; Singapore; and Straits of Malacca; in a depth of water varying from seven to twenty-three fathoms, on a floor of mud and sandy mud.

*Cab.* Belcher et Cuming.

It is distinguished from *N. obliqua* by the disposition to rostration of the anterior limb, prominent dorsal margin, slight indentation at the anterior part of the ventral margin, and larger size.

**NUCULA MITRALIS.** *Nuc. testá conoidali, solidulá, epidermide fuscá indutá, anticè brevissimè abbreviatá, rectá; margine dorsali posticá inclinatá, marginibus ventralibus crenulatis; cardine anticè dentibus 10, posticè 28–30. Long. 5½; lat. 3; alt. 4 lin.*

*Hab.* Straits of Malacca; from seventeen fathoms, mud.

*Cab.* Belcher.

The very contracted and straight anterior margin of this shell gives it the shape of a mitre, or other similar elevated head-dress.

**NUCULA PULCHRA.** *Nuc. testá ellipticá, solidá, sulcatá, interstitiis transversim striatis; marginibus ventralibus crenulatis; cardine anticè dentibus 9, posticè 27–29. Long. 7; lat. 4; alt. 5½ lin.*

*Hab.* L'Agulhas Bank, Cape of Good Hope; from seventy fathoms.

*Cab.* Belcher.

**NUCULA DIVARICATA.** *Nuc. testá ellipticá, anticè excavatá, subacuminatá, posticè rotundatá; lineis divaricatis, striatá; marginibus ventralibus crenulatis; cardine anticè dentibus 7, posticè 22–24. Long. 5; lat. 2½; alt. 4 lin.*

*Hab.* China Sea; from eighty-four fathoms.

*Cab.* Belcher.

A single valve only was brought up from this great depth, and presents a character in its sculpture which has not hitherto been met with in any recent species, but which is also found in the following. This peculiarity consists of the presence of lines diverging from an angle near the middle of each valve. It however occurs in an English fossil, *N. Cobboldiæ*.

**NUCULA CASTRENSIS.** *Nuc. testá ellipticá, anticè rotundatá, epidermide olivacé indutá; lineis divaricatis; marginibus ventralibus*

*crenulatis*; *cardine anticè dentibus* 5, *posticè* 11. Long. 3; lat.  $1\frac{1}{2}$ ; alt. 2 lin.

*Hab.* Sitka, North-west America. A single specimen was dredged in the harbour, from seven fathoms, sand.

*Cab.* Belcher.

**NUCULA TUMIDA.** *Nuc. testá ellipticá, tumidá, striatá; marginibus ventralibus integerrimis; cardine anticè dentibus* 6, *posticè* 15; *intùs leviter striatá.* Long.  $4\frac{1}{2}$ ; lat.  $2\frac{1}{2}$ ; alt.  $3\frac{1}{2}$  lin.

*Hab.* Straits of Malacca; from seventeen fathoms, among mud.

*Cab.* Belcher.

**NUCULA MARMOREA.** *Nuc. testá ellipticá, solidulá, albidd, sulcatá; lirís ad angulum planulatis; latere antico brevi, subacuminato; marginibus ventralibus minútè crenulatis.* Long.  $2\frac{2}{3}$ ; lat. 1; alt.  $1\frac{2}{3}$  lin.

*Hab.* Straits of Malacca; from seventeen fathoms, in society with *N. tumida.*

*Cab.* Belcher.

**NUCULA DECLIVIS.** *Nuc. testá parvâ, obliquè ellipticâ, solidulâ, epidermide tenui, fuscâ indutâ; latere antico brevi; margine dorsali longè inclinato, ventralibus crenulatis.* Long. 2; lat.  $1\frac{1}{3}$ ; alt.  $1\frac{1}{2}$  lin.

*Hab.* — ?

*Cab.* Belcher.

A still more oblique shell than *N. pisum*, to which it is closely allied.

**NUCULA NANA.** *Nuc. testá minimâ, trigono-ellipticâ, lævigatâ, nitidâ; marginibus ventralibus minutissimè crenulatis; cardine anticè dentibus* 5, *posticè* 11; *umbonibus fuscis.* Long. 1; lat.  $\frac{1}{2}$ ; alt.  $\frac{2}{3}$  lin.

*Hab.* Cagayan, island of Mindanao, Philippines; from twenty-five fathoms, among coarse sand.

*Cab.* Cuming.

**NUCULA BELCHERI.** *Nuc. testá politâ, oblongâ, sulcatâ, anticè elongatâ, truncatâ, angulatâ; ab umbone biangulatâ, tertio intermedio minori; dentibus numerosis, serierum ambarum numero subæquali; margine ventrali subrecto.* Long. 12; lat.  $3\frac{1}{2}$ ; alt.  $5\frac{1}{2}$  lin.

*Hab.* L'Agulhas Bank, Cape of Good Hope; dredged from a depth of forty to fifty-four fathoms.

*Cab.* Belcher.

**NUCULA SEROTINA.** *Nuc. testá politâ, oblongâ, sulcatâ, anticè elongatâ, rotundatâ, ab umbone angulatâ; margine dorsali antico subprominulo; umbonibus elevatis.* Long. 6; lat. 2; alt. 3 lin.

*Hab.* Singapore; from seven fathoms, mud.

*Cab.* Cuming.

This closely resembles a fossil from the Sutton crag. The latter is a larger shell, of somewhat different proportions, and wants the rounded anterior slope of the recent species.

**NUCULA TENELLA.** *Nuc. testá oblongâ, lævigatâ, tenui, planulatâ, anticè elongatâ, rotundatâ; umbonibus parvis.* Long.  $4\frac{1}{2}$ ; lat.  $1\frac{1}{2}$ ; alt.  $2\frac{1}{2}$  lin.

*Hab.* Singapore; from seven fathoms, mud. In society with the preceding.

*Cab.* Cuming.

NUCULA RETUSA. *Nuc. testâ parvâ, nitidâ, lævigatâ, subæquilatèrali, anticè retusâ, subacuminatâ; umbonibus elevatis.* Long.  $2\frac{1}{3}$ ; lat. 1; alt.  $1\frac{1}{2}$  lin.

*Hab.* St. Nicholas, Philippine Islands; Straits of Macassar.

*Cab.* Cuming et Belcher.

If the Lamarckian species, *N. nicobarica*,—a transversely elongated, finely striated shell, with both extremities rounded and lengthened anteriorly—is taken as a type of departure for the four preceding species, then *N. Belcheri* will be distinguished by its great transverse length, polished sulcated surface, angulated lines, truncated extremity, and three slight projections at the termination of the angles,—*N. serotina* by its polished sulcated surface, lengthened and rounded anterior extremity, and slightly prominent dorsal margin,—*N. tenella* by its flattened shape, smooth polished surface, and by being lengthened and rounded anteriorly,—and *N. retusa* by being nearly equilateral, smooth, polished, and with the anterior portion slightly disposed to terminate in a point.

NUCULA CRASSA. *Nuc. testâ oblongâ, ventricosâ, crassâ, sulcatâ, anticè arcuatè rostratâ, excavatè angulatâ; liris rotundatis; posticè valdè rotundatâ; intùs pallidè luteâ.* Long. 14; lat. 6; alt. 10 lin.

*Hab.* Australia.

*Cab.* Cuming.

NUCULA LATA. *Nuc. testâ oblongâ, politâ, planulatâ, lineis impressis excavatâ; anticè elongatâ, latè rostratâ, posticè rotundatâ; margine dorsali anticâ prominulâ; umbonibus parvis.* Long. 8; lat. 2; alt. 4 lin.

*Hab.* New Guinea; in from five to twenty-three fathoms, among mud.

*Cab.* Belcher.

NUCULA CÆLATA. *Nuc. testâ luteo-virente, oblongâ, argutè sulcatâ; anticè arcuatè rostratâ, sulcis paululùm obliterated; umbonibus prominulis.* Long. 7; lat. 3; alt. 4 lin.

*Hab.* California, between  $38^{\circ} 18'$  and  $34^{\circ} 24'$  north latitude; namely, at Russian Bodegas, San Francisco, and Santa Barbara, in from six to ten fathoms.

*Cab.* Belcher.

More ventricose and acutely beaked than *N. pella*, and presenting a partial obliteration of the sulci near the anterior dorsal margin.

NUCULA VENTRICOSA. *Nuc. testâ oblongâ, pallidè luteâ, ventricosâ, sulcatâ; anticè subrectè rostratâ, umbonibus magnis, prominentibus; margine ventrali anticè coarctatâ.* Long. 7; lat.  $3\frac{1}{2}$ ; alt. 5 lin.

*Hab.* Straits of Malacca; from seventeen fathoms, mud.

*Cab.* Belcher.

The character of the sulcation here is very different to that of the



preceding species and of *N. pella*. Here it presents the most usual features of regular furrows with intervening ridges; but in the other two species the ridges are inclined planes, having an inclination towards the ventral margin. In this direction they consequently present a number of step-like elevations, but not in the contrary.

*NUCULA RECTA.* *Nuc. testâ oblongâ, tumidâ, inclinatè sulcatâ, rectè et attenuatè rostratâ, posticè rotundatâ.* Long. 6; lat.  $2\frac{1}{2}$ ; alt. 4 lin.

*Hab.* New Guinea; in seven fathoms.

*Cab.* Belcher et Cuming.

*NUCULA EXCAVATA.* *Nuc. testâ globosâ, sulcatâ, gibbosè rostratâ, anticè carinatâ; lunulâ excavatâ, ovali, striatâ.* Long. 4; lat.  $2\frac{1}{2}$ ; alt.  $3\frac{1}{2}$  lin.

*Hab.* Panama; dredged among mud in thirty fathoms.

*Cab.* Belcher.

*NUCULA RETICULATA.* *Nuc. testâ parvâ, oblongâ, sulcatâ, striis longitudinalibus interstitialibus reticulatâ; anticè arcuatè rostratâ.* Long. 3; lat.  $1\frac{1}{2}$ ; alt. 2 lin.

*Hab.* Philippine Islands, in several localities; namely, Cagayan, island of Misamis, from twenty-five fathoms; Mindanao, from twenty-five fathoms, sandy mud; and Loay, island of Bohol, from sixty fathoms, clayey sand.

*Cab.* Cuming.

*NUCULA LYRATA.* *Nuc. testâ oblongâ, nitidâ, angulatè sulcatâ, acutè subrectè rostratâ, posticè elongatâ, rotundatâ; margine ventrali acuto integro.* Long.  $9\frac{1}{2}$ ; lat. 4; alt. 5 lin.

*Hab.* Panama; from thirty fathoms.

*Cab.* Belcher.

*NUCULA PUELLATA.* *Nuc. testâ oblongâ, nitidâ, leviter striatâ, anticè breviter arcuatè rostratâ, posticè rotundatâ; prope umbones turgidâ.* Long. 3; lat.  $1\frac{1}{2}$ ; alt. 2 lin.

*Hab.* Malacca; from ten to seventeen fathoms, coarse sand.

*Cab.* Cuming et Belcher.

*NUCULA CRISPA.* *Nuc. testâ oblongâ, turgidâ, sulcatâ, arcuatè rostratâ, anticè ab umbonibus exarâtâ, posticè obtusè carinatâ; lunulâ ovali.* Long. 3; lat.  $1\frac{1}{2}$ ; alt. 2 lin.

*Hab.* Gulf of Nicoya; from thirty-six fathoms.

*Cab.* Belcher et Cuming.

Mr. Lovell Reeve communicated a paper from Mr. Sylvanus Hanley, containing the following "Descriptions of five new species of bivalve Shells, from the collection of W. Metcalfe, Esq."

*SOLEN PHILIPPINARUM.* *Sol. testâ lineari, convexâ, crassâ, subarcuatâ, albido-lutescente; latitudine longitudinem quintuplo superante; margine posticè rotundato, anticè convexo; natibus ad quintam partem totius latitudinis collocatis; epidermide amplâ, rugosâ, impolitâ, olivaceo-flavescente; dente valido, acuto, in utrdque valvâ prominente.* Lat. 1; long. 5 poll.

*Hab.* ad Insulas Philippinarum.

A species nearly allied to the *S. ambiguus* of Lamarek, from which however it differs, both in its greater curvature and in the absence of the discal rays which adorn that species. Its breadth is throughout equal, and the umbones are considerably flattened.

**SOLENI ACINACES.** *Sol. testá lineari, nived, subdepressá, arcuatá, posticè abruptá, anticè attenuatá, rotundatá; latitudine longitudinem propè quadruplò superante; margine postico vix convexo; epidermide nitidá flavescente; cardine terminali, dente in utráque valvá, unico, rotundato.* Long.  $\frac{5}{3}$ ; lat. 3 poll.

*Hab.* — ?

A shell scarcely to be confounded with any of this genus, but with somewhat the aspect of *S. scalprum*.

**SOLENI CYLINDRACEUS.** *Sol. testá lineari, rectá, cylindraced, sub epidermide fugaci, albá, rubido-purpurascete variegatá; latitudine longitudinem sextuplo superante; margine anticè rotundato-obtuso, posticè abrupto, concavo; cardine terminali, dente sub-lunari in utráque valvá prominente.* Long.  $\frac{1}{2}$ ; lat. 3 poll.

*Hab.* — ?

A tolerably strong shell, intermediate between the *S. linearis* of Wood and the *S. brevis* of my descriptive Catalogue. The former species is considerably narrower from the umbones to the ventral margin, these proportions being precisely reversed in the latter. The colouring likewise, which in the adult is almost entirely confined to the posterior half, differs from its arrangement in the *S. brevis*.

**MESODESMA TRIQUETRUM.** *Mes. testá obliquè triangulari, valde inæquilaterali, crassissimá, tumidá, læviusculá, sordidè albá; posticè brevi, rotundatá, anticè productá, subacuminatá, subrostratá; margine antico declivi, ventrali arcuato; pube depressá; foveá ligamentali inter nates distantes planè hiante; dentibus lateralibus magnis, validis.* Long.  $\frac{7}{8}$ ; lat. 1 poll.

*Hab.* — ?

I know of no species which could possibly be confused with this extraordinary shell, which, from the peculiar triangular cavity between the beaks (as in the genus *Schizodesma* of Gray), may eventually prove the type of at least a subgenus. In the unique specimen before me there is the appearance of ochraceous rays, but I do not venture to consider them as characteristic until the comparison with further specimens. The shape reminds one of *Mulinia Donaciformis*. The cardinal tooth is bifid in the left valve.

**MESODESMA PLANUM.** *Mes. testá ovato-sublenticulari, transversá, valde compressá, inæquilaterali, utráque extremitate rotundatá; sub epidermide cornéá, albá, levigatá; natibus elevatis, acutis; margine ventrali arcuato; foveá ligamentali angustá.* Long.  $\frac{6}{7}$ ; lat. 1 poll.

*Hab.* — ?

A peculiarly flat shell, which is not unlike *M. complanatum*, but differs as well in the colouring of its epidermis as in many other particulars. From the little convexity of the dorsal margins, the

beaks appear extremely angulated. The teeth are obtuse, and the lateral short and approximate.

*Note.*—The shells described by me in this and the preceding papers will be figured in Mr. Wood's second Supplement to the 'Index Testaceologicus.'

A new species of *Chiton*, from the Philippine Islands, was exhibited by Mr. Cuming, which was thus characterized by Mr. G. B. Sowerby:—

CHITON BIRADIATUS. *Chi. testâ ovali, subelongatâ, subdepressâ, obtusè angulatâ; areis centralibus longitudinaliter minutè scabrososulcatis; areis lateralibus subelevatis, utrinque costis duabus bifidis validè irregulariter moniliformibus; areis terminalibus radiatim rugoso-costatis, margine minutissimè granuloso; colore pallidè fulvo, griseo maculato; margine griseo fasciato.* Long. .60; lat. .35.

*Hab.* Dumaguete, Ins. Negros, Philippinarum. H. Cuming legit. This species differs from *Ch. Janierensis* in having the lateral ribs bifid and the sculpture generally much more minute.

July 25.—William Yarrell, Esq., Vice-President, in the Chair.

Mr. Prince exhibited to the Meeting, on the part of Mr. Gould, nine new Birds, collected during the recent voyage of H.M.S. Sulphur, which, together with *Coryphilus Dryas*, exhibited by Mr. Gould at the meeting held on the 22nd of November 1842, and *Pteroglossus erythropygius* and *Pterocles personatus*, exhibited by him on the 14th of February 1843, comprise the whole of the ornithological novelties brought home by the expedition.

The species now exhibited were

HALCYON SAUROPHAGA. *Halc. capite, collo, dorso superiore et corpore subtùs albis, cæteris partibus saturatè cæruleis, dorso virescente.*

Head, neck, upper part of the back and all the under surface white, with the exception of the lores, which are black, and a narrow longitudinal mark immediately behind the eye, which is deep blue; remainder of the upper surface, wings and tail deep blue, tinged with green on the back and scapularies; bill black; basal half of the under mandible horn-colour; tarsi and feet blackish brown, tinged with purple.

Total length,  $10\frac{1}{2}$  inches; bill,  $2\frac{3}{4}$ ; wing,  $4\frac{3}{4}$ ; tail,  $3\frac{3}{4}$ ; tarsi,  $\frac{3}{4}$ .

*Remark.*—A typical *Halcyon* and one of the largest of the genus, differing from every other species known, particularly the *Alcedo leucocephala* of Latham, which specific term would be much more appropriate for the present bird.

*Hab.* New Guinea.

PIPRA VITELLINA. *Pip. vertice, vittâ dorsali, alis, caudâque nigris; mento, gula, pectore et torque nuchali vitellinis, partibus reliquis olivaceo-viridibus.*

Crown of the head, band across the back, wings and tail black; chin, throat, ear-coverts, chest and collar round the back of the neck,

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beautiful yolk-of-egg yellow; rump and upper tail-coverts olive-green; abdomen and under tail-coverts paler olive-green, into which the yellow of the chest gradually passes; bill black; legs yellowish brown.

Total length,  $3\frac{3}{4}$  inches; bill,  $\frac{5}{8}$ ; wing, 2; tail,  $1\frac{1}{8}$ ; tarsi,  $\frac{3}{4}$ .

*Hab.* Panama.

The only specimen procured is now in the British Museum.

**LEUCOSTICTE GRISEOGENYS.** *Leuc. fronte nigra, genis et occipite cinereis, reliquis partibus fuscis; tectricibus alarum, tectricibus cauda superioribus et inferioribus, abdominisque plumis ad apicem roseo-marginatis.*

Forehead and throat shining black; cheeks and back of the head grey; general plumage umber-brown; wing-coverts, upper and under tail-coverts, flanks and abdomen, tipped with beautiful rosy red; primaries and tail-feathers brown, faintly margined with rosy red; bill yellow; feet black.

Total length,  $7\frac{1}{2}$  inches; bill,  $\frac{5}{8}$ ; wing,  $4\frac{1}{2}$ ; tail,  $3\frac{1}{2}$ ; tarsi, 1.

This is the largest of the *Fringillinae* Mr. Gould has yet seen; it is nearly allied to, but differs from, the *Leucosticte tephrocotis*, Swains., in the greater depth of its colouring, in the cheeks as well as the hinder part of the head being grey, and in the greater abundance of the rosy hue upon the abdomen and under tail-coverts.

**NECTARINIA FLAVIGASTRA.** *Nect. corpore supernè flavescente-olivaceo; lined superciliari et corpore subtùs nitidè flavis.*

Crown of the head, ear-coverts and all the upper surface yellowish olive; stripe over the eye and all the under surface bright yellow; bill and feet black.

Total length,  $4\frac{1}{4}$  inches; bill,  $\frac{3}{4}$ ; wing, 2; tail,  $1\frac{1}{8}$ ; tarsi,  $\frac{5}{8}$ .

*Hab.* New Ireland.

The single specimen procured is in the collection of J. O. Goodridge, Esq., Assistant-Surgeon of H.M.S. Starling.

**CACTORNIS INORNATUS.** *Cact. corpore superiore nigrescente-fusco, singulis plumis olivaceo-fusco non sine tincturâ rufescente marginatis; guld et corpore inferiore fulvis, plumis notâ centrali obscuriore.*

Crown of the head and all the upper surface blackish brown, each feather margined with reddish olive-brown, the secondaries, wing-coverts and tail being more broadly margined and inclined to buff; throat and under surface buff, each feather having a darker centre; bill horn-colour; feet blackish brown.

Total length, 4 inches; bill,  $\frac{1}{2}$ ; wing,  $2\frac{3}{4}$ ; tail,  $1\frac{3}{4}$ ; tarsi,  $\frac{3}{4}$ .

*Hab.* Bow Island.

The only specimen procured is said to be a female. This species is I believe the only insessorial form inhabiting the island. Its principal interest consists in its forming an additional species of a small group of birds hitherto believed to be peculiar to the Galapagos Islands.

In the possession of the Zoological Society, to whom it was presented by the Lords Commissioners of the Admiralty.

**PSITTACUS FLAVINUCHUS.** *Psitt. viridis, vittâ nuchali nitidè flavâ; remigum primorum pogoniis internis nigris, remigis primi pogonio externo saturatè cæruleo; reliquorum pogoniis externis ad basim saturatè viridibus, exindè cæruleis, remigum minorum pogoniis externis coccineo, viridi et cæruleo pictis, rectricibus utrinque tribus externis cum pogoniis internis ad basim coccineis.*

Head, throat and under surface light green; the feathers on the sides of the neck slightly margined at the tip with black; at the nape a broad band of beautiful yellow; back, scapularies and wing-coverts dark green, the latter with paler edges; first primary black on the inner web and deep blue on the outer, the inner webs of the remaining primaries black; the basal third of their outer webs green, and for the remainder of their length deep blue, the whole very slightly tipped with buff; first four primaries black on their inner webs; their outer webs crimson for more than the basal half of their length, then green, and lastly deep blue, the two latter colours gradually blending into each other; the rest of the secondaries black on their inner and green on their outer webs, with a spot of deep blue near the extremity; tail yellowish green, crossed on the middle by a broad band of dark green, the three lateral feathers with a patch of crimson on their inner webs; basal portion of the inner webs of all the wing-feathers on their under surface deep grass-green; bill horn-colour; feet mealy white.

Total length, 14 inches; bill,  $1\frac{3}{8}$ ; wing, 9; tail,  $5\frac{3}{4}$ ; tarsi, 1.

*Hab.* Shores of South America and the Pacific.

In the collection of the Zoological Society.

**COCYZUS FERRUGINEUS.** *Cocc. capite cinereo, dorso alisque saturatè ferrugineo-fuscis, colore ad apices remigum primorum pallescente; caudâ in medio fuscâ, gradatim ad rectrices externas albescente; corpore subtùs fulvo.*

Head grey, tinged on the crown with ferruginous; back and wings dark rusty-brown, becoming paler towards the extremities of the primaries, which are brown on their inner webs at the tip; two centre tail-feathers sandy buff, passing into brown at the tip; the two next on each side sandy at the base, deepening into brown, which is darkest on the outer web; that nearest the central feathers slightly, and the next largely tipped with white; the two lateral feathers on each side buff at the base, passing into white, the inner one of the two with a line of brown down the basal two-thirds of its length; all the under surface buff, palest on the throat; bill olive-black, under mandible yellow at the base; feet black.

Total length,  $11\frac{1}{2}$  inches; bill,  $1\frac{1}{8}$ ; wing,  $5\frac{1}{4}$ ; tail,  $6\frac{1}{4}$ ; tarsi,  $1\frac{1}{8}$ .

*Hab.* Cocos island, North Pacific.

In the collection of the Zoological Society.

**PENELOPE LEUCOGASTRA.** *Pene. capite et collo superiore olivaceo-fuscis, singulis plumis cinereo marginatis; corpore superiore et alis splendide fuscis nitore metallico; caudâ æneo-viridi, rectricibus externis latè albo marginatis; abdomine et femoribus albis.*

Head and upper part of the neck olive-brown, each feather mar-

gined with grey; back, wings and upper tail-coverts rich brown with a bronzy lustre; tail bronzy-green margined with bronzy-brown, all but the two centre feathers broadly tipped with pure white; chest dull brown, gradually passing into the white of the abdomen, thighs and vent; under tail-coverts light buff; bill and feet black.

Total length, 18 inches; bill,  $1\frac{1}{4}$ ; wing, 8; tail, 9; tarsi, 2.

*Hab.* — ?

In the collection of the Zoological Society.

*LARUS BRACHYRHYNCHUS.* *Lar. capite, collo, corpore superiore, uropygio crissoque albis; dorso alisque cinereis; remige primo, ad pogonium externum et ad apicem, remigibusque sequentibus tribus, ad apicem, nigris; remigibus secundo, tertio et quarto, notâ cinered terminali; quinto vittâ nigrâ et apice cinereo.*

Head, neck, all the under surface, rump, upper and under tail-coverts and tail pure white; back and wings, including the primaries, grey, passing into white on the tips of the scapularies, secondaries, and all but the first five primaries, which are thus marked:— the outer primary has its external web and three inches of the tip of the inner web deep black; the next primary is tipped with black for three inches and a half on its outer, and two inches and a half on its inner web, and has a very minute speck of grey at the extreme tip; the third primary is tipped with black for two inches, and has a small spot of grey at the extremity; the fourth is tipped with black for an inch and a quarter, and has a larger spot of grey at the extremity than the third; and the fifth is crossed by an irregular band of black near the tip three-quarters of an inch wide, the extremity being grey, fading into white on the margin of the inner web; bill primrose-yellow; feet orange-yellow.

Total length, 14 inches; bill,  $1\frac{1}{2}$ ; wing,  $12\frac{1}{4}$ ; tail,  $5\frac{1}{4}$ ; tarsi,  $1\frac{1}{8}$ .

*Hab.* Russian America.

The species of *Ortyx* exhibited were

*ORTYX PARVICRISTATUS.* *Ort. cristâ brevi, rectâ, pallidè fuscâ, ad apicem fulvâ; fronte fulvâ; guld et vittâ per latera capitis ferrugineo-rubris; torquæ collari anticè angustâ, posticè latâ, nigrâ, albo guttatâ et castaneo tinctâ; corpore superiore cinereo-nigro et fusco adperso; pectore rufo, singulis plumis guttis sex pallidè fulvis, et saturatè fusco circumdatis, ornatis; his apud latera et abdomen grandioribus et fusco-nigrescente.*

Crest short, straight, light brown tipped with buff; forehead buff; throat and a broad stripe down each side of the head, above and behind the eye, rusty-red; ear-coverts brown; collar surrounding the neck narrow in front and broad, behind black, spotted with white and stained with chestnut; centre of the back, between the shoulders, minutely freckled grey, brown and black; remainder of the back blackish brown, each feather freckled on the margin with grey; scapularies freckled grey and brown, and ornamented on their inner webs with large patches of dark brown; wing-coverts freckled, and with a large spot of dark brown and another of white near the extremity of each feather; primaries light brown fringed with greyish

white, and a few indistinctly barred with freckles of the same on their outer webs; tail brown, crossed by narrow freckled bands of whitish and darker brown; across the breast a band of greyish red blotched with a darker tint; breast rufous, each feather with six spots of light buff encircled with dark brown, the spots gradually increasing in size on the flanks and lower part of the abdomen, and the rufous tint changing into blackish brown; vent buff; under tail-coverts like the abdomen, but the markings less distinct; bill black; feet black.

Total length, 8 inches; bill,  $\frac{1}{2}$ ; wing,  $3\frac{3}{4}$ ; tail,  $2\frac{3}{8}$ ; tarsi,  $1\frac{1}{8}$ .

*Hab.* Santa Fé de Bogota.

Nearly allied to *O. Sonnini*.

For an additional example of that division of the *Ortygidæ* to which the subgeneric term of *Odontophorus* has been given, Mr. Gould proposed, from the marbled appearance of its markings, the specific term of *marmoratus*, with the following characters:—

*ORTYX (ODONTOPHORUS) MARMORATUS.* *Ort. spatio circumoculari nudo, coccineo; plumis auricularibus rufo-castaneis; cristâ elongatâ, laevâ, fuscâ, plumis singulis flavescenti-fusco per medium irroratis; nuclâ nigrescenti-fuscâ, lineis irroratis cinereis angustis, transversim fasciatâ; primorum pogoniis externis arenaceo-fulvo guttatis; corpore inferiore fusco, lineis irregularibus et crebris nigrescentibus cinereis, et arenaceo-fulvis transversim fasciato.*

Naked orbits, scarlet; ear-coverts reddish chestnut; crest lengthened, curved and flowing, dark brown, freckled down the middle of each feather with yellowish brown; back of the neck blackish brown, crossed by numerous narrow freckled bands of grey; lower part of the back yellowish brown, freckled with a darker and a lighter tint; wings dark brown, the coverts and inner webs of the secondaries crossed by numerous broad irregular freckled bands of sandy buff; primaries spotted along their outer webs with light sandy buff; a few of the scapularies with a stripe of white freckled with black down the centre; under surface brown, crossed by numerous irregular narrow bands of blackish brown, grey, and sandy buff; bill and feet black.

Total length, 9 inches; bill,  $\frac{5}{8}$ ; wing,  $5\frac{5}{8}$ ; tail, 2; tarsi,  $1\frac{5}{8}$ .

*Hab.* Santa Fé de Bogota.

Nearly allied to *Odon. Guianensis*.

And for an Albatros nearly allied to, but larger than, *Diomedea chlororhyncha*, and which also differs from that species in the colouring of the culmen, he proposed to designate

*DIOMEDEA CULMINATA.* *Diom. spatio circumoculari nigrescenti-cinereo, gradatim pallescente; facie albâ; vertice corpore subtus et uropygio albis; dorso, alis et caudâ cinerescenti-fuscis; culmine olivaceo-flavo.*

Space surrounding the eye blackish grey, gradually passing into the white of the face; crown of the head, all the under surface and rump white; back of the neck sooty-grey; back, wings and tail dark greyish brown, the latter with white shafts; culmen for its

whole length olive-yellow; base of the under surface of the lower mandible fleshy horn-colour, remainder of the bill black; point of the upper mandible horn-colour; feet bluish white.

Total length, 30 inches; bill,  $4\frac{1}{4}$ ; wing, 20; tail, 9; tarsi,  $3\frac{1}{4}$ .

*Hab.* Southern, Indian, and South Pacific Oceans.

Oct. 24.—William Yarrell, Esq., Vice-President, in the Chair.

“Descriptions of new species of *Scalaria* and *Murex*, from the collection of Sir Edward Belcher, C.B.,” by Mr. Hinds.

*SCALARIA GLABRATA.* *Scal. testâ elongatâ, politâ; anfractibus decenis, rotundatis, ferè disjunctis; costis membranaceis, vicinis suprâ et infrâ connatis, propè suturam dilatatis; anfractu ultimo decem-costato; aperturâ ovali; umbilico peritremate tecto.* Axis 8 lin.

*Hab.* Amboina; Straits of Macassar; Straits of Malacca. On a muddy floor, in from ten to seventeen fathoms.

The specimens were all obtained without the animal, but the mottled appearance which they present seems to indicate, that when recent they were most probably of a light brown colour.

*SCALARIA DIANÆ.* *Scal. testâ ovatâ, acuminatâ, politâ; anfractibus septenis connatis, costis valdè aleformibus ornatis; anfractu ultimo hexacostato, ad basin obtusè carinato; aperturâ rotundatâ, infernè subtruncatâ; peritremate extûs alato; umbilico nullo.* Axis 5 lin.

*Hab.* Gulf of Nicoya; from thirty-six fathoms, among mud.

*SCALARIA VESTALIS.* *Scal. testâ ovato-elongatâ, pallidâ; anfractibus nonis rotundatis, connatis; costis numerosis, tenuibus, sparsim varicosis, lineis transversis eleganter cancellatis; aperturâ ovali; umbilicatâ.* Axis  $4\frac{1}{2}$  lin.

*Hab.* New Guinea; from seven fathoms, among mud.

An elegant cancellated species, with numerous fine ribs, which, when becoming varicose, are slightly spined above. The number of ribs on the last whorl appears little liable to fluctuation, and they become a very useful and valuable character in the discrimination of the species. In *S. vestalis* their number is twenty-two.

*SCALARIA SUTURALIS.* *Scal. testâ elongatâ, pallidè fuscâ; anfractibus decenis, connatis; costis numerosis, parvis, approximatis, lineis transversis decussatis, subdistanter varicosis; suturâ et anfractu ultimo ad basin carinato; aperturâ subrotundâ; umbilico nullo.* Axis 8 lin.

*Hab.* Straits of Malacca; from seventeen fathoms, among mud.

An elongated shell; also somewhat cancellated by lines traversing the numerous small ribs. At intervals of something less than the volution of each whorl a thick rounded varix is formed: a keeled line also occupies the most inferior portion of the whorl, close to the suture. The specimens had been left by the animal some time previous to being captured, and though they are not in very good condition, there still remains a disposition to a dark brown banding.

*SCALARIA ACICULINA.* *Scal. testâ elongatâ, politâ; anfractibus decenis subdisjunctis; costis rotundatis, supernè angulatis;*



*anfractu ultimo decemcostato; aperturâ ovali; umbilico parvo.*  
Axis  $3\frac{1}{2}$  lin.

*Hab.* West coast of intertropical America.

SCALARIA CREBERRIMA. *Scal. testâ ovato-elongatâ, albidd; anfractibus septenis, connatis, costis tenuibus creberrimè instructis; aperturâ ovali; umbilico nullo.* Axis 3 lin.

*Hab.* North coast of New Guinea; from seven fathoms, among mud.

The whorls are closely set with ribs, in numbers almost too great to be enumerated.

SCALARIA PORRECTA. *Scal. testâ ovato-elongatâ, fuscâ, politâ; anfractibus octonis, connatis, supernè rotundatis; costis acutis, supernè aculeatis; anfractu ultimo septemdecemcostato, pallidè fasciato; aperturâ ovali, ad basin truncato; umbilico nullo.* Axis  $4\frac{1}{3}$  lin.

*Hab.* Straits of Malacca; from seventeen fathoms, among mud.

SCALARIA VULPINA. *Scal. testâ elongatâ, fuscâ; anfractibus nonis rotundatis, connatis; costis obtusis, rotundatis, lineis elevatis decussatis; suturâ profundâ; anfractu ultimo novemcostato, ad basin obtusè carinato; aperturâ rotundâ; umbilico nullo.* Axis 3 lin.

*Hab.* Island of Quibo, Veragua, Central America; from thirty fathoms, among mud; the temperature below being  $58^{\circ}$ , and at the surface  $82^{\circ}$ .

A pretty little shell, which, under first impressions, the propriety of placing in *Scalaria* might be called in question, though it possesses the characters assigned to the genus. Still there is a difference of character and appearance, which creates a momentary hesitation. But, together with its deep suture, the basal whorl is provided at its inferior surface with a blunt keel, which is also to be met with in a few other species of *Scalaria*, but I am not aware in any other genus, and which induces me to place it here without the least doubt as to the propriety of its location.

The following new species of *Murex* were collected, with three exceptions, during the voyage of the Sulphur, under the command of Sir Edward Belcher, C.B., and figures of them will shortly be published in the 'Zoology' of the Voyage. These descriptions are by Mr. Hinds.

MUREX ANTILLARUM. *Mur. testâ subfusiformi, pallidd, trivariicosâ; anfractibus septenis rotundatis; varicibus tribus rotundatis, spiniferis, posticè fornicatis; ad angulum anfractuum spind unicâ elongatâ, deinde quinque breviusculis; interstitiis tri-, vel rariùs, quadri-fariam noduloso-costatis, lineis transversis fuscis penicillatis; canali elongato, aperto, propè anfractum basalem subflexo, spinis duabus cavis gerente.* Axis 18 lin.

*Hab.* Tortola, West Indies. Mus. Cuming.

This shell is another of those typical forms of *Murex* which have recently become somewhat numerous, and which appear to be confined to the tropical seas. I am strongly disposed to think that it is

meant to be represented in fig. 69 of the 'Conchological Illustrations,' which is mentioned as a variety of *M. Motacilla*, though there are still some little points of difference. A fine specimen often permits a conchologist to clear up his doubts as to specific importance, and I have had the assistance of such in drawing up the above description. Indifferent specimens are not uncommon, and Mr. Sowerby, jun. had most probably only such, and was compelled to leave it as a variety of *M. Motacilla*.

**MUREX CENTRIFUGA.** *Mur. testâ gracillimè fusiformi, pallidè corned, passim creberrimè striatâ; varicibus tribus, subalatis, in spinis compressis laciniatis; spirâ ad angulum anfractuum elongatâ, subrectâ; interstitiis nodo unico; aperturâ elongatâ, ovali; labro intûs levi; canali mediocri, rectiusculo, clauso, ad basin subrecurvo.* Axis 16 lin.

*Hab.* West coast of Veragua; on a sandy floor in fifty-two fathoms. This species has the general character of *M. pinniger* and *M. capensis*, and is very closely allied to the latter.

**MUREX FESTIVUS.** *Mur. testâ fusiformi, crassâ, fulvâ, trivariicosâ; varicibus simplicibus, recurvis, supernè cristatis, subtilissimè creniferis; interstitiis nodulosis, lineis subgeminis transversis fuscis eleganter ornatis; aperturâ ovali; labro intûs sparsim denticulato; canali valdè clauso, ad basin subrecurvo.* Axis 13 lin.

*Hab.* Bay of Madalena, California; dredged from seven fathoms, on a sandy floor.

**MUREX FOVEOLATUS.** *Mur. testâ fusiformi, crassâ, multivariicosâ, transversim creberrimè sulcatâ, laminis minimis longitudinalibus foveolatâ atro-purpureo pallidè bifasciatâ; varicibus septenis simplicibus, posticè rotundatis, anticè margine acutâ; aperturâ ovali, coarctatâ; labro intûs obtusè denticulato; labio interno producto; canali aperto, subrecurvo.* Axis  $12\frac{1}{2}$  lin.

*Hab.* Bay of Madalena, California; with the preceding.

**MUREX ANANAS.** *Mur. testâ fusiformi, ventricosâ, crassâ, multivariicosâ; anfractibus septenis supernè subplanulatis, transversim costatis, costis alternatè minoribus; varicibus senis rotundatis spiniferis, spirâ supremâ præcipue maximâ, brevi, rectâ, solidâ, biplicatâ, transversim compressâ, cæteris brevissimis subæqualibus; aperturâ rosed, rotundatâ, seu paulisper elongatè ovali, posticè canaliculatâ; canali mediocri, subobliquo, aperto, margine columellari rugulosâ, dorso bifariam spinoso, seriè supremâ superante.*

*Hab.* West coast of Africa. Mus. Cuming.

A shell closely resembling *M. rosarium* in its size and proportions, but finds its specific distinction in its greater massiveness, the superior size of its upper series of spines, and the absence of nodules on the interstitial ribs. Both shells have a distinct fasciation of three dark bands, but our species is entirely wanting in that beautiful and elegant covering of striae which is so conspicuous in the fine specimen of *M. rosarium* in Mr. Cuming's collection.

**MUREX BELCHERI.** *Mur. testâ magnâ, fusiformi, crassâ, ponderosâ, pallidè fuscâ, multivariicosâ; anfractibus quadratis, albo fascia-*

*tis*; *varicibus numerosis, foliaciis simplicibus, supernè elongatis, fornicatis, etate valdè erosis*; *aperturâ quadratâ, pallidè carnèd*; *labro intùs lævi, infernè dente magno, crasso, obtuso*; *canali tortuoso, aperto, ad sinistram inclinato*; *umbilico præcipuè magno*. Axis 66 lin.

*Hab.* San Diego, California. From a bank of mud near the head of the harbour.

**MUREX CALIFORNICUS.** *Mur. testâ fusiformi, fulvâ, trivariçosâ; anfractibus senis, supernè planulatis, transversim costatis, costis rotundatis, subdistantibus, ad lacinias varicum incurrentibus, intervallis costellatis, creniferis; varicibus sex-laciniatis, supremâ maximâ alatâ, deinde gradatim minoribus creniferis; aperturâ ovali, lævi; canali clauso, recurvo, ad basin purpurascente.* Axis 18 lin.

*Hab.* California. Mus. Cuming.

**MUREX HAMATUS.** *Mur. testâ rhomboideâ, pallidè luteâ, multivariçosâ; anfractibus septenis, inter varices areis quadratis; spirâ subelongatâ, acutâ; varicibus senis alatis, laciniis uncinatis; aperturâ ovali, infernè dente parvo acuto; canali clauso, rectiusculo.* Axis  $13\frac{1}{2}$  lin.

*Hab.* Bay of Guayaquil; from a muddy floor, in twenty-one fathoms.

This shell, together with *M. emarginatus*, *M. monoceros* and *M. Nuttali*, belong to a section of the genus which has been called by Conrad *Cerastoma*. But if the marginal tooth of the aperture is to be regarded as sufficient grounds for separation, then I fear we must draw freely on some of the typical species, where its existence seems to have been little heeded. Mr. Swainson assigns it as a character of his subgenus *Muricanthus* or *Centronotus*; but for the above reasons it ceases to possess any importance. In *M. hamatus* the situation of the tooth on the dorsal varices is marked by a small sharp notch.

**MUREX CIRROSUS.** *Mur. testâ fusiformi, ventricosâ, pallidè carnèd, formosissimè multivariçosâ; suturâ profundâ, propè nigricante; varicibus nonis sexfariam laciniatis; laciniis fistulosis, albis, respectantibus, gradatim minoribus; interstitiis costis rotundatis lacinias incurrentibus; aperturâ ovali; labro intùs lævi; canali gracili, recurvo, ferè clauso, dorso bifariam laciniato, serie superiore gemind.* Axis 9 lin.

*Hab.* Straits of Macassar. In fifteen fathoms, among sand and fine gravel.

An uncommonly beautiful species, both from the delicacy of its colour, and the rich, varied, and elaborate character of its sculpture.

**MUREX GRAVIDUS.** *Mur. testâ globosè fusiformi, multivariçosâ; anfractibus senis rotundatis, transversim costatis, supernè fusco fasciatis; costulis approximatis, lamellosis; varicibus quinis costulis subdivergentibus transitibus, posticè foveolatis; aperturâ ovali, productâ; labro intùs lævi; canali longiusculo, aperto, ad sinistram inclinato.* Axis 10 lin.

*Hab.* Cape Blanco, west coast of Africa. From sixty fathoms.

**MUREX RADICATUS.** *Mur. testâ fusiformi, pallidè lutescente, multivaricosâ; varicibus quinis, laciniatis, anticè abruptis; laciniis compressis, subquadratis, medio lined duplicatis, posticè medio interstitiorum exsiliantibus; aperturâ ovali, productâ; labro intus lævi; canali ferè clauso, ad basin subrecurvo, Axis 10 lin.*

*Hab.* San Blas, west coast of Mexico. From eleven fathoms, among mud.

In this species the laciniaë of the varix take root near the centre of the interspace, whence they proceed directly forwards. They are of a squarish compressed shape, and are partially divided in their middle by an impressed line.

**MUREX PERITUS.** *Mur. testâ subrhomboidè, albidd, multivaricosâ; anfractibus septenis, supernè angulatis et fuscis, ultimo elongato in canalem attenuato, transversim striatis; varicibus senis tenuibus, laciniatis, anticè inter lacinias seriebus duabus eleganter crenatis; laciniis acuminatis, uncinatis, gradatim minoribus; aperturâ ob-ovata; canali aperto, ad basin subrecurvo. Axis 9½ lin.*

*Hab.* Bay of Madalena, California. From seven fathoms, on a sandy floor.

#### BOTANICAL SOCIETY OF LONDON.

Nov. 18, 1843.—J. E. Gray, Esq., F.R.S. &c., President, in the Chair.

Dr. Bromfield presented a species of *Calamintha* new to the British flora, discovered by him in the Isle of Wight.

Read "Notes of a Botanical Excursion to Warwickshire, Worcestershire, Wales and Ireland in August last," by Mr. S. P. Woodward.

Nov. 29.—At the seventh Anniversary Meeting, J. Reynolds, Esq., Treasurer, in the Chair, the following officers were elected for the ensuing year:—J. E. Gray, Esq., F.R.S., President; Mr. G. E. Denes and Mr. T. Sansom were respectively re-elected Treasurer, Secretary and Librarian.

Dec. 13.—The President nominated Hewett C. Watson, Esq., F.L.S., and John Miers, Esq., F.R.S., Vice-Presidents.

Feb. 2, 1844.—A. Gerard, Esq., in the Chair.

Read the commencement of a paper by Edwin Lees, Esq., F.L.S., being "A Synoptical View of the British Fruticose *Rubi*, arranged in groups, with explanatory remarks."

The groups into which Mr. Lees unites the species have been already reported (*Annals*, No. 74, p. 68). The list of species will shortly be published in a new catalogue of British Plants, now in the press, for the Botanical Society of London. The following explanations, in the words of the author, will sufficiently show that his arrangement has not been founded upon any brief or superficial study of his subject.

"Having previously designated the general groups into which the British Fruticose *Rubi* are divisible, I now proceed to attempt the more difficult task of describing the species in each group, and tracing them in succession in a synoptical form. In doing this, as I must necessarily propose some alterations, it is advisable that the

candid and inquiring botanist should be informed as to the principles I have kept in view.

"In the first place then, I have desired to make no innovation but what seemed imperatively required for correct elucidation, and have therefore made every effort to profit by the labours of preceding eminent botanists who have particularly studied the *Rubi*, as Sir J. E. Smith, Drs. Weihe and Nees von Esenbeck, Mr. Borrer and Professor Lindley.

"But, secondly, I have observed with the eye of an original explorer, tracing every form that appeared to me different, without reference to the ideas of other botanists. And thirdly, having observed the same plants in a living state for several successive years, I have collated and revised my original observations, sketched every apparent species, and compared them again and again with the figures, descriptions and named specimens of botanists of authority. Thus I have been enabled in a great degree to understand the forms to which particular names have been assigned, and to test their propriety by my own experience. I trust therefore that I shall not be considered guilty of assumption where I may differ from others, being only anxious for the nearest approximation to correctness.

"It is unnecessary for me to go into the question as to what constitutes a species in this genus; for, as I have before hinted, it is not unlikely that the forms in every *group* may be really only varieties, sporting from a normal form and into each other. But if botany be a science of discrimination, it is at any rate convenient to name every remarkable continuing form as a species or subspecies, since otherwise minor variations can scarcely be distinguished, or must be placed in the same rank with more important deviations of structure. Indeed Nees von Esenbeck, one of the authors of the elaborate '*Rubi Germanici*,' has well remarked in a letter to the Rev. Mr. Leighton in the '*Shropshire Flora*,'—'I am not of opinion that all the forms proposed by my friend Dr. Weihe *as species* are to be considered as such, but in my opinion it is absolutely necessary to look for the greatest number of forms which present themselves in the genus before attempting to judge of species and fixing their limits. I can scarcely tell which is most perplexing in the path of our science: whether, with Dr. Weihe, to distinguish as species every form of bramble that presents itself to our view; or, with M. Koch, to consider all as modifications of one only. In this case I do not doubt that these are matters purely of observation, and that the faithful observer of nature will find that the truth really is between these two extremes.'"

#### BOTANICAL SOCIETY OF EDINBURGH.

Thursday, the 11th of April 1844, Prof. Graham, President, in the Chair.

Various donations to the Library and Museum were announced and the following papers read; but as all of them will appear in these '*Annals*,' their titles only are now recorded.

1. "On four genera of *Desmidiæ*, viz. *Euastrum*, *Tetmemorus*, *Micrasterias*, and *Berkleya*," by Mr. Ralfs.

2. "On a monstrosity of the pistil of *Primula vulgaris*," by Mr. C. C. Babington.
3. "On the fructification of *Cutleria*; and a continuation of a paper on the Marine Algæ of the vicinity of Aberdeen," by Dr. Dickie.
4. "On some species of the genus *Ænanthe*," by Mr. John Ball.

## MISCELLANEOUS.

RESEARCHES UPON THE TRANSFORMATIONS OF THE APPENDAGES OF THE ARTICULATA. BY M. BRULLÉ.

THERE are two kinds of transformations or metamorphoses to which the appendages of the Articulata are submitted,—the one *real*, the other *representative* (figurées). The *real* transformations are those which occur at different periods during the existence of an Articulate animal, and which are particularly well-marked in certain classes, where the laws which they follow offer most interesting subjects for investigation. The *representative* transformations are those which are presented by one and the same appendage of the body when it is regarded throughout the different groups of Articulata. We then see how the leg of one of these animals corresponds to the maxilla, or that again to the mandible of another, &c. This occurs also in the appended parts of certain phanerogamous vegetables, which, as is well known, are transformed through the influence of cultivation in such a manner as either to usurp the place of other structures, or assume a heteromorphous aspect by participating in the characters of two different organs. It results therefore that the appended parts of plants, and also those of the Articulata, are all evidently of equivalent import, and it is assuredly a remarkable fact, that this conformity should exist in their respective metamorphoses.

In tracing the series of developments throughout the appendages of the Articulata, we first of all recognize *that the appendages become modified by the progress of age in the same individual, in a manner corresponding to that by which they are modified through the progress of organization in individuals of different species.* Thus the legs are the simplest form of appendages, to which succeeds in some cases the more or less complicated structure of the antennæ, in others that of the maxillæ. But these phænomena do not cease here. It is to be observed, moreover, *that the appendages are manifested at an earlier period of the existence of an Articulate animal the more complex its degree of organization, and vice versâ, that they make their appearance the later, the fewer the number of transformations which it has to undergo.* The degree of importance, or at least the complication of an appendage, may be therefore judged of by the very period of existence in which it is first developed.

The structure of appendages furnishes us, besides, with the explanation of certain cases of monstrosity, of the kind called "*monstrosities by division.*" It is seen, for example, how these monstrosities reproduce accidentally, as regards certain appendages which are usually simple, a degree of organization which is the normal con-

dition of some other appendages. Thus, the maxillæ are formed always of several parts situated one by the side of the other, or in other words, are constantly divided into two or three branches. The legs as well as the antennæ of certain Crustacea offer the same arrangement, while, on the contrary, these parts are commonly simple in Insects; but it occasionally happens that they become ramified, and in such apparently anomalous cases the general normal structure of the appendage is simply reproduced.

In regard to these representative transformations, it is already known that M. Savigny has very ably pointed out the essential conformity of structure that subsists between the oral organs of the Haustellate and Mandibulate Insects, and advanced the opinion that the labium of Insects is formed of a pair of consolidated maxillæ. The same results have been obtained by M. Oken, who in working out this idea was led to infer, from the examination of the organ in certain insects, that the labrum was similarly constructed. Corresponding results may be predicated of the parts called *hypo-* and *epipharynx*, and thus we have all the parts of the mouth in Insects reduced to the law of "*unity of composition.*"

If the pieces of the mouth are considered in reference to the elements which constitute them, this unity of composition may be readily demonstrated. M. Burmeister has recently determined the presence of these elementary pieces of the maxillæ in the structure of the labium, and has detected them also in the mandibles, but only in some species, for they are in general intimately united. There are even mandibles, which in certain instances, as in the Insecta and Scolopendræ, are not inferior in degree of complexity to maxillæ. By such a method of examination we arrive at the conclusion, that an appendage the most complex may be yet situated in different parts of the body in different Articulata. Thus in Insects it is the *maxilla* which are the most complex; in the Crustacea it is the *foot jaws*; in the Myriapoda it is the *mandibles*, if indeed these last be not regarded as the true analogues of the maxillæ.

For many years names have been applied to the different pieces of the maxillæ in some Articulata, as the Coleoptera. It remains for us to trace out the same pieces in the maxillæ of other Insects, and in those of the Arachnida, Myriapoda and Crustacea. In pursuing this investigation, passing from the more complex condition of the maxilla in the Coleoptera to its more simple type in the Orthoptera and Neuroptera, and thence to that of the Hymenoptera, we are led finally to determine in what the greatly elongated maxillæ of the Lepidoptera consist, and thus attain to a rational knowledge of the essential constituents of that organ in the Haustellate Insects. In the butterfly, the hypertrophy of one of the elements of the maxillæ has annihilated the others, and in uniting with that of the opposite side to constitute a perfect tube, affords an example of a transitory condition of the labium, from which a single step in advance, and we are conducted to a permanent state of the lower lip in which the two halves are perfectly fused together.

In conclusion, the preceding observations most incontestably

establish the validity of that beautiful law, namely, *that all the appendages of the inferior part of the body in the Articulata are essentially analogous to each other*; this being amply demonstrated both by their details of structure, and the various transformations through which one of these appendages passes before arriving from the most simple to the most complex form.—*Comptes Rendus*, April.

MICROSCOPICAL STRUCTURE OF SHELLS.

DEAR SIR,—The ‘*Annales des Sciences Naturelles*’ for February last (published, however, but a short time since) contains an abstract of my paper on the Microscopic Structure of Shells, &c. which appeared in your *Journal* for December 1843. Prefixed to this abstract is the following note by the editor, M. Milne-Edwards:—“*En reproduisant ici un extrait du mémoire de M. Carpenter, je crois devoir réparer une omission que l’on peut reprocher à ce naturaliste, qui ne fait aucune mention des travaux de ses devanciers. En 1786, Hérisseau publia dans les ‘Mémoires de l’Académie des Sciences,’ un travail remarquable sur l’organisation des coquilles, et arriva à des résultats très voisins de ceux que M. Carpenter tire de ses propres expériences.*”

Having every reason to believe that my researches were as *novel* as they unquestionably were *original*, I was much surprised at this accusation; more particularly as many of my results depend upon the improved powers which the microscope has recently acquired, and could scarcely have been anticipated, therefore, by any writer of the last century. But my astonishment was still greater, when, on referring to the volume cited by M. Milne-Edwards, I found that no such memoir is to be found in it. Nor have I been able, by consulting the index-volumes of the *Mémoires*, to find either the name of M. Hérisseau, or any paper on the structure of shell, subsequent to the well-known contributions of M. Reaumur, which have formed the basis of all subsequent statements as to the formation and growth of shell.

I have also spent many hours of valuable time in searching through the various articles on the subject in the several dictionaries of Natural History, as well as the systematic works of M. de Blainville, M. Deshayes, and other conchologists; and the only reference that I can find to the researches of M. Hérisseau is confined to the article *Conchyliologie* in the ‘*Encyclopédie Méthodique*,’ in which he is quoted as having endeavoured (but failed) to establish by “*les expériences ingénieuses, bien plus que solides,*” that shells grow by intus-susception, like the bones of Vertebrata, instead of by accretion, as demonstrated by Reaumur.

The only instance in which, so far as I am aware, I had been anticipated by others, is in regard to the skeletons of the Echinodermata; and I have fully stated this fact in the paper,—not in the least wishing to take credit for what did not belong to me. My researches on this subject, however, had gone far beyond those of Prof. Valentin, before the publication of his Monograph.

I think, therefore, that I have a right to call upon M. Milne-Ed-



wards for an explanation of the statement which he has made to my disadvantage, and I shall be much obliged by your allowing this note a place in the next Number of the Annals,

I am, dear Sir, yours faithfully,

WILLIAM B. CARPENTER.

To Richard Taylor, Esq.

P.S.—I may add, that the abstract of my paper in the 'Annales des Sciences' is not an original one, but is copied from 'L'Institut,' into which it appears to have been translated from the inaccurate report of my paper in the 'Athenæum;' for it contains an egregious blunder, for which I should be very sorry to be made responsible,—to the effect that I propose to place the genus *Pandora* among the *Margaritaceæ*, on account of the similarity in the structure of its shell. This error was corrected by me in the 'Athenæum,' on the week following that in which the report appeared; yet it has been translated into the French journals without notice. An examination of the original paper will show that it is entirely unsupported by it.

6 North Crescent, Bedford Square, London,  
May 15, 1844.

METEOROLOGICAL OBSERVATIONS FOR APRIL 1844.

*Chiswick*.—April 1. Foggy: dry haze: clear. 2—4. Very fine: clear and dry. 5, 6. Overcast: very fine: clear. 7. Clear and fine throughout. 8. Foggy: clear and fine. 9. Fine: clear and dry. 10. Hot and very dry. 11. Fine. 12. Fine: rain at night. 13. Cloudy: rain. 14. Hazy: showery. 15. Hazy: very fine. 16. Hazy: cloudy: clear and fine. 17. Foggy: very fine. 18. Cloudy and fine. 19—24. Very fine. 25. Slight haze: very fine. 26. Dry haze. 27, 28. Clear and dry. 29. Fine: dry haze: cloudy. 30. Clear, with excessively dry air.—Mean temperature of the month  $3^{\circ}44'$  above the average.

*Boston*.—April 1. Foggy. 2—4. Fine. 5. Fine: rain A.M. 6—8. Fine. 9. Cloudy. 10. Fine. 11, 12. Fine: rain P.M. 13. Cloudy: rain P.M. 14. Fine. 15. Cloudy. 16—19. Fine. 20, 21. Cloudy. 22—28. Fine. 29. Cloudy. 30. Fine.—N.B. This month has been extraordinarily dry and warm.

*Sandwich Manse, Orkney*.—April 1, 2. Cloudy: showers. 3. Bright: showers. 4. Cloudy. 5. Cloudy: rain. 6. Clear: cloudy. 7. Cloudy. 8. Bright: cloudy. 9. Clear: cloudy. 10. Cloudy. 11. Showers: clear. 12. Clear: cloudy. 13. Cloudy: rain. 14. Bright: cloudy. 15. Bright: showers. 16. Cloudy. 17, 18. Bright: showers. 19. Rain: cloudy. 20. Bright: cloudy. 21. Cloudy. 22. Cloudy: showers. 23. Cloudy: sleet-showers. 24. Bright: cloudy. 25. Rain: fine. 26. Rain: showers. 27. Hail-showers: clear. 28. Bright: clear. 29. Clear. 30. Bright: clear.

*Applegarth Manse, Dumfries-shire*.—April 1. Fine. 2. Dull: rain P.M. 3. Rain. 4. Fair, except one slight shower. 5. Rain. 6. Fine: hoar-frost. 7. Fine. 8. Fine, but cloudy. 9. Wet A.M.: fine. 10. Fine. 11. Fine: one slight shower. 12, 13. Rain. 14, 15. Wet. 16. Hoar-frost. 17. Fair: rain P.M. 18, 19. Fair. 20. Fair and fine. 21. Fine: one slight shower. 22, 23. Fine. 24. Shower early A.M. 25. Fair. 26. Fair: heavy dew. 27. Fair. 28, 29. Hoar-frost. 30. Fair and dry.

Mean temperature of the month	.....	47°·2
Mean temperature of April 1843	.....	46·4
Mean temperature of spring water	.....	50·5
Mean temperature of ditto	April 1843 ...	47·0



THE ANNALS  
AND  
MAGAZINE OF NATURAL HISTORY.

SUPPLEMENT TO VOL. XIII. JUNE 1844.

LVI.—*On the British species of Achnanthes.*

By JOHN RALFS, Esq., Penzance\*.

[With a Plate.]

ACHNANTHES, *Bory (Ag.)*.

Fronde stipitate, standard-shaped, generally composed of few frustules, which are longer than broad, curved, and have a punctum at the centre of the inferior margin.

Fronde generally composed of few frustules, and then flag-like, but sometimes elongated into a filament, as in the *Ach. brevipes* of Kutzing†. It is attached by one of the lower angles of the basal frustule; in some species the stipes is elongated, and in others very short.

The frustules are longer than broad, and curved or bent; the upper margin is convex and the lower one concave, the latter having in the middle a minute pellucid dot or punctum. In some species the lateral portions are turgid, the central portion looking like a band between them; in others they are flat, and do not enter into the front view. The superior lateral surface differs from the lower one in the absence of the central transverse pellucid line which is present in the lower, and by its termination forms the punctum seen in the front view.

The mode of growth in this genus resembles that of *Isthmia*, except that the frustules finally separate without cohering at their angles.

*Achnanthes* differs from the other *Diatomaceæ* except *Striatella* by its stipitate flag-like fronds, and from *Striatella* it may be known by the absence of internal siliceous plates; and even a solitary frustule of this genus, separated from the stipes, may be distinguished from that of any other by its curved form and the punctum in the middle of the lower margin.

In determining the British species I have been much assisted by the Rev. M. J. Berkeley and Mr. Borrer; to the latter I am indebted for the opportunity of examining the specimens in Kutzing's 'Alg. aq. dul.'

\* Read before the Botanical Society of Edinburgh, Feb. 8, 1844.

† I have received from Mr. Harvey a specimen of this or an allied form, gathered at the Cape of Good Hope.

I have seen no specimen of the *Achnanthes Carmichaelii* of Greville.

1. *A. longipes*, Ag. Lateral surfaces turgid, appearing in the front view, with evident transverse dotted striæ, elliptic or elliptico-lanceolate with the ends somewhat obtuse; stipes longer than the frustule. Ag. Consp. Diatom. p. 58; Grev. in Hook. Br. Fl. vol. ii. p. 404; Harv. Br. Alg. p. 200; Ktz. Syn. Diatom. in Linnæa 1833, p. 576; Ehr. Infus. p. 227. pl. 20. f. 1; Pritch. Infus. p. 232. *Diatoma vexillum*, Jurg. Dec. 6, no. 6! *Conferva stipitata*, Eng. Bot. t. 2488!

On the smaller marine algæ. Southampton, *Miss Hill*; Torquay, *Mrs. Griffiths*; Shoreham, *Mr. Borrer*; Newhaven, *Mr. Jenner*; Penzance, Ilfracombe. Aberdeen, *Dr. Dickie*; Dublin Bay, *Miss Ball* (according to a specimen from Mr. W. Thompson).

It is distinctly visible to the naked eye, and forms on the infected plant a fringe of a brown colour, which becomes whitish when dried.

Fronds aggregated, flag-like, consisting of a few (2 to 8) large frustules on a stout stipes, which is from two to four times the length of a frustule. The frustules are much bent in the middle; the central portion varies in breadth, but always appears like a band between the turgid lateral portions, and is separated from them on each side by a pellucid line, within which is a longitudinal series of short transverse striæ.

When the central portion is broad there are again other series between these, but they are very faintly marked, and not perceptible except under the highest power of the microscope; in fact, under a low power the central portion exhibits no markings.

The superior lateral portion is convex, and that of the terminal frustule most so: the inferior lateral portion is concave in the middle, and its ends are often slightly directed upwards: both surfaces have numerous strongly marked, dotted, transverse striæ, which are very conspicuous at the outline.

The lateral view is elliptic or elliptico-lanceolate, sometimes slightly constricted at the centre on one or both margins, sometimes nearly straight, but the ends are always somewhat obtuse.

The colouring matter is either diffused or collected into a roundish central spot.

PLATE XIV. fig. 7. *Achnanthes longipes*: *a*, central portion; *b*, superior lateral portion; *c*, inferior lateral portion; *d*, punctum. Fig. 8. Several individuals: *b*, frustules deprived of their colouring matter; *c*, superior lateral view; *d*, inferior lateral view.

2. *A. brevipes*, Ag. Lateral surfaces turgid, appearing in the front view, with transverse distinctly dotted striæ; stipes shorter than the frustule; lateral view lanceolate with subacute extremities. Ag. Consp. Diatom. p. 59; Grev. Crypt. Fl. t. 295; Grev. in Hook. Br. Fl. vol. ii. p. 404; Harv. Br. Alg. p. 199; Berk. in Eng. Bot.

t. 2842. f. 1; Ktz. Synop. Diatom. p. 574; Ehr. Infus. p. 227. pl. 20. f. 2; Pritch. Infus. p. 232. f. 199—202. *Echinella stipitata*, Jurg. Dec. 13, no. 8!

On marine algæ. Southampton, *Miss Hill*; near Shoreham, Sussex, *Mr. Jenner*.

This species bears a considerable resemblance to *Achnanthes longipes*. Like that species, its frustule is strongly bent, and its central portion, which is marked by longitudinal series of short transverse striæ, appears like a band between the turgid lateral portions. These too are similar in shape to those of *Achnanthes longipes*, and are marked in like manner with transverse dotted striæ, which are interrupted by a longitudinal pellucid line passing down the middle. Notwithstanding these similarities it may at first sight be distinguished from *Achnanthes longipes*, as its stipes is very short; its lateral view is more acute, and often rather suddenly attenuated at the ends, and its transverse striæ are more distinctly dotted; indeed, in the more elongated frustules are series of short lines, and in its central portion the longitudinal series of striæ are also much more distinct.

The lateral view is more frequently constricted in the centre than in *Ach. longipes*.

The frustules are three to six times longer than broad.

I have not seen this species in a recent state: when dry it is of a whitish colour; and under the microscope the colouring matter is either scattered or collected into a central spot.

PLATE XIV. fig. 9. *Achnanthes brevipes*: *b*, frustules deprived of their colouring matter; *c*, superior lateral view; *d*, inferior lateral view.

3. *A. subsessilis*, Ktz. Lateral surfaces elliptic, obtuse, striated; stipes shorter than the frustule. Ktz. Syn. Diatom. in Linnæa 1833, p. 576; Ktz. Alg. no. 42!; Ehr. Infus. p. 228. pl. 20. f. 3; Pritch. Infus. p. 233.

On *Conferva tortuosa* and filiform species of *Enteromorpha*, chiefly in salt-water marshes. Hayle near Penzance, near Holyhead, by the Menai Bridge, and Penman Pool near Dolgelly.

It is very minute, scattered, not visible to the naked eye; but when plentiful gives a brown tinge to the plant on which it grows.

Frustules generally one or two (seldom more than three) on the stipes, slightly bent, two or three times as long as broad; lateral surfaces elliptic, striated, slightly turgid, with obtuse ends: both surfaces have a longitudinal pellucid line, and the inferior a transverse one also. In the front view the upper margin is slightly convex, and the lower one concave with a distinct punctum; the ends of the lateral striæ, which are much less strongly marked than in the preceding species, appear along the margin, but the lateral portions are scarcely seen. The central portion is either without markings or has very obscure longitudinal series of short

striæ, and the lines separating it from the lateral portions are less distinct than in the two preceding species. I have not been able to ascertain whether the striæ are dotted. The stipes is short and thick, as in *Achnanthes brevipes*.

This species comes very close to *Ach. brevipes*, but is a smaller plant; the frustules are less bent, the lateral surfaces are not so prominent in the front view, the striæ are less distinct, the central portion has very obscure markings or none at all, and especially the lateral view is elliptic and obtuse at the ends.

The endochrome is pale brown, and generally collected into two faint, roundish central spots. There is frequently a small air-like globule near each end of the recent frustule, which disappears when it is dried.

PLATE XIV. fig. 10. *Achnanthes subsessilis*: *b*, frustules deprived of their colouring matter; *c*, superior lateral view; *d*, inferior lateral view.

4. *A. minutissima*, Ktz. Frustules slender; lateral surfaces obtuse, striæ apparently wanting; stipes not longer than the frustule. Ktz. Syn. Diatom. p. 578. f. 54; Ktz. Alg. aq. dulc. no. 75!; Ehr. Infus. p. 228. pl. 20. f. 5; Pritch. Infus. p. 233.

In freshwater ponds, &c., parasitic on other algæ. Newtimber, Sussex, Mr. Borrer; Shoreham, Kent, Mr. Jenner; Cheshunt, Mr. Hassall; Oswestry, Shropshire, Rev. T. Salwey; common about Penzance on *Bulbochæte setigera*, J. R.; near Bristol, Mr. Thwaites.

I believe that this species is very common, but generally overlooked from its minuteness.

The fronds are scattered, extremely minute, and rarely of more than two frustules. The frustules are two to six times as long as broad, slightly curved and colourless. The stipes is not longer than a frustule, and the punctum on the lower margin is very minute.

Before I had the opportunity, through Mr. Borrer's kindness, of comparing our plant with the specimen in Kutzing's 'Alg. aq. dulc.,' I considered it a variety of the following species; and I am still uncertain whether they should be separated, although the plant above described is undoubtedly Kutzing's *Achnanthes minutissima*.

PLATE XIV. fig. 11. *Achnanthes minutissima*: *b*, frustule deprived of its colouring matter; *c*, lateral view.

5. *A. exilis*? Ktz. Frustules slender; lateral surfaces subacute; striæ indistinct or wanting; stipes longer than the frustule. Ktz. Syn. Diatom. p. 578. f. 53; Ktz. Alg. aq. dulc. no. 12; Ehr. Infus. p. 228. pl. 20. f. 5; Pritch. Infus. p. 233.

Parasitic on *Gomphonema geminatum* in several streams near Dodelley.

It is dark reddish-brown when recent, and turns greenish in drying.

This species is very minute: the frustules in a frond vary from

one or two to nine, and are occasionally even more numerous; they are slender, three to six times as long as broad, and curved: the upper margin is convex in the middle and concave on each side; the lower margin, on the contrary, is convex at the ends and concave in the centre with a minute punctum, which is scarcely discernible until the endochrome is removed. The stipes is slender, often curved, and from three to five times as long as a frustule; two or more are often connected together at the base. The lateral surfaces are flat, narrow, lanceolate, with subacute ends. In general there is no appearance of striæ, but I believe this depends upon their extreme minuteness; for in one or two instances, after the endochrome had been destroyed, I distinctly observed in some of the larger frustules the terminations of striæ along the lateral margins of the front view.

Usually the frustules are nearly colourless, whilst the endochrome forms a very pale, central, irregular patch, which occasionally indeed is of a dark brown. At each end of this patch there is almost always, in the recent state, a colourless air-like globule which disappears in drying.

This species is easily distinguished from all the preceding, except *Ach. minutissima*, by its freshwater habitat, its slender frustules, and the apparent absence of striæ. From *Ach. minutissima* it differs in its elongated stipes and more acute lateral surfaces.

Although I have compared our plant with Kutzing's *Ach. exilis*, I am not certain that it is the same species. It agrees with Kutzing's specimen in its crowded habit and elongated stipes, but its frustules are much smaller and its lateral surfaces less acute, in both which respects it is intermediate between *Ach. minutissima* and Kutzing's specimen of *Ach. exilis*.

PLATE XIV. fig. 12. *Achnanthes exilis*: *b*, frustule deprived of its colouring matter; *c*, lateral view.

*Analysis.*

- |    |   |   |                     |
|----|---|---|---------------------|
| 1. | { | Fluvatile, striæ wanting or indistinct .....  | 2                   |
|    | { | Marine or submarine, lateral striæ evident .....                                      | 3                   |
| 2. | { | Stipes much longer than the frustule; lateral surfaces subacute .....                 | <i>exilis.</i>      |
|    | { | Stipes not longer than the frustule; lateral surfaces obtuse .....                    | <i>minutissima.</i> |
| 3. | { | Stipes longer than the frustule .....   | <i>longipes.</i>    |
|    | { | Stipes shorter than the frustule .....  | 4                   |
| 4. | { | Lateral view lanceolate, with acute ends; lateral striæ strongly marked, dotted ..... | <i>brevipes.</i>    |
|    | { | Lateral view elliptic, with obtuse ends; striæ apparently not dotted.....             | <i>subsessilis.</i> |

N.B. Figure 6 of Plate XIV. is a representation of *Striatella unipunctata*, which was described at p. 456 of Vol. XI., but the figure of which was then omitted from want of space: *b*, a frustule deprived of its colouring matter; *c*, lateral view.

LVII.—*Examination of some instances of Vegetable Monstrosities, elucidating the Structure of the Pistil and the Origin of Ovules.* By M. AD. BRONGNIART\*.

WHILE some botanists contend that the placenta is a prolongation of the central, or an axillary axis applied upon or united to the carpellary leaf, others maintain that the ovules are only modifications of appendages, or even parts of the carpellary leaves themselves. In confirmation of the latter view, M. Ad. Brongniart cites an instance of monstrosity observed by him in *Delphinium elatum* cultivated at the Museum of Natural History at Paris in 1841, in which the carpels underwent all degrees of foliaceous transformation, presenting on their borders ovules, sometimes normal, sometimes passing insensibly into the state of *lateral lobes* of the carpellary leaf itself.

The most important monstrosity (observed among many others) was that in which the carpellary leaves formed, toward their summit, an ovary closed by the junction of the carpellary leaves bearing ovules scarcely altered, and presented at their inferior part a leaf whose borders were lobed, folded inwards, separated from each other, and destitute of ovules. On the borders of these carpels were observed all states of transition from lateral trifid lobes of the leaf to true ovules.

It was seen that the carpellary leaves were traversed by three principal longitudinal nervures, one median and two lateral; the latter corresponding to the margins of the carpellary leaf such as it existed in unaltered pistils, these margins by their union constituting the internal suture of the carpels; that the wall of the ovary was only constituted of that portion of the leaf comprehended between the median and lateral nerves, while the portion of the leaf outside the lateral nerves formed no part of the ovary, but was transformed into ovules. The transformation was evident, as these lobes were not abortive and ovules developed in their place, but they became smaller, curved and folded upon themselves, so as to constitute the funiculus and primine, or external membrane of the ovule.

It was easily seen, that of the three teeth each of these lobules presented, the lateral became atrophied, the base of the lobe narrowing to form the very short funiculus of the ovule, while the middle part of each lobe was hollowed and curved upwards and inwards in the form of a hood, so as to constitute the primine. As to the nucleus, it originated from a sort of cellular excrescence or papilla situated on the upper surface upon the median nerve of each lobe a little below its summit. In the lobes spread out and not participating in the formation of tegu-

\* Abstract from the *Comptes Rendus*, tome xviii. No. 13, 25 Mars 1844, communicated by A. Henfrey, Esq.



ments of ovules, the papilla corresponding to the nucleus was very small, and entirely exposed upon the slightly concave superior face of the foliaceous lobe. On the lobes whose summit presented a cup-shaped cavity, the nucleus, either little developed or of some size, occupied the bottom of this kind of cup, which corresponded to the primine. In the foliaceous lobes which had more completely taken on the form of ovules, the opening of the cup-like cavity was narrowed, and had altogether the appearance of the micropyle; the nucleus was more developed, and its free summit corresponded to the opening in the ovulary tegument as in the normal condition. Lastly, the ovule assumed more and more the form and organization of the ordinary ovule of this plant.

It must be admitted then, that in the plant in question, the vascular bundles of each placenta, or what are often called pistillary cords, were formed by the lateral nerves of the carpellary leaf; that each ovule corresponded to a lobe or large tooth of this leaf, and that its funiculus, as well as the raphé as far as the chalaza, was formed by the median nerve of this lateral lobe; that the external tegument, often vascular, of the ovule was nothing but the extremity of this foliaceous lobe folded on itself, forming a sort of hood; that the nucleus, on the other hand, was a new production, a cellular papilla, developed on the superior face of this lobe of the leaf, and in the cavity which the latter had formed.

M. Brongniart does not think that it can be contended that these lateral nerves of the carpellary leaves, from which the ovules and toothed lobes were thus indifferently developed, can be regarded as peculiar processes of the central axis destined exclusively to the production of ovules, as many physiologists have contended.

M. Brongniart believes that this is the general structure in all cases where the placenta is placed on the margin or internal face of the carpellary leaf.

The author then cites another example of monstrosity which exhibits the same origin of the ovules in a family where the ovary seems, at first sight, to deviate notably from the more ordinary structure of compound ovaries, viz. in the *Cruciferae*. In this instance, in which all the flowers on a stem of a turnep were examined, some presented the two carpellary leaves composing the siliqua in a normal condition; others very much developed, and even forming an almost vesicular siliqua, in which the ovules were replaced by little foliaceous expansions, or sometimes the carpels themselves replaced by two free leaves destitute of ovules.

Some of the vesicular siliquæ appeared at first to have the usual organization of the pistil of *Cruciferae*, although differing very

much in form and dimensions, by their longer support and narrow partition from those of *Brassica*; but on opening them it was seen that no true membranous partition existed, the thickened borders of the carpels approached each other, and were in more or less complete contact in their whole extent, or soldered together only in part. The margins of the two different carpels were, on the contrary, very intimately united together in their whole extent, in most cases.

The margins of these carpels gave origin to foliaceous lobes occupying the position of ovules, reflected upon the interior of the carpels, continuous with them by their base, disposed nearly in the same plane, and divided into two or three acute teeth, so as closely to resemble the margin of a pinnatifid leaf. Each of these lobes was traversed by a little nerve, and its subdivisions by secondary nerves. The connexion of these little folioles together at their base, their position in the same plane parallel to the axis of the siliqua, showed plainly that they were not small distinct leaves, but portions of a single lobed leaf. The juxtaposition of this lobed margin with the similarly lobed margins of the other carpellary leaf, the union even of the longitudinal vascular bundles of the two into a single median bundle, produced the appearance of a single pinnatifid leaf applied to the interior, within the suture of the carpellary leaves, so that one might have imagined that the pistil was formed of four leaves in the form of a cross, two forming the valves or walls of the ovary and the other two the placenta; but the complete examination of the monstrosity rendered this supposition unlikely to be true.

Besides the parts already indicated, there existed always in these pistils two little short cylindrical branches terminating in tubercles or papillæ representing young rudimentary leaves. These originated in the axil of the carpellary leaves, and were only their axillary buds elongated in the form of a slender axis. Also, from the centre of the ovary, between the two carpels and from the disunited base of the partition, a rather larger cylindrical axis often arose, bearing on its summit little leaves united into a capitulum; this was evidently the prolongation of the principal axis of the flower. Thus all the modifications that could present themselves on a branch bearing two opposite leaves were found in the interior of this pistil, without one of them taking part in the formation of a placenta. In the few carpellary leaves which, in a state of transition to free expanded leaves, began to separate from each other towards the top, the carpels united at bottom still presented their ovuliform lobes, which then appeared to depend more completely upon the carpellary leaves, and did not tend at all to form a second pair independent of them. It is remarkable, that in proportion as the carpellary leaves more completely assumed

the foliaceous appearance and became completely free, the lobes which replaced the ovule disappeared, and the two leaves in most flowers were oval and quite entire, but marked with three very distinct longitudinal nerves, the borders retaining no trace of the pinnatifid form, which they only appeared to present when they took the character of placentæ.

It is also remarkable, that in the pistils thus become completely foliaceous, there were again found the little axillary branches and the prolongation of the principal axis, bearing at its summit, but at some distance from the insertion of the carpellary leaves, either a bud composed of small leaves, the external of which formed a cross with the carpels, or else little abortive flower-buds.

Thus in this plant with carpels intimately united, we find that the ovules are also a dependence and a result of the modification of the margins of the leaf analogous to what we have seen taking place in the carpels of *Delphinium*. It is impossible to consider the placenta as a dependence of the principal or secondary axes, since we find these developed under the form of little branchlets, and existing at the same time as the placentæ.

There only remain then the pistils with a free central placenta, which appear difficult to reduce to the same type, that is, to carpellary leaves with marginal placentation; but with respect to these it must be remarked, that their pistils are formed after two very distinct types, that of the *Caryophylleæ* and allied families, and that of the *Primulaceæ* and their analogues. There, even, the occurrence of monstrosities comes to confirm the differences which the normal structure indicates in the composition of these pistils.

Thus the pistil of *Caryophylleæ* presents in many cases partitions which perish or disappear at a more or less advanced epoch of their development, and the placentæ appear to occupy, as in ordinary multilocular pistils, the margins of the carpellary leaves brought together and soldered round the ideal axis of the flower. An instance of monstrosity of one of the *Sileneæ* (M. Brongniart believes a *Saponaria*), communicated by M. Bravais, confirms this supposition, for the carpels had become partly free and open, and bore ovules on their margins.

On the other hand, in the *Primulaceæ* there are never any traces of partitions; the ovules are fixed upon an almost globular placenta, not divisible into longitudinal bundles, and in the frequent instances of monstrosities observed in *Primula*, *Anagallis*, *Cortusa*, *Lysimachia*, &c., the pistil has never been seen to change into ovuliferous carpellary leaves; but, on the contrary, the central placental axis, elongated in the form of a central column, bears ovules more or less modified, which pass into the state of as many little distinct leaves as there are ovules.

Thus in this case the placenta would appear really distinct from carpellary leaves, and constituted of the prolonged floral axis bearing little leaves arranged in verticils or rosettes, and susceptible of giving birth to as many ovules. M. Brongniart has already demonstrated this transformation of ovules into little leaves more or less rudimentary and folded up in a monstrosity of the China primrose; he might offer a second example of it in the *Anagallis phænicea*, if it were not that all the ovules were replaced by three or four verticils of five small sessile oval leaves bordered with glandular hairs, but not presenting any transition into the form of ovules.

There would be then two different origins of ovules: one appertaining to an immense majority of the Phanerogamous vegetables, in which the ovules arise from the border itself of the carpellary leaves, and represent the lobes or dentations of these leaves; the other peculiar to a small number of families, such as the *Primulaceæ*, *Myrtineæ*, *Theophrasteæ*, and probably the *Santalaceæ*, in which the ovules would correspond to so many distinct leaves borne on the prolongation of the floral axis.

## PROCEEDINGS OF LEARNED SOCIETIES.

### ZOOLOGICAL SOCIETY.

July 25, 1843.—William Yarrell, Esq., Vice-President, in the Chair.

Mr. Fraser having carefully determined the species of birds forming part of an extensive collection of subjects of natural history, brought to England by Mr. Bridges, laid them before the Meeting, and communicated the following notes from that gentleman relating to their habits, ranges, &c.

*Sarcoramphus gryphus*, Auct. *Condora* and *Buitre*.

“Found in all the provinces of Chile, and very abundant in the elevated valleys of the Andes. Builds its nest on the shelves of inaccessible precipices, and lays from one to two large white eggs. Iris of the female dark red.”

*Cathartes Iota*, Mol. *Ioté*.

“This species is found in abundance along the coast of Chile; also in the interior; devouring dead fish and carrion of all kinds. The head of the adult bird is red when alive. Iris light brown.”

*Cathartes atratus*, Sw. *Iotecito* and *Ioté de Mendoza*.

“This bird is found on the eastern side of the Andes near Mendoza, and is occasionally seen in Chile in the province of Colchagua. The cruncles of the head are very large when alive, and black. Iris dark brown.”

*Haliaëtus Aquia*, Temm. *Aquila* of the Spanish, *Calquin* of the Indians.

“This bird inhabits the retired woody and mountainous parts of

the country. It sometimes soars to a great height. Its principal food is partridges and domestic fowls. The young appear to accompany the old for at least six months, and depend on them till that age for food. I have frequently seen an eagle catch a partridge and carry it to its young that would be waiting on a tree or rock ready to receive it. Iris light brown; legs pale yellow; cere yellow. Builds its nest on the tops of trees, and lays from three to four dirty-white eggs."

*Polyborus Brasiliensis*, Sw. *Traro* and *Taro*.

"Feeds on carrion, worms, frogs and the larva of insects. It is common to see these birds following the ploughman, picking up worms, &c. in the newly broken soil. They build their nests in trees: the nest is composed of sticks and stems of a species of *Rumex*, and on the outside is a kind of platform where the male sits during the setting of the hen. The eggs are dirty white spotted with brown. Iris brown; legs and cere yellow. When pressed by hunger it attacks chickens."

*Phalocobæus montanus*, D'Orb. *Tuique de la Cordelliera*.

"This is a very rare bird, occurring only in the valleys of the Andes at an elevation of from 5000 to 8000 feet. Found in pairs. Iris dark brown."

*Milvago pezoporos*, Meyen. *Tuique*.

"Common in all parts of Chile. Habits the same as the *Traro* (*Pol. Brasiliensis*). Iris brown; legs light brown or grey."

*Buteo erythronotus*, King. *Aguilucha*.

"This is the small eagle of Chile, as its name in Spanish implies. It inhabits the open parts of the country, and is mostly seen perched on the top of a solitary tree enjoying the sun in the afternoon. Base of the bill, cere and legs greenish yellow; iris brown. Food, rats and small birds."

*Astur uncinctus*, Temm., Pl. Col. 313. *Peuco*.

"This species of hawk is found in the retired and woody parts of the country: it appears to seek the shade during the day and hunts its food in the evening. Iris light brown."

*Falco anatum*, Bonap. *Gavilan*.

"The Gavilan is a rare bird in Chile, and the most rapid on the wing of all the Chilian hawks. It is occasionally seen in open parts of the country perched on a rock-stone. Iris brown; legs and nostrils yellow."

*Falco femoralis*, Temm. *Alcon*.

"This is the species of hawk in Chile used for hunting partridges. It is easily domesticated. I have seen them caught in a net for the purpose of hawking, and in fifteen days afterwards follow their master and hunt partridges when sprung by the dogs. Base of the bill and margins of the eyes bright yellow; iris dark brown."

*Tinnunculus Sparverius*. *Sarnicula*.

"This is the smallest of the hawk tribe in Chile. It is said to build its nest in holes of trees. The female is easily distinguished from the male by the bands across the tail-feathers. Iris dark brown."

*Circus cinereus*, Vieill. *Nublina* is the name for the adult male, and *Barril* for the female and young.

"This species is less rapid in its motions than the other hawks, and generally flies nearer the ground. It feeds chiefly on rats and mice. The ruff of feathers round the head gives it the appearance of an owl. Iris bright yellow."

*Elanus dispar*. *Baylarin*.

"This is the rarest of the Chilian hawks. It hovers over its prey, and from that it takes its name, which signifies dancer. Eyes large; iris yellow. Found in pairs. It appears to be migratory, making its appearance during the winter."

*Athene cunicularia*, Mol., Hist. de Chile, pp. 293 and 390. *Piqueu*.

"This species lives in holes in the ground, which it makes to a considerable depth. In the afternoon it comes out of its cave and basks in the sun. It appears to live in communities, as several inhabit the same cave. Iris bright yellow."

*Athene ferox*, Vieill. *Chucho*.

"This is the smallest species of owl found in Chile; it is very destructive to pigeons, killing the young and eating only the brains of its victims. It is much dreaded by small birds, and the hiding-place of the *Chucho* is frequently discovered by their cries. It makes its nest in holes of trees. Iris yellow."

*Otus palustris*, Gould. *Nuco*.

"A rare species of owl, found in the province of Colchagua. Iris yellow."

*Strix perlata*, Licht. *Lechusa*.

"Inhabits old houses, and in holes in precipices made by the parrots. Rare in Chile."

*Bubo Virginianus*, Wils. *Túcúrářě*.

"The largest species of owl found in Chile. It inhabits woods and may occasionally be found sleeping during the day. It has derived its name from its note. Iris pale yellow."

*Caprimulgus bifasciatus*, Gould. *Plasta* and *Gallina ciega*.

"This bird is found in bushy places on the east and west side of the Andes. Iris brown. The female is rarer than the male. It is called *Plasta* from its laying flat on the ground: *Gallina ciega* in Spanish signifies Blind-hen."

*Hirundo leucopygia*, Licht. *Golondrina*.

"Called in the Indian language *Pilmayqueu*. It builds its nest, which is composed of grass and feathers, in holes under the tiles of houses. Remains in Chile throughout the year."

*Ceryle torquata*, Gmel. *Martin Pescador*.

"The Indian name of this bird is *Quete Quete*. It inhabits all the southern provinces of Chile, and may be generally seen sitting on a bough over the water waiting for fish: it darts down upon them with astonishing rapidity. Iris dark brown."

*Myiobius parvirostris*, Gould. *Pio*.

"This little flycatcher makes its appearance near Valparaiso in

gardens and on the mountains in September. It is called *Pio* from its note. Iris brown."

*Myiobius albiceps*, G. R. Gray. *Binda*.

"This little bird inhabits lonely and shady ravines. It has a singular and mournful note, from whence it has derived its name of *Binda* or Widow-bird. Iris brown."

*Serpophaga parulus*, Gould. *Torito* and *Cachudita*.

"This singular little bird inhabits gardens, and bushy situations on the mountains, in Chile. It takes its name, *Cachudita*, from the feather on the top of the head resembling a horn, *cacho* being a term for horn in Spanish. Feeds on small insects. Iris pale yellow."

*Lichenops perspicillata*, G. R. Gray. *Colegial*.

"This interesting little bird is always found near margins of rivers and marshes: when flying it has a singular appearance, as it then displays the white tips of its wings. Iris and margin of the eye bright yellow."

The *Lichenops erythropterus*, Gould, is either the female or young of the above species.

*Xolmis pyrope*, G. R. Gray. *Thincon* and *Dincon*.

"This bird is migratory: it visits the coast in the winter and spring months, and during the summer retires to the elevated parts of the country. Its food is flies and other insects. Iris bright red."

*Agriornis gutturalis*, Gould. *Mero* and *Zorzal Mero*.

"This bird is found in the central provinces of Chile. Its food is insects. Iris brown."

*Agriornis maritimus*, G. R. Gray. *Mero de la Cordelliera*.

"This bird inhabits the elevated valleys of the Andes on the east and west sides. Iris brown."

*Turdus Falklandicus*, Quoy et Gaim. *Zorzal*.

"Found in all parts of Chile. Iris brown."

*Mimus Thenca*, Mol. *Tenca* and *Trenca*.

"This bird is certainly the most celebrated for its song of all the birds in Chile: it sings during the months of September, October and November. It frequently builds its nest on the tall *Catus*\*. The eggs so much resemble the eggs of the blackbird of Europe that it would be difficult to distinguish them; nor is the nest unlike. It feeds on flies like the *Muscicapa*. Iris yellowish green."

*Opetiorhynchus nigrofumosus*, G. R. Gray. *Molinero*.

"Inhabits the sea-shore in rocky places, margins of rivers, brooks and ditches. It has a most agreeable note or warble, and flaps its wings whilst singing. Iris brown."

*Opetiorhynchus vulgaris*, G. R. Gray. *Churete*.

"Habits and manners the same as *O. nigrofumosus*."

*Geositta (Furnarius) canicularia*, G. R. Gray. *Caminante*.

"Found on the plains in the intermediate provinces of Chile."

\* So in manuscript.

*Uppucerthia dumetoria*, Is. Geoff.

"Inhabits the elevated valleys of the Andes. Iris brown."

*Pteroptochos megapodius*, Vig. *Turco*.

"The Turco is found in the ravines or quebradas near Valparaiso."

*Pteroptochos albicollis*, Kittl. *Tapaculo*.

"This bird is found in all the central provinces of Chile, especially where the *Octodon Cumingii* abounds: when pursued it takes shelter in holes made by the *Octodon*, and appears to live in harmony with that little animal. Its food is no doubt insects, worms, &c., which it obtains with its strong claws by scratching under trees and bushes. Iris brown."

*Scytalopus Magellanicus*, G. R. Gray. *Chircan negro*.

"Inhabits hedges in various parts of Chile."

*Troglodytes Magellanicus*, Gould. *Chircan*.

"This little wren builds its nest with twigs of *Trevoa trinervis*, and lines the inside with feathers: the nest is found in holes of trees and walls. It sings beautifully during the summer. Eggs white with reddish-brown spots. Inhabits gardens and hedges near Valparaiso."

*Synallaxis rufogularis*, Gould.

"Found near marshes amongst large aquatic plants."

*Synallaxis pumicola*, Kittl. *Bolaria*.

"This bird is somewhat rare, is fond of bushy situations on the mountains, and builds a cylindrical nest with a hole on the top, composed of twigs of *Trevoa trinervis*; the inside is lined with the down of a species of *Gnaphalium*: it lays from four to six eggs. Iris brown."

*Synallaxis ægithaloides*, Kittl. *Colilarga*.

"Inhabits woody and bushy places, seeking insects in the trunks of trees and amongst bushes."

*Synallaxis spinicauda*, King.

"Inhabits woody situations in the interior of the country."

*Oxyurus dorso-maculatus*, D'Orb.

"Found near marshes amongst large aquatic plants. A very rare bird."

*Dendrodramus leucosternon*, Gould. *Carpentero Pardo*.

"Inhabits woods in the province of Colchagua near the Andes. Rare."

*Muscisaxicola mentalis*, D'Orb.

"This little bird migrates to the coast in flocks in the months of June, July and August. Iris brown."

*Muscisaxicola rufivertex*, D'Orb.

"Inhabits elevated mountains of the Andes, near the snow."

*Muscisaxicola nigra*, Less. *Animita*.

"Inhabits margins of rivers in sandy places. Found in pairs the whole year."



*Anthus correndera*, Vieill.

"This interesting little bird inhabits moist plains and margins of marshes: when it flies it expands its tail and shows the two exterior white feathers: it is remarkably tame, and hides itself amongst high grass. Iris brown."

*Cyanotis omnicolor*, Swains. *Pajaro de Siete colores*.

*Crithagra? brevirostris*, Gould. *Chirique*.

"The Chirique is seen in the interior and on the coast of Chile in flocks of several thousands together. It builds its nest among high grass on the ground. Eggs dirty white with brown spots."

*Chrysometris campestris*, Gould. *Zilguero*.

"This little bird is common about Valparaiso in the months of September and October, on the mountains. It is caught with birdlime and in trap-cages, and sold in the market. It is kept in cages for its song, which is almost as agreeable as that of the canary. Iris brown."

*Chrysometris Magellanicus*, Bonap. *Zuilguero de la Cordelliera*.

"This little bird confines itself to the valleys of the Andes on the east and west side. Iris brown."

*Zonotrichia mutatina*, G. R. Gray. *Chincol*.

"Found in all parts of Chile, also in valleys of the east side of the Andes: builds its nest on bushes. Eggs white with brown spots."

*Fringilla alaudina*, Kittl. *Pichiquina*.

"This little bird makes its appearance in the summer months: inhabits corn-fields: builds its nest on the ground, and lays from four to five whitish eggs with brown spots. Iris dark brown."

*Fringilla fruticeti*, Kittl. *Jalé*.

"Inhabits hedges and bushy situations. Iris brown."

*Fringilla Gayi*, Edoy. et Gerv. *Cometocina*.

"The Cometocina visits the coast of Chile during the winter, and in summer it migrates to the valleys of the Andes. It is found both on the east and west sides. The name in Spanish signifies Bacon-eater; but why so called I know not. Iris light brown."

*Fringilla Diuca*, Mol. *Thiuca* and *Diuca*.

"The Diuca is common in all parts of Chile: during the summer months it sings before the dawn of day and in the afternoon. It is a splendid sight to see the sun rise over the Andes in the months of October and November, and the pleasure is moreover enhanced by the warbling of a thousand Diucas. It builds its nest in bushes, and lays from four to six dirty-brown coloured eggs. Iris light brown."

*Emberiza luteocephala*, D'Orb. *Canaria*.

"Inhabits the elevated valleys of the Andes, east and west sides. Iris reddish brown."

*Phytotoma rara*, Mol.

"Called *Rara* by the natives, and is generally found near houses on bushes and hedges. It is a most mischievous bird in gardens, doing considerable damage to young plants by cutting them in two

with its serrated beak : it appears to live on the juice of the plants. The note of this bird is singularly harsh, resembling more the croaking of a frog than the note of a bird. Iris bright red."

*Sturnella Loica*, Mol. *Loica*.

"The Loica is found in all parts of Chile. It congregates in winter on the plains, builds its nest on the ground amongst grass, and lays from four to six whitish eggs with brown spots. These birds often prove an annoyance to the sportsman in Chile, from the dogs pointing at them as at partridges. Iris brown."

*Icterus Thilius*, Mol. *Thili* or *Trili*.

"Occurs in marshy situations, and builds its nest amongst reeds, rushes and light grass: eggs white with brown spots. Iris dark brown."

*Agelaius curaceus*, Mol. *Tordo*.

"This bird is found in all the intermediate provinces of Chile. It congregates in the winter like the Loica and Thili. The Tordo builds its nest on trees: in size and material the nest resembles that of the thrush of Europe, and is lined with mud inside in the same manner. It lays from four to six eggs of a pale blue colour inclining to white. This bird is easily domesticated, and may be taught to whistle and talk. Iris dark brown."

*Conurus cyanolysios*, Mol. *Psit. Patachinus*, Vig. *Loro* and *Tricague*.

"It makes holes in the precipices near rivers several yards in length, where it deposits its nest and eggs. The eggs are white and almost round, and vary from three to six in number. The young are highly esteemed for the table, and are obtained by attaching a fish-hook to the end of a long pliable stick, which is thrust into the hole and turned round, or drawn backwards and forwards, until such time as the person using it considers his object secured. The natives when employed in capturing these birds incur considerable danger, since they suspend themselves from the tops of high precipices by means of a laso or hide-rope, which is either secured to a tree or stake or held by two or three persons, who move as occasion requires. Iris white."

*Psittacara cheroyeus*, Mol. (*P. leptorhynchus*, Vig.) *Cheroy*.

"Inhabits the province of Colchagua."

*Colaptes Pitiguus*, Mol. *Colaptes Chilensis*, Vig. *Pitigue*.

"The Pitigue is found in all the southern provinces of Chile in woody situations; sometimes it may be seen on the ground seeking worms and grubs. It takes its name from its cry or scream, which may be heard at a great distance. Molina has committed an error by stating that this, unlike the rest of the family to which it belongs, builds its nest in holes in the ground. I have frequently found its nest in holes of trees, but never do I remember having seen or heard of an instance of its building as Molina asserts. The flesh is eaten. Iris greenish yellow. Eggs white."

*Picus lignarius*, Mol. *Picus Kingii*, G. R. Gray. *Carpentero*.

"Inhabits woods and hedges."

*Trochilus gigas*, Vieill. *Picaflor grande*.

"The *Troch. gigas* is found in all the intermediate provinces of Chile: it is seen about Valparaiso during the spring and summer months, feeding on the flowers of *Pourretia coarctata* and *Lobelia polyphylla* in preference to others. It generally builds its nest near a little rivulet, frequently on a solitary twig or branch over the water; the nest is beautifully constructed, and is composed of moss and the down of a species of *Gnaphalium*. Eggs white; iris dark brown. Catches flies."

*Trochilus Millerii*, Loddiges. *Picaflor de la Cordelliera*.

"This beautiful and rare species of humming-bird is only found in the elevated valleys of the Andes, residing amongst storms of hail, rain and thunder, and in places where the naturalist would least expect to find a species of *Trochilus*. It subsists more upon small flies than upon the nectar of flowers. On examination of the crops I found them filled with flies, which they take before sun-down along the margins of the mountain rivulets. The specimens in the present collection were taken at Los ojos de Agua, province of Aconcagua, at an elevation of from 6000 to 8000 feet, and I saw them at least 1000 feet above that place. Iris brown."

*Trochilus galeritus*, Mol. (*T. Kingii*, Vig., *T. sephanoides*, Less.) *Picaflor*.

"Found about Valparaiso in abundance in the months of August, September and October. Feeds on the *Loranthus tetrandrus*, a parasitic plant growing on the olive. It is taken by the boys with bird-lime, made from the berries of the above-mentioned plant. This species of humming-bird is seen as far south as the island of Chiloe, in lat. 42° south. The females are destitute of the flame-colour on the head, and appear to be less numerous than the males."

*Columba Fitzroyi*, King. *Torcasa* and *Torquasa*.

"The *Torcasa* is found in all the southern provinces of Chile. Near Santiago it assembles in the winter in immense flocks, feeding on young grass and *Alfalfa*. In summer it migrates to the forests of the southern provinces to rear its young, and then feeds on the berries of the laurel. Iris reddish brown."

*Columba Boliviana*, D'Orb. *Tortola Cordellierana*, i. e. Dove of the Andes.

"This dove inhabits the Andes, but in winter it visits the coast for a short time. When put to flight it makes a whistling noise with its wings. Generally seen in small flocks."

*Zenaida aurita*, Temm. *Tortola*.

"This is the most common of the *Columbidae* found in Chile. It assembles in winter in large flocks, and is killed and brought to the markets of Santiago and Valparaiso in large quantities. Iris dark brown."

*Columbina strepitans*, Spix. *Tortolita cyana*.

"This pretty little species of dove is found in the valley of Acon-  
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cagua in Chile, and more abundantly on the eastern side of the Andes near Mendoza. Iris greenish white."

*Nocthura perdicaria*, G. R. Gray. *Perdiz*.

"This bird is dispersed over all the Republic of Chile; it is found on the bushy sides of the mountains and in corn-fields. They are either solitary or in pairs, but never congregate: their eggs are of a beautiful dark purple colour, and from ten to fifteen in number. When sprung they utter a shrill whistle, and their flight is very rapid for a short distance. The male scarcely differs in plumage from the female. Iris brown."

*Tinochorus D'Orbignianus*. *Perdiz de la Cordelliera*.

"Inhabits elevated valleys and mountains of the Andes, both on the east and west sides. The male shows a strong attachment for its mate, and calls her immediately when separated. Found in pairs. Iris brown."

*Tinochorus Eschscholtzii*. *Perdizita* and *Perdigon*.

"This interesting little bird is found on plains in Chile. When it rises from the ground it takes a rapid and circular flight, often returning to the same spot from whence it rose. In winter they assemble in flocks. Iris brown."

*Eudromia elegans*, D'Orb. *Martinella*.

"Found in pairs on the Pampas near Mendoza."

*Hæmatopus niger*, Temm. *Tira Tira*.

"Found along rocky shores in small flocks: it utters a loud shrill whistle when put to flight. Feeds on *Buccinum concholepas* and the various species of *Patella*. Legs white; iris yellow."

*Hæmatopus palliatus*, Temm. *Pilpileu*.

"Inhabits sandy shores of Chile north of Valparaiso. It feeds on marine insects and assembles in small flocks. Iris yellow; legs white."

*Ardea major*? Mol. (*Ardea Cocoi*? Linn.) *Cuca*.

"This fine species of *Ardea* is probably the *A. major*, Mol.; it is very rare, and is only seen occasionally along the banks of rivers in the southern provinces of Chile."

*Ardea Thula*, Mol. *Garsa cirigonia* and *Garsa Chica*.

"Iris pale yellow; fore part of the legs black; hinder part yellowish green. Food small fish, frogs, and the larvæ of *Libellula congregates* in the spring. Builds its nest on trees near lakes, ponds and marshes."

*Herodias galatea*, Mol. (*Herodias leuce*.) *Garsa grande*.

"Inhabits lakes, marshes and rivers. Iris pale yellow; bill yellow; legs black."

*Ciconia Pillus*, Mol. (*Ciconia Maguari*.) *Pillo* and *Pillu*; pronounced *Peel-yu* and *Pe-yu*.

"This noble bird is often seen in the marshes of the province of Colchagua, and feeds on a species of lobster, called by the natives *Cangrejo*, which is abundant in the marshes and moist meadows. The habitat of the *Cangrejo* may be known by the extraordinary cy-

linders which it makes with the mud taken from its caves ; sometimes they are elevated a foot above the surface of the soil, looking like so many little columns. The Pillu whilst stalking amongst them catches the Cangrejo on the top depositing its load brought from the bottom of the cave. I once took from the crop of those birds three entire mice, no doubt caught by them amongst the grass in the marshes. Iris pale yellow."

*Nycticorax cyanocephalus*, Mol. (*Nyc. Americanus*, Bonap.) *Guedavo*, *Huedavo*.

"This appears to be the *Ardea cyanocephala*, Mol., p. 260. It may almost be considered a nocturnal bird ; it flies and seeks its food in the evening ; during the day it is generally seen sleeping on trees or bushes whose branches extend over the water. Iris large, pale orange-colour ; legs yellowish green ; eggs pale blue. Flesh said to be excellent eating. This bird varies much in its plumage according to age."

*Phænicopterus Chilensis*, Mol. (*Phæn. ignicapillus*, Is. Geoff.) *Flémenco* and *Cheuque*.

"Inhabits shallows in the lakes and rivers, especially in the southern provinces of Chile. Eye small ; iris pale yellow ; base of the bill rose-colour ; point of the bill to the curvature black ; legs sea-green, inclining to grey ; feet and heel-joint deep rose or pink colour. It is a magnificent sight to see five hundred of these beautiful birds in a flock, wading in the shallows of the lakes, and no less so when they rise on the wing ; the contrast of the black feathers beneath the wings and the lovely scarlet and rose colours producing a very pleasing effect. I have never been able to ascertain where these birds build their nest, but it is probably in the remote and elevated valleys of the Andes in marshy places, together with the numerous species of the *Anatidæ*."

*Platalea ajaja*, Linn. *Cuchareta*, *i. e.* Spoonbill.

"A rare bird in Chile ; it is found in small flocks of five or six along the margins of rivers south of Valparaiso, and is a shy bird."

*Harpiprion Cayanensis* (*Ibis (Falcinellus) Ordi*, Bonap.). *Cuervo* and *Gallereta*.

"The *Cuervo* inhabits marshy places and occurs in immense flocks. When on the wing it always flies in some geometrical figure. Food aquatic insects. Iris crimson."

*Theristicus melanops*, Wagl. *Banduria*.

"The *Banduria* is not uncommon in the interior of Chile. Frequently seen in marshy places in small flocks ; builds its nest on trees near water. It is easily domesticated. The flesh is eaten by the natives. Iris pale red."

*Numenius Hudsonicus*, Lath. *Perdiz de la Mar*.

"Inhabits sandy bays along the shores of Chile. Feeds on marine insects."

*Himantopus nigricollis*, Vieill. *Perrito*.

"Inhabits the margins of lakes and rivers. Legs red; iris dark brown."

*Philomachus Chilensis*, Mol. (*Vanellus Cayanus*, Auct.) *Queltregue* and *Queltgue*.

"A very common bird on the plains near the Andes; it feeds on locusts during the summer. The eggs of this bird, in size and colour, resemble those of the lapwing of England, so much so that it would be difficult to distinguish them, and are also excellent eating. Iris pale purple."

*Oreophilus totanirostris*, Jard. & Selb.

"This is a very rare bird, probably a native of the Andes. It makes its appearance on the plains in small flocks in the winter. Iris brown. Rare."

*Streptilas Interpres*, Ill.

"Inhabits sandy shores and mouths of rivers. Iris brown."

*Charadrius Virginianus*, Wils.

"Inhabits sandy shores and mouths of rivers. Iris brown."

*Squatarola Urvillii* (*Squatarola cincta*, Jard.; *Charadrius rubecola*, King).

"Inhabits sandy shores and mouths of rivers. Iris brown."

*Hiaticula bifasciata*.

"Inhabits the shores and margins of lakes in Chile."

*Phalaropus Wilsonii*, Sab.

"Inhabits the lake of Quintero. Rare."

*Limosa Hudsonicus*, Sw. *Avecasina de la Mar*, i. e. Sea-Snipe.

"Inhabits the mouths of rivers near the sea. Rare."

*Scolopax Paraguaia*, Vieill. *Avecasina* and *Porrotero*.

"Found in large flocks in the marshes during winter. Iris brown."

*Rhynchea semicollaris*, G. R. Gray. *Avecasino pintada*, i. e. Painted Snipe.

"Inhabits marshes. Bill and legs pale green; iris brown."

*Rallus sanguinolentus*, Sw. *Piden*.

"Iris bright red; bill blue at the base and light green at the tip. Inhabits marshes and margins of rivers. The flesh is highly esteemed; by the Chilenos considered equal to that of the partridge."

*Gallinula crassirostris*, J. E. Gray. *Taguita*.

"The Taguita is found in marshes, rivers and lakes. Iris red; legs brown; bill pale green. Eggs brown or dirty white with reddish spots."

*Fulica galeata*, G. R. Gray.

"Found abundantly in the lakes of Quintero and Santa Domingo. Legs reddish brown."

*Anser melanopterus*, Eyton. *Pinguen*.

"Found during the winter, in pairs, on plains near the Andes, in the province of Colchagua."

*Chloephaga Magellanica*, Eyton. *Canquena*.

"Found in the winter months on the plains."

*Cygnus nigricollis*. *Cisne*.

"This noble bird is found in all the lakes near the coast of Chile. Iris brown. In pairs."

*Rhynchaspis maculatus*. *Pato Abaston*.

"Found in lakes and rivers near the sea."

*Querquedula creccoïdes*, Eyton. *Pato Jergon Chico*.

"Inhabits rivers and lakes. Common. Iris brown."

*Querquedula cærulata*, Eyton (*Anas Rafflesii*, Vig.). *Pato colorado*, or Red Duck.

"This beautiful species of duck is found in the lakes and rivers in small flocks. Iris pale red."

*Mareca Chilensis*, Eyton. *Pato real*, or Royal Duck.

"Inhabits rivers and lakes. Found in pairs."

*Anas chalcoptera*, Kittl. (*Anas specularis*, King.) *Pato del Estero*.

"This is a rare species of duck: it inhabits the rivers and lakes in the province of Colchagua where wood abounds. It does not congregate like the other species, but is mostly seen in pairs. Iris brown; web between the toes black."

*Anas Bahamensis*? Linn. *Pato Jergon grande*.

"Inhabits rivers and lakes. Common. Iris brown."

*Erismatura ferruginea*, Eyton. *Pato Pimpillo*.

"This is a very difficult bird to obtain, being very shy and diving when you approach within gun-shot of it. Found in the lake of Quintero."

*Podiceps Kalipareus*, Quoy et Gaim. *Gualita de la Mar*.

"This species confines itself to the sea, and assembles in large flocks in the months of September and October. Found in the bay of Valparaiso and along the coast. Iris red."

*Podiceps Rollandii*, Quoy et Gaim. *Pollolo*.

"Inhabits rivers and freshwater lakes near the coast. Iris red."

*Podiceps Chilensis*, Garnot. *Guala* and *Gualon*.

"This fine species of grebe inhabits the sea and freshwater lakes near the coast of Chile. Iris light brown."

*Puffinus cinereus*, Steph.

"Rocky islets near the bay of Quintero."

*Pelecanoides Garnotii*, G. R. Gray. *Palo yunco*.

"Inhabits the bay of Quintero. Rare."

*Procellaria glacialoides*, Smith.

"Found in the bay of Valparaiso."

*Daption Capensis*, Steph. *Tablero*.

"Found off the coast of Chile, from thirty to forty miles distant from land. Iris dark brown."

*Merganetta armata*, Gould. *Pato de la Cordelliera*.

*Larus dominicans* ? Licht. *Quilla*.

"Inhabits the shores of Chile ; in sandy shallows near the mouths of rivers. Iris brown."

*Xema (Chroicocephalus) cirrocephalum*, G. R. Gray. *Caguil*.

"Found with *L. dominicans* ?"

*Rhynchops nigra*, Linn. *Tijereta*, or Scissor-bird.

"This species of *Rhynchops* inhabits the coast of Chile ; its favourite abode is the warm sandy shallows in the lakes and mouths of rivers. It assembles in large flocks in the spring. Iris brown ; legs red."

*Phalacrocorax Gaimardii (Phalacrocorax cirriger, King)*. *Pato Lila*.

"Inhabits the bay of Valparaiso. Iris dark green ; legs red."

*Phalacrocorax Brasiliensis* ? Spix. *Yeco* and *Pato del Diablo*, or Devil Duck.

"This bird builds its nest on the summits of the loftiest trees, in flocks of many thousands in the bay of Valdivia, near a place called Los Guauros, south of the island of Mansera. It is impossible to remain long in the place where they build, owing to the offensive smell occasioned by their dung, together with the putrid fish which falls from the trees brought for their young. They obtain their food by diving near the rocks along the shore, and are capable of remaining long under water. Iris sea-green."

*Sula* ——— ? *Piguero*.

"The Piguero inhabits the coast of Chile from the island of Chiloe to Copiapo. It is amusing to watch the motions of this bird when flying over the surface of the sea. The moment it perceives a fish, it folds its wings and falls with the rapidity of lightning into the water, diving no doubt to a considerable depth, and often rises with the fish in its mouth. The base of the bill, gullet and legs are a beautiful light purple. Iris light brown."

The following species are found in the vicinity of the city of Mendoza, and are not found on the western side of the Andes :—

*Progne purpurea*, Boie. *Golondrina*.

"This beautiful bird makes its nest in holes along the steep banks of the rivers of Mendoza ; also in precipices near the thermal springs at Villa Vicencia. Iris dark brown."

*Muscivora Tyrannus*, Gray. *Tijerata*.

"This singular bird is very pugnacious when setting ; when on the wing it extends its tail, which gives it a very singular appearance. It takes its name from its tail resembling a pair of scissors. Inhabits fields and vineyards near Mendoza. Iris dark brown."

*Lichenops (Fluvicola cyanirostris, D'Orb.)*. *Virey*.

"This curious little bird receives its name from its note, which it makes on the wing. It perches on the top of a bush, and on a sudden ascends for two yards in the air, and whilst so doing calls out '*Vi-rey*,' returning to the same twig from whence it rose. It feeds on flies and insects, and inhabits the valleys of the Andes near Villa Vicencia. Bill blue ; legs black ; iris dark brown."



*Turdus fuscater*, D'Orb. *Zorzal*.

"Inhabits the vicinity of Mendoza. Iris brown. Sings equal to the blackbird of England."

*Mimus tricaudatus*, D'Orb. *Calandria*.

"This bird has a soft and melodious note; it sings when the sun is nearly lost in the horizon, which perhaps may give it a greater charm. Iris brown."

There is in the collection another species from this locality (Mendoza) called *Trenca*, the technical name of which has not yet been made out.

*Rhynomya lanceolata*, D'Orb. *Turco*.

"Found in bushy places on the Pampas near the river Tunilyan. Iris brown."

*Molothrus niger*, Gould. *Tordo*.

"Found in small flocks in fields near Mendoza. Iris dark brown."

*Diplopterus guira*, Gray. *Urraca*, or Magpie.

"This bird is noisy and restless in its habits; it is found in gardens, vineyards, &c. near Mendoza. Iris pale yellow."

Mr. Fraser observed that an entire series of the above Chilian Birds is contained in the museum of the Earl of Derby.

## August 8.—Prof. Owen in the Chair.

Mr. Fraser stated that he had received the following observations from Mr. George Loddiges, relating to some species of Humming Birds described in the Society's Proceedings;—

*Ornismya vestita*, Revue Zoologique, 1838, p. 314; 1839, p. 18; 1840, p. 8, is your *Trochilus uropygialis*, Proc. Zool. Soc. 1840, p. 15.

*O. heteropogon*, Revue Zool. 1839, p. 354; Mag. de Zool., 1840, pl. 12, Oiseaux, is your *T. coruscus*.

*O. microrhyncha*, Boissenneau, Revue Zool. 1839, p. 354, Dec.; Mag. de Zool. 1840, pl. 16, Oiseaux, is your *T. brachyrhynchus*.

*O. ensifera*, Revue Zool. 1839, p. 354, Dec.; Mag. de Zool. 1840, pl. 15, Oiseaux, is your *T. Derbianus*.

*O. Bonapartiæ*, Revue Zool. 1840, p. 6, is my *T. aurogaster*. The female only is described.

*O. Temminckii*, Revue Zool. 1839, p. 354, Dec.; Mag. de Zool. 1840, pl. 14, Oiseaux, is my *T. cyanopterus*.

*O. Guerinii*, Boissenneau, Revue Zool. 1840, p. 7, Jan., is your *T. parvirostris*. The female only is in both described.

*O. La Fresnayi*, Revue Zool. 1840, p. 8, Jan., is your *T. flavicaudatus*.

*O. Allardi*, Bourcier, Revue Zool. 1839, p. 294, Oct.; *O. Allardi*, Bourc., Anal. des Sci. Physiques de Lyon, iii. p. 226; *O. Paulina*, Boissenneau, Revue Zool. 1839, p. 355, Dec.; Mag. de Zool., pl. 13, 1840, D'Orbigny's *smaragdino-collis*, is my *T. Tyrianthinus*.

A species of *Cercopithecus* recently added to the Society's menagerie was exhibited. Of this species, the Secretary observed, he had seen several specimens, and that in the Leyden Museum it is labelled as the *Cercopithecus lunulatus* of Kuhl.

October 24.—William Yarrell, Esq., Vice-President, in the Chair.

The following papers were read:—

“Notes of the Dissection of a Female Orang-utan (*Simia Satyrus*, Linn.),” by Prof. Owen.

“The female Orang-utan which died October 11th, 1843, was examined by me on the following day. Its weight was 41 lbs.; its age probably between five and six years. The living animal, when first received at the Gardens, January 4th, 1839, weighed 33 lbs. 8 oz. The acquisition of the permanent series of teeth had been in progress nearly a year. Of this series the first true molar tooth on each side of both upper and lower jaws was first acquired; then the two middle lower incisors; next the two large middle upper incisors cut the gum. The two lateral upper incisors and the left lateral lower incisor were soon after displaced, but their successors had not made their appearance through the gum at the time of the death of the animal. At this period, therefore, the following deciduous teeth were retained in the jaw: the right lateral lower incisor, the four canines, and the eight molars.

“The permanent teeth (bicuspides) destined to succeed these had their crowns about half-formed. Those of the large permanent canines were in the state of hollow cones, supported, like the foregoing, by large and highly vascular matrices, in the course of conversion into the dental substance. The crowns and fangs of the lateral permanent incisors were almost completed. There was no trace of the matrix of the last true molar tooth in the lower jaw.

“The membranes of the brain were unusually injected, and there was much serum between the arachnoid and pia mater. An unusual quantity of serum had likewise been effused into the cavities of the thorax, pericardium and abdomen.

“The principal and lethal morbid changes were found in the chest: the right lung adhered by nearly the whole of its superficies to the surrounding parietes. Its substance was disorganized throughout by numerous tubercles, some of which had begun to soften in the centre. The left lung had been the seat of more recent and active inflammation; its cellular tissue was gorged with bloody serum, and its lower part hepatized. A small cyst, with firm parietes and clear fluid contents, adhered to its surface. The heart had an oval patch, two-thirds of an inch broad, of opaque lymph upon its surface, as in a former Orang: a cyst like that on the left lung adhered to its surface. The mucous membrane of the trachea and bronchi was of a rose-tint, and the tubes loaded with frothy opaque mucus.

“The right lobe of the liver was enlarged and congested; there was a slight adhesion of the epiploon to the spleen, which organ presented a slight anomaly sometimes observed in Man, viz. a small separate supplemental spleen, about half an inch in diameter, attached to the epiploon, just below the spleen proper. With the exception of a slight increase of vascularity at one or two parts, the whole alimentary tract was in a sound state.

“The laryngeal sacs were expanded as far as the clavicles and shoulder-joint, but did not extend below the clavicles.

"The ovaria were of a narrow elongated form, with a slightly tuberculated surface. I obtained ova from several of the graafian vesicles, and one of these contained two ova: they closely resemble those of the human subject, have a thick transparent vitelline tunic, containing the minutely granular contents and germinal vesicle: diameter  $\frac{1}{200}$ th of an inch."

Prof. Owen exhibited one of these ova, and concluded by observations on the brain of the Orang-utan. Its weight was 11 oz. 2 drs. 12 grs. avoird., including the injected *pia mater*.

"Descriptions of four new species of *Ortyx*," by Mr. Gould.

*ORTYX LEUCOPHRYS.* *Ort. facie et strigâ latâ superoculari fulvescenti-albis; nuchâ laterumque colli plumis splendide castaneis albo utrinque fimbriatis; illis dorsi superioris castaneis, plumbeo marginatis; pectore cinereo, strigâ rubide castaneâ per plumas singulas excurrente, primariis saturatè ferrugineis.*

Face and a broad stripe over the eye buffy white; ear-coverts and crown of the head brown; feathers of the sides and back of the neck rich chestnut, margined on each side with white; feathers of the upper part of the back rich chestnut, margined with slate-grey; breast grey, with a stripe of reddish chestnut in the centre of each feather; back dark greyish brown, very minutely freckled with black; wings brown, freckled with buff and black; primaries deep rust-red; tail dark brown, freckled with buff and black; irides clear brown; feet red; bill black.

Total length,  $13\frac{1}{2}$  inches; bill,  $\frac{5}{8}$ ; wing,  $7\frac{1}{2}$ ; tail, 6; tarsi,  $2\frac{3}{8}$ .

*Hab.* Coban, Central America.

In the collection of the Earl of Derby. Another specimen, in the museum of the Jardin des Plantes, is somewhat larger and brighter in colour than the one here described.

*ORTYX FASCIATUS*, Natt. MS. *O. cinereus, alis corporeque subtus, fulvo, nigrescenti-fusco, et albo fasciatis.*

Forehead reddish brown; crest deep brownish black, tipped with reddish brown; chin greyish white; ear-coverts brown; sides and back of the head light brown, minutely freckled with darker brown and white; all the upper surface greyish brown, minutely freckled with darker brown and white, the coverts and scapularies passing into black towards the extremity of each feather, and crossed at the tip with a narrow band of buff; tail similarly marked, but browner than the upper surface and crossed by numerous freckled irregular double bars of dark brown and greyish white; primaries brown, with lighter edges; all the under surface brownish black, each feather crossed at the tip with a broad band of pure white, which, becoming gradually wider on the centre of the abdomen, leaves that part white; on the breast the white marks are very faint, and the feathers are tinged with rufous; thighs buff; under tail-coverts light buff, with two blackish brown spots down the centre of each feather; bill black; feet flesh-colour.

Total length,  $8\frac{1}{2}$  inches; bill,  $\frac{5}{8}$ ; wing,  $4\frac{1}{4}$ ; tail, 3; tarsi,  $1\frac{1}{4}$ .

*Hab.* California.

In the collections of the Royal Museum at Brussels and of His Highness the Prince Massena, to whose kindness I am indebted for the loan of the specimen here described.

For this species, perhaps the most interesting of its family, I cannot do better than retain the specific appellation proposed for it in a letter lately received from him by my late much-valued and lamented friend Mr. John Natterer of Vienna, whose talents as a naturalist are too well known to require any eulogy from me.

*ORTYX LEUCOTIS.* *O. facie, cristâ, et plumis auricularibus albis, fusco leviter tinctis, guld saturatè castaneâ, colli utroque latere strigâ splendidè castaneâ nigro punctatâ, ornato; corpore subtùs castaneo, albo distinctè guttato, præsertim apud pectus atque latera.*

*Adult Male.*—Face, crest and ear-coverts white, slightly tinged with buff; throat dark chestnut; stripe from over the eye down each side of the neck chestnut, speckled with black; stripe down the back of the neck buff, speckled with black; sides and back of the neck spotted black and white; all the upper surface, wings and tail greyish brown, very minutely freckled with dark brown and greyish white; centre of the back blotched with black; inner webs of the scapularies and secondaries dark brown, margined internally with buff, forming a line in the direction of the body when the wing is closed; all the under surface chestnut, distinctly spotted with white, the spots separated by black; under tail-coverts buff, with a black mark down the centre of each; middle of the abdomen reddish chestnut; bill black; feet flesh-colour.

*Young Male.*—Crest and ear-coverts brown, head and throat striated with rufous and black; spots on the back stronger than in the adult; the colouring of the under surface similar, but much less rich, and the centre of the abdomen deep buff.

*Female.*—Crest and ear-coverts brown; sides of the head and the under surface pale buff, spotted and blotched with brown and black; centre of the abdomen wholly buff; all the upper surface pale brown, crossed by numerous narrow freckled bars of white; tail crossed by six or eight similar bars.

Total length,  $8\frac{1}{4}$  inches; bill,  $\frac{5}{16}$ ; wing,  $4\frac{1}{4}$ ; tail,  $2\frac{1}{2}$ ; tarsi,  $1\frac{1}{4}$ .

*Hab.* Santa Fé de Bogota.

*ORTYX (ODONTOPHORUS) STROPHIUM.* *O. vertice et plumis auricularibus nigrescenti-fuscus; facie sordidè albâ nigro punctatâ; mento albo, guld saturatè nigrâ, lunulâ albâ, ornatâ.*

Crown of the head and ear-coverts blackish brown; sides of the face dull white, speckled with black; chin white; throat deep black, crossed by a broad crescent-shaped mark of pure white; all the upper surface dark brown, freckled and marked with sandy buff; each of the scapularies with a large patch of black near the tip of the inner web, and a stripe of buff down the centre; all wing-coverts with a spot of buff at the tip; primaries and spurious wing dark brown; breast and under surface rich reddish chestnut, with a large spot of white in the centre of each feather; vent and under tail-coverts deep brown tinged with buff; bill black; feet blackish brown.

Total length, 9 inches; bill, 1; wing,  $5\frac{1}{2}$ ; tail, 2; tarsi, 2.

*Hab.* The southern countries of Mexico.

This is a most robust species, and distinguished from its congeners by its larger bill, shorter tail, and large and powerful tarsi.

“Descriptions of new species of *Delphinula*, a genus of pectinibranchiate Mollusks, collected for the most part by H. Cuming, Esq. in the Philippine Islands,” by Mr. Lovell Reeve.

1. DELPHINULA SCALARIOIDES. *Delph. testâ globulosâ, albâ; anfractibus rotundis, varicosis, varicibus elevatis, solidis, annuliformibus; interstitiis transversè striatis, striis elevatis; intus margaritaced.*

Conch. Icon. *Delphinula*, pl. 3. fig. 11, *a* and *b*.

*Hab.* Island of Mindanao, Philippines (under stones at low water), Cuming.

The whorls of this species, which is not punctured like the *Delphinula Peronii*, are encircled with solid rings about seven to the whorl, after the manner of a *Scalaria*; the shell might indeed be mistaken for one, were it not for its solidity and pearly interior.

2. DELPHINULA VARICOSA. *Delph. testâ angulato-globosâ, albâ, foraminibus sparsim puncturatâ; anfractibus supernè angulatis, fortiter varicosis, varicibus multicarinatis et elevato-striatis; intus margaritaced.*

Conch. Icon. *Delphinula*, pl. 3. fig. 12, *a* and *b*.

*Hab.* Island of Corregidor, Philippines (found in sandy mud); Cuming.

This species differs from the *Delphinula Peronii* in having the spire more prominent, and varices entirely across the whorls; they are also more strongly and closely set; the shell is moreover much more sparingly punctured.

3. DELPHINULA DEPRESSA. *Delph. testâ plano-rotundatâ; spirâ valdè depressâ, foraminibus puncturatâ; albâ; anfractibus supernè angulatis, fortiter varicosis, varicibus ad angulum acuminato-elevatis; intus margaritaced.*

Conch. Icon. *Delphinula*, pl. 3. fig. 14, *a* and *b*.

*Hab.* Island of Camiguing, Philippines (under stones at low water); Cuming.

No one can fail to recognize this species, by its depressed spire and by the pointed elevation of the varices on the angle of the whorls.

4. DELPHINULA DISCOIDEA. *Delph. testâ discoïdèd; spirâ plano-depressâ, liris longitudinalibus et transversis, interstitiis subtiliter striatis, eximè clathratâ; peripheriâ carinis duabus clathratis prominentibus ornatâ.*

Conch. Icon. *Delphinula*, pl. 4. fig. 15, *a* and *b*.

*Hab.* Cagayan, island of Mindanao, Philippines (found in coarse sand at the depth of ten fathoms); Cuming.

The latticed sculpture of this shell very much resembles the character of a figure in plate 31 of the ‘Magasin de Zoologie’ for 1834, under the appellation of *Delphinula adamantina*, Duclos. It differs,

however, essentially from that species in form, and I regret to say the *D. adamantina*, according to the figure alluded to, is quite unknown to me, though elaborately described by Deshayes in the ninth volume of his edition of Lamarck's 'Animaux sans vertèbres.'

5. DELPHINULA EVOLUTA. *Delph. testâ spiraliter discoideâ, partim evolutâ; anfractibus subquadratis, marginibus corrugato-crenatis.*

Conch. Icon. *Delphinula*, pl. 4. fig. 16, *a* and *b*.

*Hab.* Island of Corregidor, Bay of Manila (found in coarse sand at the depth of seven fathoms); Cuming.

The loose manner in which this shell is rolled, giving it the appearance of a miniature hunter's-horn, is not a casual deformity. Several specimens were collected by Mr. Cuming at the above-mentioned island.

6. DELPHINULA MURICATA. *Delph. testâ turbinatâ, pallidè aurantio-fulvâ, maculis coccineis vividè aspersâ; anfractibus carinis tribus prominentibus muricato-squamulosis cinctâ, supra et infra subtiliter corrugato-striatis; suturis peculiariter profundis.*

Conch. Icon. *Delphinula*, pl. 4. fig. 18, *a*, *b* and *c*.

*Hab.* East Indies; Humphreys MSS.

This is by no means a newly-discovered species, the specimens here figured having been found in the old collection of the late Mr. George Humphreys, with the name and locality above used attached to them in his hand-writing.

7. DELPHINULA CLATHRATA. *Delph. testâ subdiscoideâ, anfractibus rotundatis, carinulis transversis et longitudinalibus æquidistantibus regulariter clathratis; labro incrassato, marginato; umbilico per-amplio.*

Conch. Icon. *Delphinula*, pl. 5. fig. 21, *a* and *b*.

*Hab.* Island of Corregidor, Bay of Manila (found in coarse sand at the depth of seven fathoms); Cuming.

A small species, with a regular latticed surface.

8. DELPHINULA COBIJENSIS. *Delph. testâ turbinatâ, minutâ; anfractibus convexis, carinulis transversis et longitudinalibus, æquidistantibus regulariter clathratis; umbilico mediocri; labro simpliciter.*

Conch. Icon. *Delphinula*, pl. 5. fig. 22, *a* and *b*.

*Hab.* Port of Cobija, Peru (found under stones in rocky places at low water); Cuming.

The sculpture of this shell, familiarly known to Mr. Cuming as his "little Cobija species," is exactly similar to that of the *D. clathrata*; it is however much less discoid in form, the whorls are not so round, the umbilicus is smaller, and the lip is not marginated.

9. DELPHINULA SYDEREA. *Delph. testâ turbinatâ, spirâ plano-concavâ, apice interdum rosaceo, anfractibus angulato-convexis, tuberculis muricatis, in seriebus duabus aut pluribus radiatim stellatis; labro incrassato, marginato.*

Conch. Icon. *Delphinula*, pl. 5. fig. 23, *a* and *b*.

*Hab.* Island of Camiguing, Philippines (found under stones at low water); Cuming.

The leading feature of this species, and which is especially prominent in young specimens, is its peculiar star-like display of tubercles; the concave flatness of the spire is also remarkable.

10. DELPHINULA CIDARIS. *Delph. testâ subgloboso-turbinatâ, solidâ; anfractibus transversim et longitudinaliter tuberculato-costatis, costis longitudinalibus majoribus, prominentioribus; anfractuum parte inferiori foraminosâ.*

Conch. Icon. *Delphinula*, pl. 5. fig. 27.

*Hab.* Calapan, island of Mindoro, Philippines (found in coarse sand at the depth of ten fathoms). This is the roundest and most solid species of the genus.

#### LINNEAN SOCIETY.

January 16, 1844.—E. Forster, Esq., V.P., in the Chair.

Read an extract from a letter addressed by John Ashton Bostock, Esq., Assistant Surgeon in H.M. 3rd Buffs, to his father John Bostock, Esq., M.D., F.L.S.

The letter is dated Agra, Oct. 21st, 1843, and describes the occurrences of a journey from Allahabad. The extract is as follows: "Between Cawnpore and this place I witnessed one of the extraordinary phænomena peculiar to tropical climates, viz. a flight of locusts. The direction of the flight was nearly due east, and the rate four miles per hour; and you will form some idea of the immense host, when I tell you, that travelling at the same rate and in the opposite direction, I was between two and three hours in passing through them. During the whole time, the horizon, as far as the eye could reach, was darkened, and every nearer object was obscured. On looking directly upwards the appearance was that of a very heavy snow-storm, and the ground, which was covered by them, resembled the fields strewed by the dried leaves of the autumn. Several of them flew into my Palken. They were  $2\frac{1}{2}$  inches long, of a pink colour, marked with dark brown. The poor natives were shouting and endeavouring to prevent their devouring the crops, to which they prove most destructive."

Read also a continuation of the series of memoirs on the *Radiata* of the Eastern Mediterranean. By E. Forbes, Esq., F.L.S., Professor of Botany in King's College, London.

The memoir now read relates to the order *Echinidæ*, the Mediterranean species of which Professor Forbes states to amount in number to between twelve and fifteen. Of these nine occur in the seas of the Egean Archipelago, at various depths, some being found as low as a hundred fathoms. They are enumerated as follows:—

Fam. SPATANGACEÆ.

Gen. SPATANGUS, L.

*Spatangus purpureus* is rare to the east of the Morea, but more

abundant and attaining a larger size on the coasts of Sicily and Malta. The Mediterranean specimens are in every respect identical with the British, and *Spat. meridionalis* of Risso is the same species.

Gen. BRISSUS, Klein.

Fragments of Sea-urchins belonging to this genus were repeatedly found in very deep water on several parts of the Archipelago and on the coast of Asia Minor, but too imperfect to admit of determination. One of these, probably belonging to a new form, was taken in mud at the depth of from 100 to 140 fathoms.

Gen. AMPHIDETUS, Agassiz.

Of this genus Prof. Forbes describes a new species nearly related to *Spat. cordatus* of Pennant, which he characterizes as follows:—

*A. Mediterraneus*, dorso convexiusculo; depressione subplano; impressione scutiformi, extremitate anali truncatâ impressâ caudâ prominenti acuminatâ, ventre plano; areâ post-orali lanceolatâ.—Long.  $1\frac{1}{2}$  unc.; lat.  $1\frac{1}{4}$ ; alt.  $1\frac{1}{4}$ .

Of this species, which was taken in a few feet water in the Island of Paros by Capt. Graves, but which Prof. Forbes has dredged as deep as twenty fathoms, the author gives a detailed description; and particularly notices the occurrence on each side of the madreporiform plate, obliquely behind the posterior ovarian foramina, of a minute perforation, surrounded by a circle of minute spiniferous tubercles. Similar perforations similarly encircled are seen between each of the ovarian foramina laterally and anteriorly, so that their total number is five. These, the author states, are the eye-sockets with their protecting spines or eye-lids. Their presence, he adds, is unnoticed in any description of the species of *Spatangaceæ*, though they are doubtless to be found in all.

Fam. CLYPEASTERIÆ.

Gen. ECHINOCYAMUS, Leske. Fibularia, Lam.

*Echinocyamus pusillus* is abundant throughout the Egean Sea, being thrown up in shell-sand and equally plentiful at all depths between one and a hundred and ten fathoms. Dead specimens were even dredged at a depth of two hundred. Specimens taken alive in the European seas are undistinguishable from those found in the ancient tertiaries of the Paris basin, in the miocene strata of Touraine and the Crag, and in the pliocene beds of the Mediterranean. Prof. Forbes regards *Fibularia Tarentina*, Lam., *Fib. Ovulum* and probably *Fib. angulosa* as synonyms of this species.

Fam. CIDARIDÆ.

Gen. ECHINUS, L.

*Echinus esculentus*, L., was very rarely met with in the Egean Sea; while, on the other hand, *Ech. lividus*, Lam., was most abundant, being always littoral and covering the rocks within a fathom of depth, but never, so far as Prof. Forbes has observed, boring into them.



A living species which the author is unable to distinguish from the fossil *Echinus monilis*, DeFr., was found very abundantly at the depth of between twenty and a hundred fathoms. It would appear to be the same with *Ech. pulchellus*, Risso, and a variety *Ech. decoratus*, Agass. It is also *Ech. miliaris* of Grube, but very distinct from the true *Ech. miliaris*.

Gen. CIDARIS, Lam.

Species of *Cidaris Hystrix*, Lam., were frequently met with, but perfect specimens are not so common. They are occasionally, however, found in considerable numbers and appeared to be gregarious, between thirty and forty living examples having been taken in a single dredge in seventy fathoms water off Cape Krio in Asia Minor, the site of the ancient city of Cnidos. The author gives a particular account of the differences between this species and *Cid. papillaris* of the British and Norwegian seas, and observes that it possesses the power of climbing up branching bodies by means of its spines alone. He thinks it possible that the perforated tubercles of this genus may have reference to this habit, the additional ligament giving additional firmness to the long spine.

February 6.—R. Brown, Esq., V.P., in the Chair.

Read “Descriptions of the Nests of two Hymenopterous Insects inhabiting Brazil, and of the species by which they were constructed.” By John Curtis, Esq., F.L.S.

The materials for this paper were obtained by Mr. Curtis from a collection in the possession of Lord Goderich, to whom it was presented by the Right Hon. Henry Ellis, on his return from his late special mission to Brazil.

The first insect described belongs to the family of *Tenthredinidæ* and to the genus *Hylotoma* of Klug. But this extensive group, as Mr. Curtis has already remarked, affording sufficient grounds for further generic subdivision, he has distinguished the present species by the following name and characters:—

DIELOCERUS, Curt.

*Antennæ* articulo 3<sup>to</sup> in mare furcato, piloso; in fœminâ simplici. *Tibiæ* ante apicem espinosæ. *Clypeus* profundè emarginatus. *Labrum* orbiculare: *mandibulæ* graciles, acutæ, altera denticulo interno minuto: *maxillæ* subæqualiter bilobæ; *palpi* mediocres, 6-articulati, articulis tribus basalibus æqualibus, secundo tertioque crassis, quarto paulò minore, quinto omnium minimo quadrato, sexto gracili, haud reliquis longiore: *mentum* sub-semiovatum; *palpi* tuberculis prominentibus affixi, breves, crassi, 4-articulati, articulo secundo latiore, tertio omnium gracillimo longitudine primi: *labium* latum, trilobum.

This genus is most nearly related to *Schizocerus*, Latr. The species on which it is founded is named by Mr. Curtis *Dielocerus Ellisii*, and is described at length, and the distinctions pointed out between it and *Hylotoma formosa*, Klug, to which Mr. Curtis was at first inclined to refer it. Its economy is totally different from

that of any other known species of *Tenthredinidæ*; the caterpillars of the solitary saw-flies, especially the larger species, forming single oval cocoons of a very tough and leathery material attached to twigs; and those even of the gregarious species placing their cocoons (which are oval cases of silk and gum) in an irregular manner with no unity of design. The caterpillars of *Dielocerus Ellisii*, on the contrary, which are evidently gregarious, unite to form on the branch of a tree, an oval or elliptical case, four or five inches long, narrowed superiorly, very uneven on its surface, and of a dirty whitish ochre in colour. The cells, thirty-eight in number in the nest examined, are placed at right angles to the branch, piled horizontally one above the other, unequal in size and irregular in form, those next the tree being pentagonal, the central ones hexagonal, and some of the outer ones nearly round or oval. In one of these cells Mr. Curtis found a dead female, and most of them had the exuviae of the caterpillars remaining, but no shroud of the pupæ; he thinks the smaller cells may have been occupied by the males. At the end of each cell is a circular lid, formed of the same leathery material as the rest of the comb, which being cut round by means of the sharp mandibles, leaves an opening through which the saw-flies make their way. In two of the cells were found the dead caterpillars, which closely resemble those of the genus *Hylotoma*.

The author observes upon the dissimilarity of the mode of formation of this nest to that of any previously observed, the compound nidus (as far as hitherto known) being always the work of the parent insects for the protection of their young through the first three stages of their existence. In this case, however, it is formed by the larvæ themselves for the purpose of their own metamorphosis. The nearest approach to this economy seems to be the nidus formed by the maggots of some of the *Ichneumones adsciti*, whose silken cells are placed regularly in rows.

Mr. Curtis then proceeds to describe two species of *Schizocerus* from his own cabinet with the following characters:

*S. nasicornis*, ♂ niger, abdomine pallidè ochraceo apice nigro, alis nebulosis, pedibus fuscis; femoribus 4 posterioribus ochraceis, capite anticè 1-dentato.

*S. ochrostigma*, ♂ fusco-niger, alis obscurè hyalinis: costâ stigmatè flavis, pedibus ochraceis; tibiis tarsisque posticis fuscis.

The other nest brought home by Mr. Ellis is that of a wasp of the Fabrician genus *Polistes*, but differing apparently from any of the species hitherto recorded as forming similar habitations. The insect by which it is constructed is thus characterized:

*Myraptera brunnea*, sericeo-fusca, pedibus ochraceis, femoribus genubus tibiisque 4 posterioribus (nisi basi) fuscis, maculis duabus in genis flavis.

The nest is attached to a twig not much more than an eighth of an inch in diameter. It is eight inches long and fifteen in circumference, pear-shaped, and having on its outer margin a hemispherical tubercle pierced with a circular hole a little more than half an inch

in diameter. The materials of which the nest is composed are very substantial; and the external undulations allow of the tracing of four layers of comb. Many of the neuters fell out on shaking, but neither males nor females were detected. The specimen being unique, Mr. Curtis has not cut it open, but he entertains no doubt that its structure is very similar to that of the nest of *Polistes nidulans*, figured by Reaumur. The following characters are those of a nearly allied species; of which numerous neuters were contained in the same collection :

*Myraptera elegans*, sericeo-nigra, capite thorace abdomineque lineis cingulisque fulvis, tibiis tarsisque ochraceis.

Mr. Curtis adds a list of the nine species referred to the genus *Polistes*, and which should be distributed into four genera, distinguished by the structure of the trophi; no assistance being derivable from the form of the antennæ or the neuration of the wings. They are as follows :

I. Abdominis petiolo brevi sensim incrassato.

1. *Polistes Gallica*, L.
2. ——— *Actæon*, Hal. The nest resembles the foregoing.
3. ——— *Africana*, Pal. de Beauv.

II. Abdominis petiolo brevissimo, abruptè incrassato; thorace posticè truncato.

4. *Epipone nidulans*, Fabr.
5. ——— *Lecheguana*, Latr.

III. Abdominis petiolo elongato, clavato; thorace abruptè truncato.

6. *Chartergus Morio*, St. Farg.

IV. Abdominis petiolo elongato, clavato; thorace posticè declivi.

7. *Myraptera scutellaris*, White.
8. ——— *elegans*, Curt.
9. ——— *brunnea*, Curt.

The paper was accompanied by a series of drawings illustrative of the insects and their nests.

Feb. 20.—The Lord Bishop of Norwich, President, in the Chair.

Read a further portion of Mr. Griffith's memoir on Root-Parasites and their allies, comprehending a description of *Asiphonia*, a new genus of *Asarinæ*, and an account of *Hydnora*, Thb.

## MISCELLANEOUS.

### METHOD OF PRESERVING ANIMAL SUBSTANCES. BY M. GANNAL.

FROM the observations made by M. Gannal, and reported to the Académie des Sciences at a recent sitting, it appears that arsenic does not permanently preserve animal substances, although it prevents, for the moment, a putrid fermentation.

He alludes to his former communication, explaining how the salts of ~~them~~ act on the gelatine and preserve the animal matter from putrid fermentation by the combination of the two substances. The

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gelatine is thus rendered incapable of putrefaction ; but the other evil, viz. the destruction by insects, is not avoided. For the latter object he proposes the following preparation :—

1 kilogramme of sulphate of alum—1 kilog. =  $2\frac{1}{4}$  lbs. avoird. ;

100 grammes of nux vomica in powder—100 grammes =  $3\frac{1}{2}$  oz. av. ;

And 3 litres of water—3 litres =  $5\frac{1}{4}$  imperial pints.

The above to be boiled down to  $2\frac{1}{2}$  litres, and then allowed to cool : the clear liquid is to be drawn off and serves for injection. The residue is employed in the following manner. With four table-spoonsful of this residue mix the yolk of one egg ; let this paste be prepared as wanted. It is to be used for covering the interior of the skin, and particularly the fleshy parts which may have been left in skinning the animal. The yolk of egg serves to preserve the suppleness of the skin, tanned by the salts of alum.

In order to preserve the feathers of birds he proposes three modes :—

1. The employment of nux vomica in powder.

2. An alcoholic tincture of 100 grammes of nux vomica, macerated in 1 litre of alcohol.

3. An alcoholic solution of 2 grammes of strychnine in 1 litre of alcohol.

Whatever mode may have been used for preserving the animal, the ravages of insects may be instantly arrested by covering with a soft brush the whole of the skin, either with the tincture or solution above described, as may be found best adapted.

If the feathers of birds are of delicate colour, the solution of strychnine should be employed ; and for those very delicate birds, where soaking in either of the preparations is not possible, the nux vomica must be used in powder, taking care to insert it well in the napes of feathers. In all cases the inside of the skin may be rubbed with the paste.

In conclusion he states that from his experience he feels assured—

That no arsenical preparation can ensure the preservation of animal substances ;

That they are destroyed by exposure to the air for a period exceeding three years ;

That those substances enclosed in hermetically sealed cases are destroyed even in one year ;

That the soluble salts of alum are quite effective in arresting putrid fermentation ; and

That the employment of the preparation of nux vomica, as described, perfectly preserves animal substances from the attacks of insects.

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